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ABSTRACT

Between 1980 and 1982, the International Association for the Evaluation of Educational Achievement (IEA) Second International Mathematics Study (SIMS) collected data on mathematics curricula, teaching practices, and achievement from samples of students, teachers, and schools in 18 countries. This material is a technical supplement describing the curriculum and organization of mathematics in each participating system in a way that permits interpretation of the "outcomes profile" of each system. Chapters included are: (1) "System Profiles" (describing school systems, teacher qualifications, mathematical content/materials, and examinations and control in each of 18 countries); (2) "Cognitive Item Tables"; (3) "Definitions of International Subtests"; (4) "Appropriateness Ratings Tables"; (5) "Indices of Intended Coverage"; (6) "Teacher Opportunity-To-Learn Ratings Tables"; and (7) "Indices of Implemented Coverage." (YP)

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Supplement

Ian Mestbury

to

The IEA Study of Mathematics I:

Analysis of Mathematics Curricula

Kenneth J. Travers

and

Ian Westbury

University of Illinois at Urbana-Champaign

College of Education

University of Illinois at Urbana-Champaign

1989

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PREFACE

Between 1980 and 1982, the International Association for the Evaluation of Educational Achievement (IEA) <u>Second International Mathematics Study</u> (SIMS) collected data on mathematics curricula, teaching practices, and achievement from samples of students, teachers, and schools in 20 countries or school systems. SIMS was conducted at two grade levels, Population A in which students were (typically) in the national grade in which the modal age was 13, and Population B where students were taking a most advanced, pre-university course(s) in school mathematics their systems offered.

The following school systems participated in one or another of the SIMS studies (the population levels sampled are in parentheses):

Belgium (Flemish) (A, B) Japan (A. B) Belgium (French) (A, B) Luxembourg (A) Canada (Britich Columbia) (A, B) Netherlands (A) Canada (Ontario) (A, B) New Zealand (A, B) England & Wales (A, B) Nigeria (A) Scotland (A, B) Finland (A, B) Swaziland (A, B) France (Å) Hong Kong (A, B) Hungary (A, B) Sweden (A, B) Thailand (A, B) Israel (A. B) United States (A. B)

The international reports of SIMS are being published in three volumes as follows:

Kenneth J. Travers and Ian Westhury, <u>The IEA Study of Mathematics I:</u> <u>Analysis of Mathematics Curricula</u> (Oxford: Pergamon Press, 1989).

D. F. Robitaille and Robert A. Garden (Eds.) <u>The IEA Study of</u> <u>Mathematics II: Contexts and Outcomes of School Mathematics</u> (Oxford: Pergamon Press, 1988).

Leigh Burstein (Ed.) <u>The IEA Study of Mathematics III: Student Growth</u> <u>and Classroom Processes in Lower Secondary Schools</u> (Oxford: Pergamon Press, in preparation).

This volume is a technical supplement to the first volume in this series but, at the same time, it can be seen as a supplement to all the volumes in the series of SIMS reports. Volume I seeks to describe the curriculum and organization of mathematics in each participating system in a way that permits interpretation of the 'outcomes profile' of each system. This supplement contains a set of detailed 'country profiles' describing the contexts of the populations studied (and sampled) in each system, a comprehensive description of the pool of items used to create the cognitive tests used as the principal test of outcomes for the study, and a set of tables describing the emphases found in the curriculum of each SIMS system.

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System Profiles: Elizabeth Oldham, Peter M. Staples, James J. Hirstein, Gullayah Dhompongsa, Nongnuch Wattanawaha, Chantenee Indrasuta, Ian D. Livingstone.

Figures and Tables: Richard G. Wolfe, Gullayah Dhompongsa, Nongnuch Wattanawaha, Chantenee Indrasuta, Angela Chang, Judith Ruzicka.

Like all of the volumes in this series of reports, this supplement could not have been prepared without the unstinting assistance of the SIMS National Research Coordinators and the International Coordinating Center in the New Zealand Department of Education directed by Roy W. Phillipps and Robert Garden. We must again acknowledge that assistance.

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Ian Westbury Kenneth J. Travers

Abbreviations for Educational Systems

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| Belgium (Flemish) | BFL |
|---------------------------|-----|
| Belgium (French) | BFR |
| Canada (British Columbia) | CBC |
| Canada (Ontario) | CON |
| England and Wales | ENW |
| Finland | FIN |
| France | FRA |
| Hong Kong | нко |
| Hungary | HUN |
| Ireland | IRE |
| Israel | ISR |
| Japan | JPN |
| Luxembourg | LUX |
| Netherlands | NTH |
| New Zealand | NZE |
| Nigeria | NGE |
| Scotland | SC0 |
| Swaziland | SWA |
| Sweden | SWE |
| Thailand | THA |
| United States | USA |

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1. System Profiles

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The system profiles offered here report the situation in each system at the time of testing within the Study, viz., 1980-82.

I. School System

Belgium has four linguistic areas: French, Dutch, German and bilingual French-Dutch. Education is based on a monolingual principle and there are three cultural communities: French, Flemish, and German.

Freedom of education is specified by the Belgian Constitution, with the result that schooling is organized by several different bodies: the State, Provinces, communes, and free institutions (chiefly Catholic). The schools have a common structure. Children aged 2½ to 6 may attend pre-schools, and most of them do so. Schooling is communisory from 6 years of age; there are primary schools for children aged 6 to 12, and secondary schools for those aged 12 to 18. The minimum leaving age is 14, but this is being raised to 18; currently most students stay in school well past the minimum age.

A fundamental reorganization of secondary education has been taking place since 1971. The traditional system with distinct General, Technical, Artistic and Vocational tracks has been gradually replaced by Reformed Secondary Education (RSE). Reformed Secondary Education, designed to bring about greater democratization of education and to simplify its administrative structure, was introduced by law in 1971 and by 1975 was established in all state schools. Both systems contained four programs or streams: General Secondary, Technical, Artistic and Vocational, but under RSE, the distinctions between general, technical and artistic education have been minimized.

II. Teacher Qualifications

Teacher education in Belgium is provided by special higher education institutions and by the universities. The universities offer four-year courses that train teachers for upper secondary schools. Other teachers-those for pre-school, primary, lower secondary, and technical education-are trained by means of short (chiefly two-year) courses at the higher education level; there are separate diplomas for each category of teacher.

For lower secondary school teachers, options for study are available in the fields of mother tongue, history, modern languages, mathematics, exact sciences and geography, physical education and biology, and art. For those who wish to teach at the upper secondary level, studies at university are required. Students take courses for a "license" in their specialist subjects, and for the last two years they take supplementary courses in teacher training. Teacher education is under review and some universities have already intensified their training.

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III. Mathematical Content/Materials

State curricula are generally drawn up by groups consisting of inspectors, teachers, and representatives of parents' associations. Other organizing bodies (Provinces, Communes and free institutions) can either adopt the State curriculum, or they can submit their own for the approval of the Minister for Education.

Following the pioneering work of Professor G. Papy and his center at the University of Brussels, a "modern" mathematics curriculum was officially introduced into the schools in 1968. All organizing bodies were involved the reform activity and much effort has gone into spreading the new curriculum through the secondary schools. This curriculum represents many changes in content and emphasis when compared with the previous courses. Conventional arithmetic has almost totally disappeared, its place being taken by the theory of numbers (natural, whole, rational, real, and Algebraic calculations are still taught, but they have been complex). reduced to an minimum; new emphasis has been given to such algebraic structures as groups, fields, vector spaces, and matrix calculations. Geometry, the topic of greatest reform, is approached analytically rather than descriptively. Analysis has been retained at the upper levels, although the sequencing of some topics has been changed, and new topics in integration have been introduced.

IV. Examinations and Control

State schools follow an official curriculum established by the Ministry of Education. Catholic schools have their own curriculum committees but, as they are subsidized by the state, they are required to follow a curriculum that corresponds with that approved by the Ministry of Education.

At the primary level, regional examinations may be organized by inspectors of schools in each canton. Students can obtain a "certificate of primary education" at the end of primary education, but this examination is

optional. In the Catholic schools, examinations in mother tongue and mathematics are required. The results of these examinations are mainly used for educational research purposes.

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At the secondary level, examinations are organized at the school level. As a guarantee for standards, there is a jury, a commission d'homologatica, which validates the examination and the quality of teaching. The jury checks that legal conditions have been fulfilled; it tries also to determine the level of teaching for a sample of classes or students by looking at studen' schedules, examination papers, and workbooks. The school certificate must be "homologated" if a student wishes to use it for applying to a university or for entry to public administration. The jury is independent and controls private schools as well as state schools. Two Examinations Commissions, one for general secondary education and one for art and technical education, also allow secondary students to obtain rtificates and diplomas for entrance to higher education. This route is chosen by students who have not proceeded through the usual path for secondary education (for example, through independent study).

Any secondary school graduate has the right to attend a university but some faculties, such as engineering, may require a further examination for admission. Entrance to a particular university may also be obtained by passing an examination offered by that university.

V. <u>Differences Between Belgium (Flemish) and Belgium (French) School</u> <u>Systems</u>

Most important features of school organization are common to both parts of Belgium. However, important differences do exist the respective importance of the organizing bodies (Catholic schools predominate in the Flemish part of Belgium; States, Provinces and Commune schools are more numerous in French Belgium).

Slight differences may exist in the number of periods devoted to school subjects, the curriculum, in-service training opportunities, and evaluation procedures.

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I. School System

All provincial (state) schools are comprehensive, offering courses for all levels of ability and various programs are available for different student interests. Elementary (primary and intermediate) schools, covering seven grades, are attended from age 6 through age 12. Secondary education is provided for five years by three types of school: junior secondaries (providing the first three years of secondary school), senior secondaries (providing the last two years of secondary school), and secondaries (combined schools providing all five years). Attendance is compulsory until age 16 (i.e., through the first three years of secondary education). About 85 percent of the student population remains in school beyond age 16 to complete the final two years of secondary school.

II. Teacher Qualifications

Over 99 percent of teachers have professional teacher training and about 95 percent of those with professional training also have a university degree. These are typically bachelors degrees, involving the equivalent of four years of undergraduate work in a subject matter major and one year of teacher training. Until about ten years ago a Standard Teaching Certificate could be obtained after two to three years of professional teacher training without a university degree. Older teachers qualified in this way account for five percent of teachers with professional training.

III. Mathematical Content/Materials.

British Columbia has a provincial curriculum guide in mathematics. It was revised in 1976 and utilizes a number of strands combined in a spiral approach. Some local school districts also provide curriculum guides. All Population A students take essentially the same mathematics course, although local adjustment to meet a range of student abilities is possible since the curriculum guide provides for multiple textbooks.

Senior secondary (hence, Population B) students may choose from a wide variety of courses to meet graduation requirements. Mathematics at this level consists of a sequence of two elective courses (one per grade level).

Two courses, Probability and Statistics 12 and Geometry 12 have been available for several years as electives in the final year; lowever, they are offered in very few schools. (In 1981, for example, less than 5 percent of Population B students took either of these courses.) The most popular terminal mathematics course is Algebra 12 taken by about 40 percent of Population B students; this course exists in a basic format and an enriched format. The 1976 curriculum guide revision deleted a number of topics (matrices and determinants, introduction to calculus, etc.) to form the basic format. The enriched format includes some of those topics (but no calculus) as well as others (vectors and polar coordinates) and teaches the concepts from the basic format at a higher level of sophistication. Thus. mathematics offerings are typically uniform, with all differentiation provided primarily by the choices of programs, courses and formats at the senior secondary level, but within a comprehensive school system.

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While course content, objectives, and textbooks are determined by the curriculum guide, sequencing and emphasis can be modified somewhat by choices among the several textbooks available, and freedom is given to the teacher in choice of teacher methods, in testing, and in grading.

IV. Examinations and Control

In 1980-81 no province-wide examinations were used for certification or selection purposes but provincial assessments were conducted every 4 years in grades 4, 8 (Population A) and 12 (including Population B). The assessment results helped to identify strengths and weaknesses in the system and aimed to provide direction for curriculum committees and help teachers decide topic emphasis and priority. (As of the 1983-84 school year, province-wide examinations in 13 "academic" subjects have been mandated at the Grade 12 level. The examination counts for 50 percent of the student's final grade, with the school assigning the remaining 50 percent.)

The province's Ministry of Education both determines the curriculum and develops and administers the assessments. However, practicing teachers do the majority of the work of actual curriculum development. Thus, a fair amount of control is exerted through the provincial curriculum guide, although significant teacher influence is present because of the cooperate nature of curriculum development and the provision for variation through multiple approved textbooks.

The Ministry of Education also makes available to schools <u>Classroom</u> <u>Achievement Tests</u> in mathematics for use at their discretion. These tests are keyed to the curriculum, and norms are provided to facilitate interpretation of raw scores.

There are non-compulsory "scholarship" examinations for Population B students in all academic subjects in the curriculum. Students select four subjects and those who are successful are awarded monetary grants to meet the cost of further education. The content of these examinations exerts considerable influence on the implemented curriculum.

1.3 CANADA (ONTARIO)

I. <u>School System</u>

Government of Ontario-funded schools (Public [grades K-13] and Roman Catholic Separate [grades K-10]) account for more than 95 percent of the school population for ages 5-16. The Roman Catholic schools (Separate Boards) contain approximately 30 percent of the age 5-13 cohort, decreasing to 10 percent for ages 14-15. Private schools account for approximately two percent of the age 5-14 population, rising to 6 percent for the ages 16-17; part of this increase is due to enrollments in the Separate Board grades 11-13 which, not being government-funded, are considered private.

French-language elementary schools, operated, for the most part, by Separate School Boards, are attended by five percent of the age 5-13 population. Three percent of the age 14-17 population attend publicly supported French-language high schools.

The Ontario Ministry of Educatic. provides curriculum guidelines according to a divisional structure. Primary (junior kindergarten-grade 3), Junior (grades 4-6), Intermediate (grades 7-10) and Senior (grades 11-13). However, this structure is not reflected in the organization of individual schools (K-6, 7-10, 11-13, etc.) and in reality a variety of grade-level groupings exist. All schools in the province attempt to conform to ministry guidelines for their curriculum and all secondary schools wishing to offer a graduation diploma approved by the Ontario Ministry of Education must be inspected.

Virtually all Public, Separate and Private secondary schools are comprehensive, with most offering instruction at three levels beginning at grade 9: <u>Advanced</u>, <u>General</u> and <u>Basic</u>; a fourth level, <u>Modified</u>, was added in 1980. Though all schools offer Advanced and General level courses, the Basic and Modified levels may be more typically found in public secondary schools.

Students may leave school when they reach the age of 16, but 92 percent of 16-year-olds continue to attend. At the completion of grade 12, the <u>Ontario Secondary School Graduation Diploma</u> (OSSGD) is conferred. The <u>Ontario Secondary School Honours Diploma</u> (OSSHGD), requiring the completion of six honours courses in grade 13, is normally required for admission to

an Ontario university but not for universities in other provinces. Approximately 62 percent of the age cohort achieve the OSSGD and 24 percent the OSSHGD. Approximately 14 percent of the age cohort register in an Ontario university the year following their graduation.

II. Teacher Qualifications

Teacher-training in Ontario is the responsibility of faculties of education in provincial universities. Two types of program exist: <u>consecutive</u> training in which candidates attend a faculty of education for a one-year Bachelor of Education degree following receipt of a university bachelor's degree, and (less common) <u>concurrent</u> training in which a Bachelor of Education is earned as the main undergraduate degree. In either case, faculty programs must comply with Ministry regulations and standards in order to award the Ontario Teaching Certificate which is necessary for teaching in provincially-funded schools.

At the Senior and Intermediate levels prospective teachers must elect two areas of specialization. Selection of mathematics education as the main option at the Senior level usually requires the successful completion of <u>five</u> university-level mathematics courses and a Faculty of Education mathematics teacher program. Selection of mathematics education as the secondary option at the Senior level or as an Intermediate option requires <u>two</u> university-level mathematics courses and completion of a training program. Teaching at the Primary or Junior level requires a Bachelor of Education earned in either a consecutive or concurrent program.

In Ontario most grade 7 and 8 students are taught mathematics by trachers who are responsible for the entire curriculum.

III. Mathematical Content/Materials

The Ministry of Education issues official curriculum guidelines and lists of approved textbooks, films, tapes, kits and other materials. All Population A (grade 8) students follow the prescribed course which consists of core and optional topics. No formal tracking or streaming is provided for in grade 8 (in contrast to grades 9 and 10) though optional topics permit considerable variety from class to class. Mathematics is a required subject through grade 10.

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<u>Senior Guidelines</u>, first issued in 1972, cover grades 11-13. At grades 11 and 12, the mathematics courses offered are <u>Foundations of</u> <u>Mathematics (Advanced level)</u> and <u>Applications of Mathematics</u> (General level). Though not required to do so, virtually all students enrolled in grade 11 take either <u>Foundations</u> (47%) or <u>Applications</u> (48%) courses. Forty-one percent of grade 12 students enroll in the <u>Foundations</u> course and 35% in Applications.

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Four grade 13 mathematics courses are offered: <u>Relations and Functions</u> (taken by 65% of students), <u>Calculus</u> (55%), <u>Algebra</u> (28%), and <u>Mathema-tics of Investment</u> (8%), and students may include all four in the six credits required for Honours graduation. Fifty-five percent of the grade 13 population enroll in two or more grade 13 mathematics courses and approximately twenty percent take three.

Since the Ministry of Education approves all textbooks used in schools and regularly monitors implementation of the guidelines, it exerts considerable influence over course content throughout the Province.

IV. Examinations and Control

In 1968, a province-wide examination for the grade 13 diploma was replaced for university and college entrance purposes by the Ontario Tests for Admission to College and University. This program was discontinued in 1974, and since then no province-wide examination system has been in effect, though local school boards may administer standardized and locally prepared achievement and ability measures.

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I. School System

Most schools in England and Wales are 'maintained' by central and local government funds, although there is a small number of independent fee-paying schools.

The structure of the maintained system has altered considerably in the last 40 years. In the late 1940s, children entered <u>primary</u> school in the term in which they reached their fifth birthday, and stayed until the age of 11; they were then selected for one of three types of secondary school: <u>grammar</u> school (providing academic education), <u>secondary modern</u> school (providing less academic education, typically up to the school leaving age of 15), and <u>technical</u> school (geared to technical and craft studies; in practice not many such schools were available). By 1980 the tripartite system has been largely replaced by <u>comprehensive</u> schools, catering for all children from the age of 11 (typically to a maximum of 18) spanning several grades.

The first comprehensive schools tended to be large. In an effort to reduce their size, various local Education Authorities have altered the ages of transfer. For instance, in some areas there are <u>middle</u> schools, covering the grades for ages 8-12, 9-13 or 10-14; in others, the final two years of the 11-18 comprehensive school ("the sixth form") have been split off to create <u>sixth form colleges</u>.

Some 17 percent of the age cohort remains in secondary school until the age of 18. The school leaving age was raised to 16 in 1973.

II. Teacher Qualifications

Two structures for secondary teacher education--"concurrent" and "consecutive"--exist side in England and Wales. In the <u>concurrent</u> system, students enter education courses--leaving to a Bachelor of Education degree --as soon as they leave secondary school; they follow pedagogical and professional studies alongside other academic disciplines. Those receiving their teacher education <u>consecutively</u> take a first degree which does n⁻t include educational studies, and then complete a one-year post-graduate diploma in education. Post-graduate training has always been encouraged; but it was not a requirement until 1974 for teachers in secondary schools, and it has, at times since then, been waived for teachers of mathematics.

III. Mathematics Content/Materials

In theory, there is great curricular freedom in England and Wales, but in the actual situation this freedom is affected by the demands of the examination system. From the early 1960s, "modern" syllabuses were introduced in some schools, while others chose to retain the traditional work. Traditional, modern and "compromise" syllabuses still exist side by side, and are taught to the full ability range, at least at lower secondary level; formerly, many second-level students did not proceed beyond arithmetic.

Secondary textbooks are prepared commercially, and selected--typically --by the head of a school's mathematics department.

IV. Examinations and Control

In 1980-81 there were two examinations taken by pupils at the end of statutory schooling (that is, at 16). These were: the <u>General Certificate</u> of <u>Education Ordinary Level</u> ("G.C.E. O-level") and the <u>Certificate of</u> <u>Secondary Education</u> ("C.S.E."). O-level is taken by the top 25% of the ability range; C.S.E. was designed for the next 35%, although in practice the range is greater than this. There are several G.C.E. examining boards, generally associated with universities; similarly, there are several regional C.S.E. boards. Although each board typically offers more than one mathematics syllabus (spanning the "traditional/compromise modern" spectrum), there is a great similarity across boards between courses of the same "type."

In addition, there is a <u>General Certificate of Education Advanced</u> <u>Level</u> ("G.C.E. A-level") examination, taken by 18-years-olds. Typically, students take three subjects at this level. Those taking mathematics spend nearly one quarter of their time--or even, if they take mathematics as a "double subject," nearly half their time--on the subject.

I. School System

In Finland compulsory education continues to age 16. All children aged 7-15 years attend a general municipal comprehensive school containing 9 grades. The first six grades form the lower level where the curriculum is in principle the same for all students. At the upper level (grades 7, 8, and 9) students (in 1981-82) choose "sets" at different levels in foreign languages and mathematics (from the 1985-86 school year the sets were removed). Besides these sets, students can choose some elective subjects in grades 8 and 9. At present, students completing at least an intermediate course in the first foreign language and mathematics, and a longer course in the second foreign language, gain unlimited entitlement for further studies after comprehensive school. Otherwise they have only limited entitlement; for example, they are not eligible to enter senior secondary school.

After completing comprehensive school, students can continue their education in a senior secondary school (a 3-year academic upper secondary school), a vocational school (2- or 3-year), a commercial school or institute (3-year), or a technical school or institute (3- or 4-year). After upper secondary school, students can go to a university, to a commercial or technical institute, or possibly to some other specialized institute at the university level.

II. Teacher Qualifications

Mathematics teachers complete a 3-4 year Bachelor of Science degree or a 5-6 year master's degree at a university. The degree consists of three subjects, usually mathematics, physics and chemistry. A teacher who has a master's degree is required to have a major, called <u>laudatur</u>, in mathematics and a minor, called <u>cum laude approbatur</u>, in two other subjects. Subsequently, teacher candidates spend one year at a teaching training college to acquire formal teacher qualifications.

·III. Mathematical Content/Materials

Finland has a national syllabus in mathematics for both the comprehensive school and the secondary school. The comprehensive school syllabus was

prepared in 1970, and has been developed further in a draft syllabus covering the subject matter common to all students taking comprehensive school mathematics (the core curriculum of 1976). All students in Population A (comprehensive school 7th grade) study mathematics either in the <u>longer</u> or <u>shorter</u> course. Grade 8 or 9 students may take a <u>general</u>, <u>intermediate</u> or <u>advanced</u> course in mathematics, one of the three sets mentioned above.

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The upper secondary school syllabus for mathematics wis prepared in 1973 and published in 1974. Students may choose a <u>long</u> or <u>short</u> course. The <u>short</u> course requires 2½ periods a week for three years. The <u>long</u> course requires about 4 periods a week in each grade and is designed to prepare students for further training in mathematics, science and technology.

Teachers must use textbooks approved by the National Board of General Education and written on the basis of the national syllabus. For both the comprehensive school and upper secondary school there are many texts from which teachers can choose. The Matriculation Examination, at the end of upper secondary school, exerts a strong influence on the objectives and content of instruction at this level.

IV. Examinations and Control

The 3-year senior or upper secondary school culminates in the Matriculation Examination which consists of tests in four compulsory and two The tests are set by the National Matriculation optional subjects. Examination Board and are marked by teachers who return the papers to the Board for a second marking. Students who study the long course in mathematics are required to complete the mathematics test. Those who study the short course can choose between a mathematics test and a general paper graded either approbatur, lubenter (reaalikoe). Pass marks are approbatur, cum laude approbatur, magna cum laude approbatur, or. laudatur. At present, successful matriculants receive two certificates-the Matriculation Board Certificate and, from their own school, a Secondary School Leaving Certificate.

I. School System

Compulsory school attendance in France begins at age 6. Children attend a five-year elementary school from age 6 until age 10. At the end of elementary school, all students enter the first cycle of the high school (college). The four-year college is composed of two periods. At the end of the observation period (first two years) selection takes place; most students continue in the college while others, depending on age and ability, are guided to pursue an efficiency certificate in a Professional Education Lycée (LEP). At the end of the college, (ninth year), students move to the second cycle of high school (lycée) or to long-term professional training (in the LEP). The Lycée can be technical, classical (academic), or polyvalent (academic, but mainly economic and some technical).

In September 1981, the <u>lyce</u> underwent a reform. The first year (<u>class de seconde</u>) is the same for all students for the main subjects of mathematics, physical sciences and French. Several options are also available: for example, management, Latin, technology and art. This class is called <u>second de determination</u>. At the end of this first year, differentiation is made between students among several classes available. The structure of these classes is very similar to that of the science or mathematics. However, mathematics is studied in every class.

II. Teacher Qualifications

After attending the <u>lycée</u>, prospective teachers attend a university, then obtain a teaching certificate through national competitions, examinations or teacher training schools. The diploma received determines the teacher's position, salary, and the number of classes that must be taught. The <u>Teacher General Education Diploma</u> (PEGC) requires two years of general university study and one year in a teachers college (<u>Ecole</u> <u>Normale</u>). These teachers may teach several subjects and teach only in the <u>collèges</u>. The <u>certifie</u> (CAPES) requires three years of mathematics at the university followed by a competitive examination during a fourth year of pedagogical courses. Teachers holding a <u>certifie</u> teach mathematics courses in <u>collèges</u> or in <u>lycées</u>. The <u>agregé</u> requires four years of mathematics at the university followed by a fifth year that includes a national competitive examination. <u>Agregé</u> professors may teach mathematics in <u>collègrs</u>, in <u>lycées</u>, or in the first cycle of universities. This is a very prestigous qualification attained by only 15 percent of teachers but every <u>lycée</u> would contain some such teachers.

III. Mathematical Content/Materials

Mathematics curricula are nationally determined for the <u>collèges</u> and <u>lycées</u> and are followed by both public and private schools. The number of hours taught in each subject is decided by the Ministry and no principal may modify it.

In the <u>collèges</u>, computation and geometry are taught simultaneously. The new curriculum (1977) emphasizes intuitive knowledge and recommends avoiding an axiomatic presentation of geometry.

In the <u>lycees</u>, curricula differ according to the section (or orientation). Section C (mathematics and physics) is the most prestigious mathematics curriculum with students taking 9 hours of mathematics per week. Section D (mathematics and natural sciences) students take 6 hours of mathematics a week. <u>Lycee</u> students in other sections take at least three hours of mathematics per week. Teaching in the <u>lycees</u> is usually more abstract than in the <u>collèges</u>, but the use of teaching aids is considered important.

IV. Examination and Control

Textbooks have a considerable influence on the orientation and order of presentation of material, but the content of mathematics is prescribed by the Ministry. National examinations are used to insure that the national content is followed. The <u>Elementary Studies Certificate</u> (CEP) is an examination of declining importance, but it is still used by some employers. The <u>First Cycle Studies Certificate</u> (BEPC) is not required to enter a <u>lycée</u>, but can be an important. It can be taken in the school or externally, administered through one of the educational regions (<u>academies</u>). The <u>baccalaureate</u>, obtained at the end of the <u>lycée</u>, is the first university examination, and is under the control of committees of

examiners chaired by university professors. Students successful in the <u>baccalaureate</u> can be admitted to the university in whatever subject they choose, but in practice, the choice of section in the <u>lycee</u> determines the type of university study which can be pursued.

I. <u>School System</u>

Six grades of free and compulsory primary education are intended to begin at age six, though immigration enforces tolerance of late entry. For the majority, primary education is preceded by three years of fee-paying kindergarten education from 3 to 5 years.

At age 12+, on the basis of parental preference and academic ability, children are allocated to secondary schools. Most (89 percent in 1980) follow grammar school courses, some with a predominantly technical bias, while the remainder enter pre-vocational courses. Approximately 60 percent of those who complete form 3, the ninth and final year of free education, continue in subsidized or wholly Se-paying school places to take the Certificative of Education in form 5, two years later.

Grammar school courses may be offered in either Anglo-Chinese Schools (English language medium) or Chinese Middle Schools (Chinese language medium). Both Anglo-Chinese and Chinese Middle Schools offer post-Certificate of Education, pre-university courses, the former of one or two years, the latter of only one year's duration. These final, twelfth and thirteenth grades are known as form 6 and form 7 (or upper sixth).

II. Teacher Qualifications

Mathematics teachers in the lower grades of secondary schools (forms 1 to 3) tend not to ive special qualifications in mathematics but are usually professionally qualified and to some degree specialized in mathematics and science teaching. Those at the upper levels (forms 4 to 7) sually hold university degrees in mathematics; an increasing number of teachers receive teacher training by way of une year's full-time, or two years of equivalent part-time, study.

III. Mathematics Content/Materials

Prior to the reform movement of the 1960s, mathematics syllabuses in grammar schools were based upon pre-war models. Great emphasis was laid on skill in computation and in recognizing "typical" problems in examinations, an emphasis which often led to rote learning and excessive drill.

In the summer of 1962 a seminar was organized during which new ideas and developments in mathematics education in the Western countries were first introduced to Hong Kong teachers. This work resulted in production of a course leading to a Hong Kong <u>School Certificate</u> (Grade 13) examination in mathematics. More recently, a provisional syllabus has been produced which seeks to bring together the most vital elements and insights from both the traditional and the modern approaches.

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In the year of testing for SIMS, there were three mathematics syllabuses available in the Hong Kong <u>School Certificate Examination</u>: traditional, modern and provisional. The schools were free to follow whichever syllabus they choose.

Both examinations are administered by the Hong Kong Examinations. Authority, an autonomous public body. Many students also if the G.C.E. "A"-level examinations of the University of London, England. Since success in these examinations has very significant social and economic implications for the candidates, the curriculum and the teaching in the schools are dominated by them. Any curriculum revision incorporated into the examination syllabuses has a pronounced impact on the school curriculum.

IV. Examinations and Control

At the Population A level there are no national examinations. Teachers are free to determine their own teaching curricula, though there are published curricula recommended by the Government's Curriculum Development Committee. At the Population B level, the majority of students follow either a one-year course leading to the <u>Higher Level Examination</u> and entry to the Chinese University of Hong Kong, or a two-year course leading to the <u>Advanced Level Examination</u> and entry to the University of Hong Kong or to the Ho.g Kong Polytechnic.

I. School System

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Compulsory education in Hungary begins at age 6 and ends at age 16. Kindergartens are available for children aged from 3 to 6 ycars, and more than 80 percent attend. For those who do not, a one year preparatory program for five year-olds is available.

At age six, after being tested for school readiness, children begin compulsory elementary school. Those not ready for school take a one year postponement, returning to kindergarten or taking school preparatory courses. About 90 percent of seven year-olds are in school. Over 90 percent of those starting elementary school complete the eight grades. During the last four years of elementary school (grades 5 through 8) subjects are taught by specialist teachers.

Since schooling must continue until age 16, those who complete elementary school before that age and who do not go on to secondary school, must take part in "extension training" until age 16. But most (about 80 percent) of those in the age group who finish elementary school go on to a vocational school or four-year academic secondary grammar school. The goal of the latter is university matriculation, and this type of school is attended mainly by those aspiring to a university or college education, or by those undecided about their future after elementary education. Four-year vocational schools provide training for middle-level specialists in trades which demand some theoretical knowledge. Trade schools provide training for skilled workers not requiring a theoretical background.

II. Teacher Qualifications

In the first four years of elementary school, virtually every subject is taught by the same teache. These teachers are trained in three-year teacher-training institutes which require matriculation from secondary school as a pre-requisite for entry. Grades 5 to 8 are taught by subject matter specialists, prepared in four-year teacher training colleges. Mathematics teachers often teach another subject, frequently physics or cremistry.

Secondary school teachers are trained at universities. The program of study lasts five years, during which they specialize in the teaching of two subjects. (Mathematics is usually coupled with physics.) The program of study for a mathematics major is composed mainly of higher mathematics and physics, psychology, and pedagogical and methodological subjects. All universities have "model secondary schools" attached, where students are able to practice teaching.

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III. Mathematical Content/Materials

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Over the past three decades, Hungary has undergone a series of curriculum reforms, affecting grades 1-8 particularly. At this level there is now a single, centralized curriculum, and teachers are required to use textbooks prepared and published by state enterprises.

For grades 9-12, there are nine types of curricula:

<u>Courses a-f</u> are for students of vocational secondary schools.

<u>Course g (Basic Mathematics)</u> is designed for students not specializing in mathematics. About 92 percent of the grade group follows this course, in both vocational and academic secondary grammar schools.

<u>Course h</u> (<u>Special Mathematics I</u>) is for students who take mathematics as an integral part of their studies, and provides opportunity to learn sephisticated mathematics. Although offered only to a few, this program contributes to the education of mathematicians and scientists.

<u>Course i</u> (<u>Special Mathematics II</u>) is for specially yifted students. Seven classes in the country are offered for students selected for their outstanding mathematical abilities.

Although new curricula were implemented for the secondary schools in 1979-1980, starting with grade 9, no major changes are envisaged until the mid-1980's, by which time students with the new primary school background will have reached secondary school.

IV. Examinations and Control

The widespread curriculum changes introduced in Hungary at intervals between 1946 and 1978 have affected all grades of the school system. Along with the curriculum reform, there has been some relaxation of control, and teachers in grades 1-8 are now able to work within broad guidelines around a compulsory core syllabus. At the secondary level teachers have been given

more freedom to use their own methods. For example, two sets of textbooks for secondary grammar schools have been provided, instead of one, as formerly. The teacher can choose between them. The first set is along traditional lines, while the second contains more experimental material.

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After completing general school, nearly all students in Hungary go on to secondary school without the need to pass any examinations, but the type of school they may choose is strongly influenced by their school marks.

In all secondary schools, students in the fourth grade (17-18 yearolds) may take a final external examination, the "maturity" examination. Students at trade schools also sit for a final examination to obtain a certificate.

Students who wish to continue to tertiary education must pass an entrance examination with both oral and written sections. A total score is obtained by incorporating a component reflecting grades in secondary school. Minimum requirements for entry are determined by universities and colleges.

The data collected for SIMS reflect the situation in 1979-80 and 1980-81 regarding Population A and B, respectively. Recent changes include the abolition of <u>Course h</u> (Special Mathematics). The role of this course has been overtaken by additional courses of mathematics taught in virtually every secondary grammar school.

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I. School System

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Education in Ireland is compulsory between the ages of 6 and 15. However, most children start school in their fifth year, and more than half the cohort stays in school until the age of 17.

Children start in primary school, attending typically until they are 12 years of age. They then transfer to one of a number of types of postprimary school. Prior to 1960, two main types of school were available: Secondary schools (privately owned but funded mainly by public money, and offering an academic education), and vocational schools (owned by local Vocational Educational Committees, and offering education geared to entry to a trade). During the 1960s and early 1970s, attempts were made to bridge the gap between academic and non-academic education; the academic provision in the two types of school became more similar, though their management About the same time, some comprehensive structures remained distinct. schools were opened by the State. They were followed, in the early 1970s, by community schools, distinguished from the comprelensives by a different management structure, but intended to be comprehensive in curriculum and student intake. The three sectors--secondary, vocational and comprehensive/ community--now exist side by side. Their respective enrollments at the time of SIMS testing were approximately 200,000, 60,000 and 23,000.

II. Teacher Qualifications

The typical mathematics teacher in a secondary, comprehensive or community school has a degree (not necessarily in Mathematics) and a <u>Higher</u> <u>Diploma in Education</u> (a qualification obtained by completing a one-year graduate course in the theory and practice of education). Mathematics teachers in vocational schools must be graduates, and some Vocational Education Committees demand that Mathematics must be a substantial part of the degree course; the <u>Higher Diploma</u> is not necessary, but a number of teachers have the qualification. Traditionally, secondary teachers do not specialize; many teach more than one subject.

III. Mathematical Content/Materials

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In 1980-82, syllabuses were prescribed and national examinations controlled by the Department of Education. This made the system essentially centralized despite the varied ownership and management structures. Mathematics is a required subject in the junior cycle of secondary schools; it is not compulsory in the senior cycle, but is taken by more than 90 percent of the in-school cohort.

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There are three main courses in mathematics at post-primary level, each associated with a different national examination. The first two, the Intermediate Certificate and Day Vocational (or the Group) Certificate, belong to the junior cycle of post-primary education; the third, for the Leaving Certificate, is a senior cycle course. The Intermediate and Leaving Certificate courses are offered at two levels of difficulty, "Lower" and "Higher" for the Intermediate, and "Ordinary" and "Higher" for the Leaving. The content of all the courses has undergone a series of reforms in the last twenty years, and further periodic changes are envisaged.

Textbooks are produced commercially, but are unlikely to be adopted by many schools unless they closely mirror the official courses.

IV. Examinations and Control

In 1980-82 the Department of Education controlled the three national examination: the <u>Group Certificate</u> (taken typically after two or three years of post-primary education), the <u>Intermediate Certificate</u> (taken after three or four years of post-primary education), and the <u>Leaving Certificate</u> (taken, usually, two years after the <u>Intermediate Certificate</u>). In Mathematics, about 80 percent of the age cohort take the Intermediate and about 15 percent take the <u>Group Certificate</u> (with some students taking both, the <u>Group Certificate</u> one year and the <u>Intermediate</u> the next); over 90 percent of those still in school take Mathematics for the <u>Leaving Certificate</u>. The examinations, which are fully external, have a very great backwash effect because of their importance for entry ... employment and to higher and further education.

1.10 ISRAEL

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I. School System

Compulsory education encompasses the ages 5-16 years and is free until the end of the secondary school (grade 12). Within Israel there are separate Jewish and Arab systems with the medium of instruction being Hebrew and Arabic respectively but both systems are supervised by the Ministry of Education and Culture. Only the Jewish system was included in SIMS.

In this system, two parallel school structures are to be found. The first structure comprises an 8-year primary school cycle, followed by a three-track secondar, cycle:

- (a) academic or university bound;
- (b) vocational--a small cluster of university-bound classes and a majority of terminal high school classes;
- (c) agricultural--including both university- and non-university bound classes.

The second structure, known as the <u>Reform Structure</u>, and introduced in 1968, comprises a six year elementary school, followed by a six year secondary school with two departments:

- (a) lower three-year middle school department--non-selective, comprehensive;
- (b) upper three-year department--academic and non-academic tracks.

The reform is being implemented rather slowly throughout the country, owing to budgetary difficulties. In 1980 approximately 50 per cent of the eighth grade students were encompassed within the <u>Reform Structure</u>.

II. Teacher Qualifications

Primary School

In grades 1-4 the homeroom teacher teaches all subjects including mathematics. In grades 5-8 (and in the reform system, in grades 5-6) either home room teachers or teachers having some specialization in the subject teach mathematics.

Teacher training institutes for primary school teachers are postsecondary but mostly without academic status. They grant teachers' diploma after three years of study. Recently institutes, which meet criteria specified by the National Council for Higher Education, may apply for permission to open a fourth year of study for students excelling in their studies who may receive a B.Ed.

Secondary Schools

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Secondary schools teachers obtain training in universities. For the lower Secondary grades, a bachelor's degree in the Department of Mathematics is required. Those who intend to teach in grades 11-12 must earn an M.A. degree in mathematics. In addition to these academic degrees, a diploma course in a School of Education is required.

Recently Schools of Education have opened Departments of Mathematics Teaching. Admission to these departments is granted to those who have a B.A. degree in mathematics. The departments grants an M.A in Mathematics Teaching.

Middle Schools

Teachers in Middle Schools are expected to have training equal to that of Secondary School teachers, or alternatively extended mathematics studies in non-academic teacher training institutes.

III. Mathematical Concept/Materials

At the elementary and junior high school levels there is only one course in mathematics which all students must take. At the elementary level the course is called <u>Arithmetic and Geometry</u> and at the Junior High school level Algebra and Geometry.

At the tenth grade level, there is again only a single course, which all students take, but from the eleventh grade, a track system starts in most schools. About three-fifths of the students follow one of the two science tracks (physics or biology) and the remainder follow the humanistic and social science track. Algebra and trigonometry are offered in all tracks but the syllabuses vary. Calculus is taught to students in science tracks only, and analytic and solid geometry further restricted to students in the physics track.

IV. Examinations and Control

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There is an official national curriculum which affects course content, sequence and emphasis, textbooks, teaching methods, and examinations. Supervisors and instructors are provided to assist teachers in following the syllabus, but do not have a large impact on what goes in schools.

The general framework for school examinations has not changed since 1965. It is in the hands of an external examining body operating within the Ministry of Education. At the Population B level, examination papers in mathematics are set within the Ministry, and marked (anonymously) by experienced mathematics teachers. The <u>Maturity Certificate</u> is awarded to students at the end of secondary school, on the basis of a composite of their school mark in grade 12 and their grades on the examination paper. The examination has a major bearing on the material taught to students in grades 10-12, but has a much smaller "backwash" effect on .tudents in Population A (grade 8).
27

I. School System

Compulsory schooling in Japan begins in the year following a child's sixth birthday. After completing a six-year elementary school, children go on to a three-year lower secondary school. While public, national and private schools are available, over 96 percent of students attend public schools run by local government authorities through lower secondary level. Selective national schools also exist, but less than 1 percent of students attend these. Attendance is compulsory for all children through the first nine years.

Of those who complete lower secondary schooling, over 94 percent continue to upper secondary schools. Some differentiation into specialized schools takes place at this point (68 percent of the students are in General Secondary Schools). At this upper secondary level, approximately 70 percent of the students attend public schools and 30 percent private schools.

II. Teacher Qualifications

Minimum requirements for teachers vary according to school level and class of certificate. For those intending to teach at the lower secondary level, a second-class certificate can be obtained by two years' study beyond the upper secondary school. Those desiring higher teaching qualifications may obtain a first-class lower secondary or second-class upper secondary certificate (equivalent to a bachelor's degree) after four years' study. The first-class upper secondary certificate requires two years beyond the Bachelor's degree, studying exclusively mathematics subjects.

III. Mathematical Content/Materials

The course of study is prescribed by the Ministry of Education and is followed by all schools, public and private. A revised course was implemented in 1980 in elementary schools, 1981 in lower secondary schools and 1982 in upper secondary schools.

Mathematics in the upper secondary schools follows a course structure. Students first take <u>General Mathematics</u> or <u>Mathematics I</u>, then <u>Mathematics IIA</u> (non-academic) or <u>Mathematics IIB</u> (academic). The academic program concludes with <u>Mathematics III</u>. <u>Applied Mathematics</u> is provided for pupils in vocational courses, where students learn the advanced topics needed in their specialist areas. The academic series (I, IIB, III) is completed by about 30 percent of students entering general secondary schools and blends topics from algebra, geometry, analysis, probability and statistics.

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Most textbooks are compiled by commercial publishers in accordance with the Course of Study and must be authorized by the Ministry of Education for school use. For public schools, the selection from available textbooks is made by local boards of education. Private schools may make their own selection.

IV. Examinations and Control

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Examinations are given for entry to national and private schools at the elementary and secondary levels. These examinations are competitive, and the number of places is limited. Admission to upper secondary schools and universities is also based on a competitive entrance examination. Students who fail the entrance examination to their desired university often continue their preparation after graduation from senior secondary school to try again the next year. In many large cities there are private schools preparing students for such examinations. Private tutoring classes are also becoming popular with elementary and lower secondary pupils to help them avoid failure on upper secondary entrance examinations.

In 1977, the University Entrance Examination Center was formed to develop an entrance examination, put in force from 1979, that could be used by universities throughout the country. Studies may be admitted to university on the basis of achievement on the Center Examination, and/or on the basis of results on a second examination given by each university.

1.12 LUXEMBOURG

I. School System

Ten years of schooling, beginning at the age of five years, are required in Luxembourg: one year of pre-school, six years of primary school and three years in one of four parallel school types of different lengths and aims. The Lycée (secondary general school), of seven years, prepares for the university. After the first year students can choose between a humanistic section (with Latin) or a modern language section. After the third year there is a second choice among different sub-sections: languages, mathematics, sciences and economics. The Ecole Moyenne, of five years' duration, prepares for careers in the public and private sector and business. Other Secondary Professional Schools prepare craftsmen and skilled workers for industry and agriculture. For each of these school types there are entrance examinations.

The <u>Ecole complémentaire</u> of three years gives basic instruction to children intending to remain at school only until the minimum leaving age of 15 years. These are mostly children with learning difficulties.

In the period of data collection for SIMS the <u>Ecole moyenne</u> and the <u>Secondary Professional Schools</u> were gradually being replaced by a new school type called <u>Lycée secondaire technique</u>. In the Study both the <u>Ecole moyenne</u> and the <u>Ecole professionelle</u> and the new school type, <u>Lycée secondaire technique</u>, with different mathematics programs were included.

II. Teacher Qualifications

The preparation of <u>Lycée</u> teachers consists of a university degree in mathematics (after a least four years of study of mathematics) followed by professional teacher training of three years. Those who have completed their studies, except for teacher training, are termed <u>stagiaires</u>. Because of \hat{a} teacher shortage, mathematics may be taught in the lower classes by teachers who have specialized in other scientific disciplines.

To teach in the <u>Lycée secondaire technique</u> teachers require a university degree and some professional training (not necessarily in mathematics in either case), although some may be stagiaires.

III. Mathematical Content/Materials

Each school type has a mathematics syllabus prescribed by the Ministry of Education and subject to periodic modification. In the <u>Lycées</u>, an orientation towards current French programs has been introduced, while in the <u>Moyen</u> adaptation is in the direction of Belgian programs. In the professional schools, both Belgian and German programs are offered. In the <u>Ecole Complémentaire</u>, no modifications have been introduced since 1960.

IV. Examinations and Control

The programs prescribed by the Ministry of Education are compulsory in Luxembeurg schools. The entrance examination for the Lycée (grade 7) is identical for all students as is the entrance examination for Lycée secondaire technique (formerly Ecole moyenne and Ecole professionelle). There is no entrance examination to the Ecole Complémentaire.

Teachers are not at liberty to choose or delete topics from the syllabus, particularly in grade 13 in the Lycées, where we final examinations are common for all students. Examination scores are the only results taken into account in that year. In the other years, the teacher is free to decide, within a given program, what is more or less important (in view of the final examination). The School Director, however, is required to verify that the official program has been covered. For this reason, commune final tests are often taken by all students of the same grade in any one school.

In the <u>Ecole Complémentaire</u>, teachers are free to select what seems most adequate for the level and interest of the students. There are no national examinations for these schools, which largely contain those who fail the entrance examinations to the other schools.

1.13 NETHERLANDS

I. School System

Compulsory school attendance in the Netherlands begins at age $6\frac{1}{2}$ years and continues to age 16. Primary schools cater for children from age 6 to age 12.

Beginning at the secondary level, students may attend either vocational schools or general secondary schools. Both types of secondary schools begin with one or two transition years to allow for the correction and the prevention of mistaken choices of study and redirectio. There is no strict correspondence between age and year in school due to differences in entrance age and the repetition of grades.

Vocational schoo's occur at three levels: (a) elementary vocationa schools (<u>LBO</u>, 4 years) lead to apprenticeships and employment or to advanced vocational education; (?' intermediate vocational schools (<u>MBO</u>, 2-4 years) lead to lower supervisory positions, self-employment, or further training; (3) higher vocational schools (<u>HBO</u>, 2-5 years) lead to managerial or executive positions.

General secondary schools are of three kinds: (1) intermediate general secondary schools (MAVO, 4 years) provide a general education in preparation for MBO or higher general secondary; (2) higher general secondary schools ($\underline{HA_{1}}$, 5 years) provide general education in preparation for <u>HBO</u> or pre-university; (3) pre-university schools (\underline{VWO} , 6 years) provide a general education in preparation for university study.

By age 16, the end of compulsory education, about 65 percent of the students are completing or continuing in general secondary education and about 45 percent are in lower technical education. Nearly 50 percent of the cohort are still taking some form of education at age 18. Approximately 12 percent of them eventually go on to university study and another 12 percent go to vocational colleges.

II. Teacher Qualifications (Secondary Education)

Teacher training in the Netherlands can take place in universities or in special schools and various levels of qualification are offered. The lowest qualification permits teaching in <u>LBO</u> and <u>MAVO</u>. Further

qualifications are needed to teach in HAVO, and the highest qualification is necessary for teaching in the upper HAVO grades and in VWO.

III. <u>Mathematical Content/Materials</u>

Mathematics syllabuses in the Netherlands have been totally revised since the Secondary Education Act of 1968. Each scnool-type in secondary <u>general</u> education has its own mathematics syllabus prescribed by the Ministry of Education, and global topic areas are specified to be taught at particular grade levels for each type. The courses offered vary in both content and complexity.

Students in pre-university education (<u>VWO</u>) study a number of compulsory subjects, including mathematics, through the first three years. For the last three years, most <u>VWO</u> programs allow students to choose between two emphases: (A) Foreign languages and economics subjects; (B) Science and Mathematics. The students choosing the A-Program may, if they wish, select <u>Mathematics I</u> (Algebra and Calculus). Students choosing the B-Program must select <u>Mathematics I</u>, but <u>Mathematics II</u> (Vector Geometry and Linear Algebra) is optional.

For elementary vocational schools (<u>LBO</u>) there is no prescribed mathematics syllabus, and so these schools have much more freedom in determining the content of their mathematics programs. The only official syllabus constraint in the vocational education system is a prescribed program for students taking the final examination at the highest level of <u>LBO</u>.

IV. Examinations and Control

Students take a national examination at the firal grade level in each type of secondary school. Those in general secondary education take a written examination, prescribed by the Ministry of Education, in each school subject. Two years before final examinations, <u>HAVO</u> and <u>VWO</u> students select their examination subjects; <u>HAVO</u> students are required to choose six subjects, <u>VWO</u> students choose seven subjects, and <u>MAVO</u> students choose six subjects.

In vocational education (<u>LBO</u>), students may take examinations at one cf three levels (A, B, C). Only those for level C (the highest) are

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determined by the Ministry of Education. Individual schools are completely free to determine their programs and methods of assessment at the two lower levels.

1.14 NEW ZEALAND

34

I. <u>School System</u>

Attendance is compulsory from 6 to 15 years of age, although most children begin at 5 and about 70 percent of the children remain in school until 16 years of age. Nearly 30 percent complete 5 years of secondary school but only 17 percent complete the terminal year of secondary school.

State primary and intermediate schoo's are comprehensive schools offering courses for all levels of ability. Private schools are established to provide education within the framework of a particular or general religious or philosophica' belief. They are not controlled by a statutory authority. Integrated schools are private schools, mainly Roman Catholic, which have become part of the state system under the control of a statutory authority.

A majority of students attend state secondary schools, most of which are coeducational, non-selective schools. In some cities zones are established and school selection is restricted according to the area in which the children live. Approximately 30 percent of all students at the secondary level attend schools segregated by sex.

II. Teacher Qualifications

The typical secondary school mathematics teacher completes a 3 or 4 year degree at a university followed by one year of teacher training in a secondary teachers college. The typical primary/intermediate teacher spends 3 years a: a primary teachers college and is generally not a mathematics specialist.

III. Mathematical Content/Materials

New Zealand has a national syllabus in mathematics. Since 1970, a new syllabus based on "modern mathematics" and the spiral approach has been in place. In general, all Population A (Form ?) students follow a common integrated mathematics syllabus with the degree of difficulty of the course adjusted to class ability. The new syllabus at Population B level (Form 7) reflects an increaseJ emphasis on mathematical structure and the notion of function. At this level, students are generally free to choose from a

variety of subjects. About two-thirds spend 4 to 5 hours per week on mathematics.

At lower levels, textbooks are written to the national syllabus and exert a powerful effect on course objectives and content. At higher levels, teachers are free to choose the sequence and emphasis of content as they think appropriate, but external examination prescriptions exert a strong influence on course objectives and content.

IV. Examinations and Control

National norm-referenced examinations are scheduled for the last three levels of schooling as follows:

Age 15: School Certificate Examination. This can be taken in one to six subjects; most students take at least four, and three-quarters include mathematics as one of their options.

Age 16: University Entrance Examination. Teachers are able to "accredit" students for this qualification, assessing their suitability for university by a process of internal assessment. Of the students enrolled at this level, between 55-60 percent gain university entrance. In addition, all students usually study for the Sixth Form Certificate, which allows a wider range of subjects and is based on internal assessment with standards set nationally.

Age 17: Universities Bursaries Examination. This is taken by most students at this level and also by very able students aged 16. Bursaries are awarded on the basis of total marks obtained in 3, 4, or 5 subjects. The most able students may also take University Scholarship Examinations.

Mathematics examinations and standards are set by the School Certificate Examination Board (government appointed), by regional Mathematical Associations, or by the Universities Entrance Board. Movement through the three examination levels is determined by principals of individual schools but is based on national examination guidelines which outline what constitutes a pass at each level.

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I. School System

Education in Nigeria has been developing rapidly in recent years, with increasing enrollments at all levels of the system.

The structure of the system is being altered in accordance with a National Policy of Education, introduced in 1976. Formerly, primary school courses--intended to cater for children aged six years or older--were of six or seven years' duration. The various types of secondary education (secondary grammar, modern, technical, commercial, and comprehensive) offered five-year courses, except for modern schools (being phased out), which offered three-year courses. Some secondary grammar schools provided a further two-year pre-university course, leading to advanced certification in three school subjects (e.g., Mathematics, Physics, Chemistry, Biology, Economics, English Language, etc.). All of the secondary schools are now state-owned.

Under the National Policy on Education, changes include the introduction of a uniform six-year cycle for primary education, followed by a uniform two-tier system of secondary education (a three-year junior cycle course, followed by a three-year senior cycle course).

Apart from the restructuring of the secondary education in terms of years, there is also a restructuring of the curriculum. What used to be the different types of secondary schools--grammar, technical, commercial, etc., are reflected in the new structure as curriculum options or streams. In the Junior Secondary Schools all students will be exposed to both "academic" subjects (English language, Mathematics, Social Studies, etc.) and pre-vocational subjects (metal work, woodwork, electronics, local crafts, etc.).

In the Senior Secondary all students will be exposed to a core curriculum plus a set of electives which will have the effect of streaming the students into academic (grammar), technical, commercial, etc.

Full implementation of this new system is not achieved yet because the schools are yet to be equipped for the technical and vocational courses.

Universal primary education is now within sight. At secondary level, however, participation rates are still low.

II. Teacher Qualifications

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Various types of teacher qualification are available in Nigeria. The <u>Teachers Grade II Certificate</u> is officially prescribed as the minimum qualification for primary school teachers (though some teachers have no training, and indeed may have no postprimary education). There is a category of Grade I teachers who have specialized in rural science.

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Secondary "grammar" school teachers possess the <u>Nigerian Certificate</u> <u>in Education</u> (a three-year course for people who have the West African School Certificate--described below--or an equivalent qualification), or university degrees (for example, the Bachelor in Education or a "subject" degree with or without post degree teaching certificate). N.C.E. teachers teach the lower secondary classes while degree-holders teach in the higher classes of secondary school. Teachers of mathematics may not have a special mathematics degree but would have taken some mathematics courses beyond the secondary school level (either in a College of Education or at the university).

III. Mathematical Content/Materials

Traditional African education used elaborate counting systems which were taught in informal ways. When formal Western-style schooling was introduced, primary school mathematics was limited to arithmetic. Secondlevel courses dealt with the traditional topics of arithmetic, algebra, geometry, and trigonometry.

At the time of the attainment of nationhood, a case was being made for curriculum reform in all Africa. The African Mathematics Program (AMP), popularly known as <u>Entebbe Mathematics</u>, was the first scheme to come to prominence. Workshops, held between 1962 and 1969, produced more than 80 mathematics texts, spanning primary level, secondary level, and teachereducation. Nigerians were to the forefront in this development. The most successful AMP project in Nigeria was the Lagos experiments for which new primary textbooks were written. Altogether, however, it could not be claimed that the mathematics taught in the average Nigerian school was "modern."

In 1970, the Federal Military Government created the Nigerian Educational Research Council (NERC). This body was responsible, in the early 70s, for workshops aimed at mathematics at primary, secondary and teacher-training

level. A systematic and integrated approach throughout Nigeria was lacking, however. When government intervention eventually came, it took the form of a decree that "modern" mathematics was to be abolished in primary school and suspended at secondary level. A national task force, already set up by NERC, worked on the development of new curricula. In fact, some modern concepts are included, though unacceptable terminology has been avoided; for example, the concept of a set is present in the curriculum, but the term "set" is avoided.

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IV. Examinations and Control

There is a national examination at the end of primary schooling; it is conducted by the various state ministries of education, and leads to the First School Leaving Certificate. Entrance to secondary grammar and technical schools is controlled by an Entrance examination. The West African Examinations Council (WAEC) on behalf of the federal government, conducts a national common entrance examination for entry into the federal government-owned secondary schools; while state Ministries of Education conduct state entrance examinations fo entry into their own secondary schools. WAEC is a multinational examining body, embracing Gambia, Ghana, Liberia, Nigeria and Sierra Leone; in each country, it conducts those examinations decreed by the national government in question. For Nigerian secondary education, it conducts the West African School Certificate examination, the terminal examination for basic secondary education in Anglophone West Africa. This is after five years in the old system and will be after six years when the new system starts operating. WAEC still has about four years to align its syllabus with that of the NERC. WAEC also deals with the Higher School Certificate (taken after a pre-university course lasting a further two years) and other such examinations. This pre-university course will be phased out under the new system.

I. School System

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e general supervision of the education system in Scotland, except for the universities, is the responsibility of the Secretary of State for Scotland acting through the Scottish Education Department. The duty of providing education locally rests with twelve local authorities, which are responsible for buildings, equipment, and employment of staff. There are three main types of schools: <u>education authority</u> (under the management of local authorities, and accounting for the vast majority of the schools), <u>grant-aided</u> schools (accounting for 2% of the students), and <u>independent</u> schools (holding less than 2% of the students).

Full-time primary schooling is from five to twelve. Pupils then generally go on to six-year comprehensive schools which are typically co-educational and non-denominational although there is a statutory requirement for local authorities to provide schools for particular denominations where numbers justify it. Schooling is compulsory to age 16 but approximately 50% continue beyond this age.

II. Teacher Qualifications

All teachers must be registered with the General Teaching Council for Scotland.

<u>Primary</u> teachers train at colleges of education, either for three years or (in conjunction with a university or the Council for National Academic Awards) for a four year B.Ed. course; or alternatively they pursue a one-year course at a college of education after their university degree.

<u>Secondary</u> teachers must be graduates. Apart from a small number who follow a concurrent course, all graduates take a one-year teacher-training course at a college of education.

III. Mathematical Content/Materials

Curriculum is generally in the hands of the local authorities and schools have considerable freedom for experimentation. There is a Central Consultative Committee on Curriculum, which is the main advisory body to the Secretary of State for scotland. There are also four Curriculum Development

Centres, attached to colleges of education; together with Her Majesty's Inspectors of Schools, they provide curricular guidance to local authorities and teachers.

The Scottish Examination Board (formerly the Scottish Certificate of Education Examination Board) lays down very broad outlines, without detail, of the curricula to be followed by students sitting for their examinations (about half the age cohort in the case of mathematics). Expert groups--for mathematics, the Scottish Mathematics Group (SMG)--then produce materials to flesh out these courses. Use of these is voluntary, but the SMG textbooks are selected and used by more than 90% of teachers.

Materials for a modular mathematics course, intended for mixed ability and less able classes and for students who are not aiming to specialize in mathematics, have also been devised; however, they are not widely used.

IV. Examinations and Control

The Scottish Certificate of Education is taken at <u>Ordinary</u> Grade in fourth year, and <u>Higher</u> Grade in fifth and sixth year.

1.17 SWAZILAND

I. Structure of the Educational System

Since independence, the government has set a goal of eventually providing basic education for the entire population. While the goal had not yet been achieved by the early 1980s, progress was being made. Over the 11 years from 1969 to 1980, the number of primary and secondary schools together had grown by 30 percent, pupils by 90 percent, and teachers by 112 percent. In 1980, over 112,000 pupils attended 450 primary schools and 23,000 students attended 82 secondary schools; a large proportion of the schools were operated by private organizations.

In the early 1980s, the primary course extended from grade 1 through grade 7. Although most children enter school at age six, many who graduate from the primary grades are older than age 12, because of a high incidence of grade reputation.

Secondary education extends from form 1 through form 5. The dropout rate in secondary schools is high, chiefly because of students performing poorly in academic work or lacking the funds to pay school fees.

II. Teacher Qualifications

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Two colleges offer two-year training programs for primary-school teachers, with candidates from among holders of junior secondary school certificates. William Pitcher College also offers a two-year course for luwer-secondary teachers. Additional secondary-school teachers are graduates of the University of Botswana and Swaziland, which offers a four-year degree program.

The rapid growth of primary education following independence found the nation faced with a critical shortage of qualified teachers so that a large number of untrained people had to be employed to staff primary school classrooms. The government therefore inaugurated an inservice educational system to upgrade the skills of under qualified teachers.

Because there continues to be a shortage of local instructors for secondary schools, Swaziland still recruits expatriates to fill positions for which Swaziland teachers are not prepared or which they have vacated in order to take more attractive employment in other sectors of the job market.

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III. Curriculum Development

Curricula are designed by primary and secondary units within the Ministry of Education. At the primary level, the course of study includes such conventional academic subjects as mathematics, science and social studies, English, and Siswati. In the secondary schools the same array of academic subjects are taught as in the primary grades but at a higher level of complexity.

IV. Examination System

The educational system includes three major examinations in the 12-year primary and secondary sequence. The first, given at the end of the primary course, earns the <u>Swaziland Primary Certificate</u>. The second, for the <u>Junior Certificate</u>, is given at the end of form 3. The third, for the <u>Cambridge Certificate</u>, comes at the end of form 5. At each level, as in many countries following the British educational pattern, many students leave the school system because they either fail the examination or else do not qualify for the limited number of openings at the next level. The most serious cause of such dropout is the shortage of facilities at the upper levels.

43

I. School System

Swedish education has been characterized by "rolling reform": the introduction of successive reforms, based on research and duly followed by evaluation, each one leading on to the next. The reforms of the 1960s are particularly notable. Following many years of study and more than a decade of experimentation, the then existing "parallel" systems of schools of different types was replaced from 1962 by a nine-year compulsory comprehensive school (grundskola) catering for students of from 7 to 16 years of age. Compulsory schooling starts at age 7, and spans the nine years of the grundskola. The grundskola has three departments: lower (grades 1 to 3), middle (grades 4 to 6), and upper (grades 7 to 9). From grade 7 students can choose between short (easier) or long (harder) course alternatives in mathematics and English. But the main principle is that until the end of their compulsory schooling, students are kept together in undifferentiated classes, and that regardless of their choice of electives and course types in the compulsory school, they can choose either theoretical or practical study lines in their subsequent non-compulsory schooling.

More recently, upper secondary schooling has also been unified, and students may take two, three or occasionally four years of post-compulsory education in the <u>gymnasieskola</u>. At present, some 85 percent of the cohort proceed to the <u>gymnasieskola</u>, entering one of 23 "study lines" (Natural Sciences, Liberal Arts, Technology, and so forth). After upper secondary school students can go on to higher education. Every study line in the <u>gymnasieskola</u> (in some cases after supplementary studies in special subjects) fulfills the general admission requirement for higher education. Within the last few years, higher education too has been unified. These major reforms were centrally organized and administered; but recently, the strongly centralized system is giving way to different patterns of decentralization.

II. Teacher Qualifications

Teachers in the lower and middle departments of the <u>grundskola</u> are trained at teachers' colleges (Schools of Education); those in the lower department prepare for two and a half years, while those in the middle department prepare for three years. Teachers in the upper department of the <u>grundskola</u>; and in the <u>gymnasieskola</u>, do at least three years of university study (normally obtaining a B.A. or a higher degree), and then take a year's pedagogical and practical training at a School of Education.

Even at senior levels, teachers of mathematics generally teach one or two other subjects as well.

III. Mathematical Content/Materials

The National Board of 'jucation (NBE) compiles and reviews the curriculum, recommends working methods, and is responsible for research and development in the schools.

Curricula for the <u>grundskola</u> were specified in the program <u>Lgr62</u> and again in <u>Lgr69</u> and <u>Lgr80</u> (the numbers referring to the years of issue); those for the <u>gymnasieskola</u> were set out in <u>Lgy65</u> and again in <u>Lgy70</u>.

In mathematics, the 1960s saw the introduction of typical "modern" content into the curriculum. After the Royaumont conference in 1959, the Nordic Committee for Modernizing the Teaching of Mathematics was set up; it worked between 1960 and 1967, carrying out extensive experiments with new teacher materials at the level of both the grundskola and the Also, in 1964, the NBE appointed a working party on new gymnasieskola. terminology in mathematics. Both these developments affected the mathema-This was not as radically different from Lgr62 as had tics in Lgr69. been expected and hoped for; but it did introduced ippical "modern" work, for example in inequalities, sets, and probability and statistics. At the level of the gymnasieskola, Lgy65 introduced a more radical program, including vectors (in place of the former Euclidean geometry), calculus differential equations, complex numbers and set theory. This program was reduced in the syllabus of 1972 representing a partial withdrawal from "modern mathematics." Courses for both types of school have been further revised more recently omitting some of the "modern mathematics."

IV. Examinations and Control

There are no final examinations of traditional type.

The curricula published in 1962, 1969 and 1980 have resulted in a major reduction in the use of marks at primary levels. Final marks are crucial to students who have chosen a study line at upper secondary school where the number of places is smaller than the number of applicants and a selection is therefore necessary. There is a five-point scale of marks, on which 1 is lowest and 5 is highest, on a relative basis for the country as a whole. To help arrive at norms for assigning marks, nationally standardized tests are given in Swedish, foreign languages and mathematics in a comprehensive school. At the upper secondary level, standardized tests are administered at all schools throughout the country in a number of additional academic subjects. These tests are compulsory only in the upper secondary school.

1.19 THAILAND

46

I. School System

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Since the proclamation of the 1977 National Scheme of Education, schooling in Thailand has been divided into primary education, lower secondary education and upper secondary education. A majority of students attend public schools, and attendance is compulsory until age 15 or completion of primary education, whichever comes first. Primary education covers the first six years of schooling, and lower and upper secondary education each require three years for completion. At the lower secondary level students are able to choose from a wide variety of academic and vocational studies in accordance with their interests and aptitudes. The upper secondary level allows specialization in those areas necessary to the students' future, continued studies or vocational careers.

The percentage of the relevant age group enrolled in schools for the primary, lower secondary and upper secondary level are 97, 29 and 17 respectively. Public primary schools account for 91 percent of the school population aged from 7 to 13. At the lower secondary level, public schools account for 79 percent of the school population (age-range 14 to 16). At the upper secondary level (age-range 17 to 19) there are 3 types of school: academic, vocational and teacher training. Here, public schools account for 28 percent of the academic tream student population, 48 percent of the vocational tream, and all of the teacher training-stream.

II. Teacher Qualifications

The typical teacher of Population A students completes a two-year diploma in education at a teacher training college, taking mathematics as a major field of study. Training starts after the completion of secondary education or following a diploma in education (primary level). Opportunities are available for these teachers to continue their study at a university for two more years to earn bachelor's degrees in education, concentrating on mathematics.

The typical teacher of Population B students has completed a four-year bachelor's degree in education with a major field of study in mathematics.

III. Mathematics Content/Materials

Thailand has national curricula for all school subjects. The Ministry of Education is responsible for their development and implementation. A new integrated syllabus based on "modern mathematics" was introduced in 1977 for the upper secondary level and in 1978 for the lower secondary and primary levels.

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All Population A students follow a common mathematics syllabus which stresses the mathematics essential for everyday life. In the last year of the lower secondary level and at the upper secondary level, mathematics is not compulsory, but the majority of the students follow one of the two available programs: one for "mathematics/science" students which reflects an emphasis on mathematical structure, and another for "arts" students which includes fewer topics and puts less emphasis on structure. The two programs require approximately six and four hours per week, respectively.

At all levels, textbooks are written to the national syllabus and published by both the Ministry of Education and private publishers. Methods of presentation used by teachers follow closely those given in textbooks and teachers' manuals.

IV. Examinations and Control

Each school sets its own examination papers for each grade, following closely the national curriculum and the evaluation guidelines prescribed by the Ministry of Education. In some regions, schools form into groups to assist each other in various academic matters, including the sharing of examination papers. Standardized tests are being prepared by the Ministry of Education for national assessment purposes. Schools normally require entrance examinations at the lower secondary and upper secondary levels.

I. School System

The school system of the united States exemplifies decentralization. Not only are the 50 states responsible for policy and practice, they variously delegate responsibilities to school districts within their boundaries. The tradition of local control remains a significant force in the J.S. As a general rule, schooling is compulsory from about 6-16 years and provided tuition-free until the age of 18 (in some areas to about 20). About 10 percent of students attend private schools, the majority of which are associated with religious denominations.

The predominant pattern is seven years of elementary schooling (K-6), followed by three years each of junior and sentor high school. In some cases, the two high school levels are contained within one institution. In others, elementary school extends to eight years, followed by a 4-year high school. An emergent pattern is a 4-year primary school, succeeded by four years in each successive level: middle (or intermediate) school, and high school.

II. Teacher Qualifications

Teachers are prepared for the elementary and secondary schools in undergraduate institutions, some of which were formerly teachers colleges. Students intending to teach at the secondary level follow a general four year course of studies leading to a bachelor's degree, with a concentration in the academic subject they plan to teach and professional studies. Some teachers complete the undergraduate academic program before studying professional subjects at the graduate level. All will have some supervised student teaching experience as part of their professional preparation. Graduate and in-service studies have also been encouraged by salary incentives and state licensing requirements. Many states demand a master's degree for a permanent secondary school teaching certificate.

III. Mathematical Content/Materials

For roughly the first eight school years (grade K-7, ages 5-12), all students study a general mathematics curriculum, with emphasis on arithmetic

of whole numbe. fractions, and measurement. In many schools, students are grouped by ability and move at a faster or slower pace through the core topics.

49

Beginning in grade 8 (13 years old), the first clear content/st dent streaming appears on a significant scale. Approximately 10 percent of all eighth-graders take a full-year course in elementary algebra (polynomials through quadratics). These are the students most likely to enter university study in a mathematically-oriented discipline. Their usual progression of courses is:

| Grade | 8 | (age 13) | <u>Algebra I</u> |
|-------|----|----------|-----------------------------------|
| Grade | 9 | (age 14) | Geometry |
| Grade | 10 | (age 15, | Algebra II and Trigonometry |
| Grade | 11 | (age 16) | Elementary Functions, Analysis or |
| | | | Trigonometry/Analytic Geometry |
| Grade | 12 | (age 17) | <u>Calculus</u> |

The most common variation is interchange of <u>Geometry</u> and <u>Algebra</u> <u>II</u>. By grade 12 this group has shrunk to about 5 percent of the student cohort.

While ability grouping among the remaining mathematics students is common in grade 7 or 8, the next point of curricular streaming is at grade 9 (age 14). At that point most sturents who will pursue college preparatory programs begin algebra, while the others continue general mathematics (largely pursuing a previously elusive mastery of basic arithmetic skills). The second level of college-bound students includes many who will eventually pursue a mathematically-oriented career such as engineering, mathematics teaching or computer science. Those students will follow the above course sequence, one year behind. Another group of college-bound students will pursue only two or three years of this sequence--often with much less depth or breadth in the individual courses.

IV. Examinations and Control

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The only nation-wide examinations for secondary school students are offered by private, non-profit organizations, which determine content and standards of achievement in consultation with teachers, subject specialists at universities, and state and local school administrators. Results are taken into account by colleges in their admission procedures. New York State provides the state-wide <u>Regents' Examinations</u> in high school subjects, but students may acquire high school diplomas signifying completion of the required number of courses as certified by high school authorities, which may be sufficient to allow them to enter 2- and 4-year colleges.

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Generally, standards and examinations for completion of course requirements and for graduation from secondary school are set by the school or the school district.

51 2. Cognitive Item Tables 「ない」であった 「いいいのかく

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| 2. | 1. | 1 | Kev | to | Reading | Coani'ive | Item | Table |
|----|----|---|-----|----|---------|-----------|------|-------|
|----|----|---|-----|----|---------|-----------|------|-------|

For each item the following information is available in the cognitive item table:

Sample Item:

A SALE STORE STATE OF A SALE AND A

Line 1: 009 30 is 75% of what number? Line 2: 1 004 1 0 0 33 0 36 0 1 06 07 14 15

Line 1: International i. constion

009--Item code

30 is 75% of what number?--Partial text

Line 2: International information

1--Correct response (key)

004--Position in international content grid

1--Behavioural level

O--Anchor item status

- 0 33--F m and position of the item on the crosssectional version of the study (e.g., Core form-Item 33)
- 0 36--Form and position of the item on the longitudinal version of the study (e.g., Core form-Item 36)

O--Stratum for crossectional form construction

1-- ctratum for longi dinal form construction

06 07 14 15--Subtest codes

Definition.

' ternational content grid

000 Arithmetic 001 Natural Numbers 002 Common Fractions 003 Decimal Fractions 004 Ratio, Proportion, Percent 005 Number Theory 006 Exponents 008 Square Roots 009 Dimensional Analysis

- 100 Algebra
 - 101 Integers
 - 102 Rationals
 - 103 Integer Exponents
 - 104 Formulas
 - 105 Polynomials
 - 106 Equations and Inequations
 - 107 Relations and Functions
 - 110 Finite Sets
- 200 Geometry

201 Classification of Plane Figures

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- 202 Properties of Plane Figures
- 203 Congruence of Plane Figures
- 204 Similarity of Plane Figures
- 205 Geometric Construction
- 206 Pythagorean Triangles
- 207 Coordinates
- 208 Simple Deduction
- 209 Informaal Transformation
- 212 Spatial Visualization
- 215 Transformational Geometry
- 300 Statistics
 - **301 Data Collection**
 - 302 Organization of Data
 - 303 Representation of Data
 - 304 Interpretation of Data
 - 306 Outcomes/Events
- 400 Measurement
 - 401 Standard Units
 - 402 Estimation
 - 403 Approximation
 - 404 Area, Volume, Etc.

Behavioural level

- 1 Computation
- 2 Comprehension
- 3 Application
- 4 Analysis

Anchor item status (An item that appeared in the First International Mathematics Study is an anchor item.)

- **O** Not an anchor
- 1 Anchor item
- 2 Modified anchor item

Stratum for cross-sectional form construction

- 1 Arithmetic
- 2 Algebra
- 3 Geometry
- 4 Statistics
- 5 Measurement

Stratum for longitudinal form construction

- 1 Fractions
- 2 Ratio, Proportion, Percent
- 3 Algebra
- 4 Geometry
- 5 Measurement
- 6 Integers (not in international core)
- 7 Statistics (not in international core)

Subtest codes

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These are the subtests as defined in the study. The number of subtest codes per item varies. The following subtest codes are used:

- 01 Estimation and Approximation
- 02 'New maths' in First Study
- 03 Basic skills
- 04 Algebra (Computation)
- 05 Calculator use
- 06 Arithmetic (Computation)
- 07 Proportionate thinking
- 08 Anchor Items
- 09 Whole numbers
- 10 Common fractions
- 11 Common fractions (Computation)
- 12 Decimal fractions

2.1.2 Cognitive Item Table

Wei !

| 0 | 01 | (22 * 18) - (47 + 59) is equal to 1 001 1 1 0 20 2 34 0 1 6 03 05 06 08 09 15 45 |
|----|----|--|
| 0 | 02 | Matchsticks are arranged as follows. If the pattern is 2 001 3 0 0 31 4 12 0 1 6 09 15 16 |
| 0 | 03 | 2/5 + 3/8 is equal to 5 002 1 1 0 17 0 31 1 1 1 03 06 08 10 11 15 43 45 |
| 00 | 04 | Which of the following is a pair of equivalent fractions? 4 002 2 0 0 14 3 3 0 1 1 10 15 16 |
| 00 | 05 | 0.40 * 6.38 is equal to 3 003 1 1 0 18 0 26 0 1 1 03 05 06 08 12 15 43 45 |
| 00 |)6 | Alexandra walked from Riverview to Bridgeport, which are 3 003 3 0 0 3 2 7 0 1 1 03 12 15 16 44 48 |
| 00 |)7 | (847.36) in the number in the box, the digit 6 represents 1 003 2 0 0 35 4 33 0 1 1 03 12 15 16 |
| 00 |)8 | In a school of 800 pupils, 300 are boys. The ratio of the 5 004 2 0 0 26 0 33 1 1 2 07 13 15 16 |
| 00 |)9 | 30 is 75% of what number? 1 004 1 0 0 33 0 36 0 1 2 06 07 14 15 |
| 01 | 10 | The value of 2**3 * 3**2 is 4 006 1 1 0 23 2 16 0 1 2 03 05 05 08 15 45 |
| 01 | 1 | What is the square root of 12 * 75? 2 008 2 1 0 34 1 30 0 1 2 05 08 |
| 01 | 2 | (-2) * (-3) is equal to 5 101 1 0 0 4 0 16 1 2 3 04 17 20 |
| 01 | 3 | The air temperature at the foot of a mountain is 31 degrees 5 101 3 0 0 40 0 25 1 2 3 03 17 20 21 44 |
| 01 | 4 | Which of the following sequences of numbers is in the order 3 102 2 0 0 1 1 35 0 2 3 20 21 |
| 01 | 5 | Simplify: $5x + 3y + 2^{-1} - 4y$ 4 104 1 1 0 10 2 24 0 2 3 04 08 18 20 43 45 |
| 01 | .6 | Soda costs a cents for each bottle, but there is a refund 2 104 3 1 0 25 4 27 0 2 3 08 18 20 21 46 |
| 01 | 7 | If $p = 1w$ and if $p = 12$ and $1 = 3$, then w is equal to 3 106 1 1 0 12 0 13 0 2 3 04 08 19 20 43 45 |
| | | |

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- 018 The error in the above reasoning, if one exists, first 1 106 4 0 0 22 2 12 0 2 3 19 20 21
- 019 The table below compares the height from which a ball is 3 107 2 0 0 39 0 30 0 2 3 20 21
- 020 There are 9 elements in set q and 6 in set r. How many 4 110 3 0 0 16 0 0 0 2 3 20 21
- O21 A quadrilateral must be a parallelogram if it has 5 201 2 0 0 28 3 23 0 3 4 22 26 29 31
- 022 AB, CD, AD, EF are intersecting straight lines as shown 1 201 1 0 0 9 1 27 0 3 4 23 26 29 30
- 023 The length of the circumference of the circle with center at 4 202 4 1 0 32 0 19 1 3 4 07 08 23 26 29 31 46
- 024 If segment PQ were drawn for each figure shown below, it 4 203 3 0 0 36 3 29 0 3 4 24 26 29 31
- 025 The triangles shown above are congruent. The measures of 2 203 3 0 0 6 1 6 0 3 4 24 26 29 31
- 026 On level ground, a boy 5 units tall casts a shadow 3 units 2 204 3 1 0 19 4 15 0 3 4 07 08 25 26 29 31 46 48
- 027 (Right triangle with 2 sides given) What is the value of S? 2 206 1 0 0 2 3 1 0 3 4 29 30
- 028 What are the coordinates of point P? 4 207 1 0 0 38 0 39 1 3 4 27 29 30
- 029 One of the following points can be joined to the point (-3,4) 1 207 3 0 0 29 1 34 0 3 4 27 29 31 48
- 030 In which diagram below is the second figure the image of the 3 209 1 0 0 5 1 2 0 3 4 28 29 30
- 031 The diagram shows a cardboard cube which has been cut along 4 212 3 0 0 13 0 7 0 3 4 29 31
- 032 Here is a table that shows the number of trees planted along 5 302 2 0 0 7 4 34 0 4 7 03 34 35
- 033 The circle graph shows the proportion of various grain crops 1 303 2 0 0 21 1 22 0 4 7 03 32 34 35
- 034 Which of these is a true statement about the information 3 303 3 0 0 15 4 21 0 4 7 03 32 34 35

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053 When x = 2, (7x + 4) / (5x - 4) is equal to 2 105 1 0 1 29 1 28 0 2 3 04 20

054 Which equation is true for all values of n? 1 106 2 0 1 32 4 20 0 2 3 19 20 21

055 For the table shown, a formula that could relate m and n is 5 107 3 0 1 2 2 5 0 2 3 20 21

58

056 Which one of the following diagrams illustrates the statement 3 110 1 0 1 28 0 0 C 2 3 04 20

057 The figure QRST is a square and PQT an equilateral triangle. 4 201 3 0 1 9 1 31 0 3 4 22 26 29 31

- 058 Lines AB and CD are parallel. Two angles whose measures 2 202 2 0 1 13 1 10 0 3 4 23 26 29 31
- 059 Three straight lines intersect as shown in the diagram. 4 202 4 1 1 34 2 8 0 3 4 08 23 26 29 31
- 060 Two of these triangles are similar. They are 5 204 1 0 1 26 0 0 0 3 4 25 26 29 30
- 061 If s is the set of points with x-coordinates greater than 3 1 207 2 0 1 30 0 0 0 3 4 27 29 31
- 062 In the above rectangle the measure of angles ROQ is 3 208 3 0 1 4 2 13 0 3 4 29 31
- O63 PQRS is a rectangle. Its image after a transformation is 1 209 1 0 1 18 4 29 0 3 4 28 29 30
- 064 What is the name of the solid figure, each of whose faces 1 211 1 0 1 14 0 0 0 3 4 29 30
- O65 You wish to know about the popularity of the soft-drink Slosh 5 301 2 0 1 19 3 7 0 4 7 34 35
- 066 The graph shows the distance traveled by a tractor during a 2 303 2 0 1 24 1 19 0 4 7 32 34 35
- 067 Joe had three test scores of 78, 76 and 74, while Mary had 3 304 2 1 1 7 2 9 0 4 7 08 34 35 44 46
- 068 The distance between two towns is usually measured in 5 401 1 0 1 31 0 29 0 5 5 03 36 38 39
- 069 The length of AB is 1 unit. Which is the best estimate for 2 402 2 0 1 12 0 8 1 5 5 01 38 40
- 070 What is the area of the above parallelogram? 4 404 1 0 1 25 1 20 0 5 5 37 38 39

- 071 The rectangle shown above is cut along the dotted lines, and 3 404 2 0 1 23 2 13 0 5 5 37 38 40
- 072 The figure above shows a rectangular box. Which of the 4 403 3 0 1 5 1 9 0 $^{\rm 6}$ 5 01 03 05 38 40
- 073 162 * 45 is equal to 5 001 1 0 2 9 3 28 0 1 6 03 05 06 09 15 43

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- 074 (Triangular array of 1'; What is the sum of the 50th row? 1 J01 4 0 2 8 1 17 0 1 6 09 15 16
- 075 In the figure the little squares are all the same size and 3 002 2 1 2 26 J 28 1 1 1 03 07 08 10 15 16
- 076 Four 1-liter bowls of ice cream were set out at a party. 5 002 3 0 2 27 0 4 0 1 1 10 15 16 44
- 077 The position on the scale indicated by the arrow is 2 003 2 0 2 23 1 18 0 1 1 01 03 12 15 J6
- 078 A runner can 3,000 meters in exactly 8 minutes. What was 2 003 7 1 2 12 4 3 0 1 1 05 08 12 15 16 46
- 079 A painter is to mix green and yellow paint in the ratio of 4 004 3 0 2 24 0 12 1 1 2 07 13 15 16 44
- 680 Which of these numbers is a prime number? 3 065 1 0 2 11 2 20 0 1 2 06 15
- 081 Since 4 * 9 = 36, the square root of 36 is equal to 4 008 2 0 2 22 3 33 0 1 2
- 082 The set of integers less than 5 is represented on one of the 1 101 2 0 2 34 4 5 0 2 3 17 20 21
- 083 A, B, and C are .umbers greater than 0. Which of these is 5 102 2 0 2 13 0 0 0 2 3 20 21
- 084 0.00046 is equal to 2 103 1 0 2 29 1 33 0 2 3
- 085 If y dollars are shared equally among four boys, how many 4 104 2 0 2 4 2 29 0 2 3 18 20 21 44
- 086 If 4x/12 = 0, then x is equal to 1 106 1 1 2 1 0 18 1 2 3 04 08 19 20 45
- 087 The Davis family took a car trip from Anabru through Bergen 3 106 3 0 2 28 1 4 0 2 3 19 20 21 44 47
- 088 a/15 b/5 is equal to 1 105 1 0 2 5 3 35 0 2 3 20

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089 AB // DC and AD // BC. Quadrilateral ABCD is a 2 201 2 C ^ 16 2 21 0 3 4 22 26 25 31

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- 090 The line m is a line of symmetry for figure ABCDE. The 3 202 1 0 2 15 2 6 0 3 4 23 26 28 29 30
- 091 One of the following figures is congruent with the figure 5 203 1 0 2 25 4 16 0 3 4 24 26 29 30
- 092 If triangle λ YZ is a triangle similar to triangle ABC but 3 204 3 0 2 32 0 0 0 3 4 25 26 29 31
- 093 Which of these is a correct statement for this triangle? 1 206 1 0 2 3 2 25 0 3 4 29 30
- 094 In the diagram, OPQR is a parallelogram, 0 is the origin, 1 207 3 0 2 33 0 0 0 \bigcirc 4 27 29 31
- 095 Which statement can be used to find the value of Y? 4 208 2 0 2 6 0 0 0 3 4 29 31
- 096 Triangle ABC and triangle A'B'C' are congruent and their 5 209 2 0 2 14 2 14 0 3 4 28 29 31
- 097 A table shows scores for a class on a 10-point test. How many 2 302 1 0 2 18 1 12 0 4 7 34 41
- 098 Here is a table of data and a graph of the same data. What is 4 303 2 0 2 31 4 8 0 4 7 32 34 35
- 099 In the graph, rainfall in centimeters is plotted for 13 weeks 2 304 4 1 2 19 3 27 0 4 7 08 34 35
- 100 ? meters + 3 millimeters is equal to 2 401 1 0 2 2 0 1 0 5 5 03 36 38 39
- 101 A 15 centimeter piece is cut from a ribbon 1 meter long. What 1 401 3 0 2 17 1 7 0 5 5 03 36 38 40
- 10? The measure of the angle shown is nearest to 4 402 2 0 2 30 2 17 0 5 5 01 38 40
- 103 A square is removed from the rectangle as sr What is the 3 404 3 0 2 21 0 23 0 5 5 03 05 37 38 40
- 104 Michael has a large number of wooden blocks. Which are cubical 5 404 3 0 2 7 3 17 0 5 5 03 37 38 40 44
- 105 Which of the following is (are) true? 5 001 2 1 3 9 4 6 0 1 6 02 05 08 09 15 16
- 106 Peter and Paul decided to start saving money. Peter can save 4 001 3 ' 3 31 1 32 0 1 6 03 07 08 09 15 16 44 46

125 If two triangles are similar, which of the following 1 204 2 0 3 7 3 9 0 3 4 25 26 29 31

- 126 The straight line joining the points (2,3) and (2,7) cuts 5 207 2 0 3 13 4 4 0 3 4 27 29 31 47
- 127 In the above diagram, triangles ABC and DEF are congruent, 4 208 3 0 3 25 0 21 1 3 4 28 29 31
- 128 If, in the given figure, PQ and RS are intersecting straight 3 202 3 1 3 19 3 34 0 3 4 08 23 26 29 31
- 129 There are 7,000,000 girls under the age of 21 in a country 4 303 3 0 3 10 2 4 0 4 7 32 34 35
- 130 The weight gain from 6 to 10 months was 2 304 1 0 3 2 4 35 0 4 7 03 34 41

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- 131 The petals on 100 flower: of different kinds were carefully 4 302 2 0 3 14 2 3 0 4 7 34 35
- 132 A team scores an average of 3 points per game over 5 games. 5 304 1 0 3 8 1 11 0 4 7 07 34 41
- 133 How many pieces of pipe each 20 meters long would be required 2 401 3 0 3 5 4 23 0 5 5 03 05 36 38 40
- 134 Each of the small squares in the figure is 1 square unit. 3 402 3 0 3 29 4 7 0 5 5 01 38 40
- 135 The length of a box was measured and found to be 9 cm to the 5 403 2 0 3 11 2 31 0 5 5 01 38 40
- 136 What is the capacity of a cubic container 10 cm by 10 cm by 1 404 2 0 3 6 3 15 0 5 5 03 37 38 40
- 137 Which of the following operations with whole numbers will 4 001 2 1 4 22 2 15 0 1 6 02 05 08 09 15 16
- 138 A group of children was divided into 7 teams with nine in 3 001 3 2 4 14 3 8 0 1 6 03 09 15 16 42 44
- 139 (3/5)/(2/7) is equal to 1 092 1 0 4 15 2 10 0 1 1 03 06 10 11 15
- 140 7 3/20 is equal to 2 003 1 0 4 6 0 32 1 1 1 03 05 06 12 15 43
- 141 The speed of sound is approximately 340 meters per second. 2 003 3 0 4 3 3 22 0 1 1 (5 07 12 15 16 44
- 142 The table above shows the values of x and y, where x is 5 004 2 0 4 26 1 16 0 1 2 07 13 15 16
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- 161 How much longer does it take for car B to go 50 kilometers 1 303 2 2 4 34 2 19 0 4 7 08 32 34 35
- 167 The graph shows the time of travel by pupils from home to 3 304 2 0 4 23 4 11 0 4 7 03 34 35

- 163 There are five black buttons and one red button in a jar. If 2 305 1 0 4 11 3 6 0 4 7 34 41
- 164 According to the scale shown, the length of side BC of a 1 402 1 0 4 8 4 30 0 5 5 01 03 38 39
- 165 Which of the following is the closest approximation to the area of 4 403 2 0 4 28 0 5 1 5 5 01 03 05 38 40
- 166 What is the surface area c. this solid rectangular box? 5 404 1 0 4 18 3 20 0 5 5 03 37 38 39
- 167 The area of the shaded figure, to the nearest square unit, is 4 402 3 0 4 20 0 6 1 5 5 01 38 40
- 168 A solid plastic cube with edges 1 cm long weighs 1 gram. 1 404 4 0 4 17 0 10 1 5 5 37 38 40
- 169 Suppose you start at point m(-1,-1), move a distance of one 3 207 2 0 1 8 3 11 0 3 4 27 28 29 31
- 170 Given vector V and vector W as shown in the figure above, 2 215 3 0 4 27 4 18 0 3 4 29 31
- 171 If D is the direction of projection and A is the axis of 5 215 2 0 2 20 1 8 0 3 4 29 31
- 172 Find the value of N. N = $10^{**3} + 10^{**1} + 10^{**0} + 10^{**}(-2)$ 3 103 2 0 3 24 2 22 0 2 3 20 21
- 173 U and V are two vectors. Which figure below represents U V? 4 215 1 0 1 6 2 11 0 3 4 29 30
- 174 A half-turn about 0 is aplied to the figure above. Which of 4 215 2 0 4 24 4 22 0 3 4 28 29 31
- 175 On a number line two points A and B are given. The coordinate 5 207 2 0 3 3 0 11 0 3 4 27 29 31
- 176 Among the following lines D1, D2, D3, D4, D5, which has no 2 205 3 0 2 10 1 14 0 3 4 29 31
- 177 Candidate A received 70 percent of the votes cast in an 3 004 3 0 0 0 3 14 0 1 2 03 05 07 14 15 16
- 178 72% is equal to 1 004 1 0 0 0 2 1 0 1 2 03 06 14 15 43

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197 The picture above shows how Pedro used a short tree to find 1 204 3 0 0 0 2 32 0 3 4 03 07 25 26 29 31 47

198 Which of the following patterns can be folded along the 3 212 4 0 0 0 3 4 0 3 4 29 31

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199 The area of the shaded circle is what part of the area of the 3 404 3 0 0 0 4 9 0 5 5 37 38 40

2.2.1 Key to Reading Cognitive Item Table

For each item the following information is available in the cognitive item table:

Sample item:

いたちょう かんかい たいまた かいたい あいたい アンドリント・シート たいない たいたい しんちゅう しょうしょう

Line 1: 028 The graph of a function f has a point of inflection at Line 2: 3 505 1 0 1 07 1 07 5 14 16 27

Line 1: International information

028--Item code

The graph of a function f...-Partial text

Line 2: International information

3--Correct response

505--Position in International Content Grid

1--Behavioural Category

0--Anchor item status, see below

- 1 07--Form and position of the item on the crosssectional version of the study (i.e., Form 1 Item 7)
- 1 07--Form and position of the item on the longitudinal version of the study (i.e., Form 1 Item 7)
- 5--Stratum for crosssectional form construction

14 16 27--Subtest codes

Definitions:

Item code:

For Population B there are 136 items

Behavioural levels:

- 1 Computation
- 2 Comprehension
- 3 Application
- 4 Analysis

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- 0 Not an anchor
- 1 Anchor item
- 2 Modified anchor item

Stratum for form construction:

- 1 Sets and Relations
- 2 Number Systems
- 3 Algebra
- 4 Geometry
- 5 Elementary Calculus
- 6 Probability and Statistics
- 7 Finite Math

Subtest codes:

These are the subtests as defined in the study. The number of subtest codes per item varies. The following subtest codes are used:

01 Sets and Relations 02 Number Systems 03 Number Systems (excluding Complex Numbers) 04 Complex Numbers 06 Algebra 07 Algebra (Computation) 08 Algebra (other than Computation) 09 Ecations and Inequations 10 Geometry 11 Analytical Geometry 13 Trigonometry 14 Analysis 15 Functions 16 Differentiation 17 Integration 18 Calculus 19 Probability and Statistics 20 Calculator Use 21 Anchor Items 'New' Mathematics 22 25 Behaviour/Analysis 26 Higher Level Behaviours 27 Computation 28 Comprehension

29 Application

2.2.2 Cognitive Item Table

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1. P.

| 001 If X and Y are sets, then (X U Y) intersects (X intersect 4 102 2 2 2 11 2 11 1 01 21 22 28 | Y) |
|---|----------|
| 002 For all rational numbers A,B,C and D, A - (B + (C - D)) 2 201 1 0 2 01 2 01 2 02 03 27 | |
| 003 An operation * (on the set of real numbers) is commutati 4 201 3 1 2 16 2 16 2 03 21 22 29 | ve if, |
| 004 3a**1/2 x 3a**-1/2 = 5 204 1 0 6 01 6 01 2 07 27 | |
| 005 Which of the following points lies in the region bounded 1 305 2 0 1 14 1 14 3 08 09 29 | by |
| 006 The curve defined by y = 3x (x - 2)(2x + 1) intersects th 5 301 2 0 2 02 2 02 3 08 15 29 | e x-axis |
| 007 A stationer wants to make a card 8 cm long and of such a 2 304 3 1 8 09 8 09 3 08 09 21 25 | width |
| 008 P is a polynomial in x of degree m, and Q is a polynomial 1 301 4 0 3 10 3 10 3 08 28 | |
| 009 In a Cartesian coordinate system, what is the equation 2 403 2 1 3 17 3 17 4 09 11 21 29 | |
| 010 In the interval 2 pi (le) x (le) 4 pi 3 406 3 0 6 05 6 05 4 09 13 20 29 | |
| 011 L is the line determined by the equation $ax + by = 0$, and 5 403 3 0 7 13 7 13 4 10 11 27 | m is |
| C12 Which of the following is (are) true for all values of the 4 501 1 1 4 15 4 15 5 13 14 15 21 29 | eta |
| 013 Which of the following could be a sketch of the graph 2 502 3 0 7 17 7 17 5 14 15 27 | |
| 014 A function f is defined by $f(x) = (3x + 1)**6$. 3 504 1 0 6 04 6 04 5 14 16 27 | |
| 015 Intgr (x - 1)**2 dx is equal to 3 507 1 1 1 05 1 05 5 14 17 21 28 | |
| 016 Let a function f be defined by $f(x,y) = x$. 1 104 4 0 8 08 8 08 1 01 15 22 25 | |
| 017 The number of pairs of integer values of x,y which satisfy 2 305 1 0 7 10 7 1C 3 07 09 27 | 1 |

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018 If z = cos(pi/6) + i sin(pi/6) then z^{**3} is equal to 3 205 3 0 7 04 7 04 2 02 04 29 019 Which of the following (x - 1), (x - 2), (x + 2), (x - 4)5 301 2 0 4 02 4 02 3 08 20 28 020 x and y are real numbers. The product of the matrices 4 306 3 2 3 12 3 12 3 08 22 29 021 According to the graph, (ax + b) (gt) (cx**2) when 2 304 4 0 8 13 8 13 3 08 09 25 022 The rectangular coordinates of three points in a plane 5 405 2 0 5 14 5 14 4 10 28 023 An angle theta is known to be between 90 degrees and 180 degrees 1 406 3 2 4 07 4 07 4 10 13 20 29 024 As line segment AB rotates about line segment AC in space 1 403 4 0 6 07 6 07 4 10 11 25 025 Which of the following is negative ? 3 501 1 0 4 03 4 03 5 10 13 20 27 026 Given log (base b) 2 = 1/3, log (base b) 32 is equal to 4 501 3 1 8 15 8 15 5 14 21 29 027 Which of these is the sketch of the graph of the function f 2 501 3 0 1 01 1 01 5 14 15 29 028 The graph of a function f has a point of inflection at 3 505 1 0 1 07 1 07 5 14 16 27 029 The line z in the figure is the graph of y = f(x)4 508 1 0 8 03 8 03 5 14 17 27 030 A set of 24 cards is numbered with the positive integers 4 601 1 1 4 14 4 14 6 21 27 031 The symbol P(intersects)Q represents the intersection 2 102 2 1 3 06 3 06 1 01 21 22 28 032 Given that the square root of 600 's approximately 24.4949 1 203 1 0 1 13 1 13 2 02 03 27 033 If a(subscript 1) = 1 and a(subscript n+1) = a(subscript n) 5 202 3 0 3 07 3 07 2 03 28 034 The complex number z = x + iy (where x and y are real numbers) 3 205 4 0 8 16 8 16 2 02 04 25

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035 What are all values of x for which the inequality 2 304 2 1 5 05 5 05 3 08 09 21 28 $036 P(n) = n^{**}3 - 2n^{**}2 - n + 2/(n^{**}2 - 1)$ 3 302 1 0 8 04 8 04 3 07 27 037 The equation of line 1 is y = 4x - 5. 1 305 3 0 5 10 5 10 3 08 09 29 038 A certain number of students are to be accommodated in a hcstel. 2 305 3 0 7 07 7 07 3 08 09 29 039 If cos theta = 1/2, then cos 2 theta 1 406 1 0 5 07 5 07 4 10 13 20 27 040 Point B is on line AC. If AC = 3AB, then C is 3 405 3 0 5 12 5 12 4 10 22 29 041 The graph of the curve $y = (2x + 1) / (x^{**2} + 2x + 3)$ intersects 5 501 1 0 7 12 7 12 5 14 15 27 042 The functions f and g are defined by f(x) = x - 14 502 2 0 8 12 8 12 5 14 15 22 28 043 The graph above is the representation of one of the following 5 501 3 1 7 05 7 05 5 14 15 21 29 044 The graph of the function f is shown above 4 508 3 0 6 13 6 13 5 14 17 29 045 Four persons whose names begin with different letters 2 601 1 2 2 12 2 12 6 19 21 27 046 A function f with domain (1,2,3) is defined 5 104 1 0 4 01 4 01 1 01 15 22 27 047 If $10^{**a} = 4$ then $10^{**}(1 + 2a)$ is equal to 3 204 2 0 7 16 7 16 2 02 03 29 048 The speed of an object increases uniformly 4 203 3 0 4 19 4 09 2 02 03 20 29 049 8/(3-2**1/2) is equal to 2 303 1 0 3 08 3 08 3 07 27 050 Two mathematical models are proposed to predict the return y 5 304 2 0 2 08 2 08 3 08 09 22 29 051 A piece of wire 52 cm long is cut into two parts 2 305 4 0 6 15 6 15 3 08 09 25 052 Find the difference: (vector b) - (vector a) of the vectors 2 405 1 1 8 11 8 11 4 10 21 22 27

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053 What is the equation in x and y of the curve 4 403 3 1 6 08 6 08 4 10 11 21 29 054 For what values of x does the function 1 501 2 1 4 10 4 10 5 14 15 21 055 The diagram shows the sketch of the graph of the cubic function f 3 501 2 0 2 05 2 05 5 15 28 056 A radioactive element decomposes according 1 501 3 1 3 13 3 13 5 14 15 21 29 057 If the graph of the equation $y = 3x^{**}3 + 6x^{**}2 + kw + 9$ 5 505 1 0 3 04 3 04 5 14 16 29 058 The area enclosed between the curve $y = x^{**}4 - x^{**}2$ 3 508 2 0 2 10 2 10 5 14 17 28 059 In the graph, rainfall (in centimetres) is plotted 2 602 1 0 1 08 1 08 6 19 27 060 The same test was given in two classes. The first class, 4 602 3 0 6 10 6 10 6 19 20 29 061 The inverse of the function [(-2,0),(-1,1),(0,2),(1,3)] is 2 104 1 0 3 14 3 14 1 01 15 22 27 062 If u = 3+i, and v = -2-2i, then u/v is equal to 2 205 1 0 3 02 3 02 2 02 04 27 063 A number is the multiplicative inverse 3 201 2 1 8 07 8 07 2 02 03 21 22 28 064 According to one plan for travelling to Mars, 5 202 4 1 5 02 5 02 2 02 03 21 25 065 If(x-1) / (x**2 + 3x + 2) = p / (x+1) + q / (x+2)1 302 1 0 4 12 4 12 3 07 27 066 The solution set for the equation (1-2x)(2+x) = 01 301 1 0 2 14 2 14 3 07 09 27 067 If x is a real number, then y defined by 4 303 3 0 5 03 5 03 3 08 29 068 In the figure above, (line segment)PG (is perpendicular to) 3 406 1 2 6 09 6 09 4 10 13 21 27 069 One side of an equilateral triangle lies along the x-axis 1 403 3 0 2 09 2 09 4 10 11 29 070 If xy = 1 and x (gt) 0, which of the following statements is true 5 502 2 1 1 10 1 10 5 14 15 21 28

089 A warning system installation consists of two independent alarms 1 601 3 0 4 11 4 11 6 19 20 29 090 If n distinct points are marked on a circle 5 701 2 0 5 09 5 09 7 28 091 A function f is defined by f(x) =1 104 3 0 4 05 4 05 1 01 15 22 29 092 The complex number (1+i)**2 is equal to 3 205 1 1 4 13 4 13 2 02 04 21 27 093 Z is a complex number with the modulus $(2^{**1/2})$ 2 205 2 0 1 09 1 09 2 02 04 28 094 If a is a dig ., let .a represent the number 4 203 4 0 6 11 6 11 2 02 03 25 095 When (1+p)**6 is expanded, the coefficient of 3 301 1 1 5 16 5 16 3 07 21 27 096 Given that a (gt) 0, $(a^{+}5)^{+}1/6$ is equal to 1 303 2 0 1 02 1 02 3 08 28 097 A freight train travelling at 50 kilometres per hour 4 304 3 1 6 12 6 12 3 08 09 20 21 29 098 PQRSTJ is a regular hexagon in which PQ represents 5 405 2 0 7 15 7 15 4 10 22 28 099 If UV = 2, YZ = 3, XU z = 3 and UV parallel to YZ, 4 401 1 0 1 03 1 03 4 10 27 100 R is a vector which can be expressed as 1 405 4 0 1 16 1 16 4 22 25 101 Lim(2x+1)(x+1)/(3x**2-2) is equal to 2 503 2 0 6 02 6 02 5 14 20 28 102 The function f, defined by f(x) [(x-1)(3x+1)] / [2x-1)(x-2)]5 502 4 0 5 11 5 11 5 14 15 25 163 Intgr $i-2(x^{**3} - x)dx$ is equal to ' 3 506 3 C 1 04 1 04 5 14 17 29 104 At which roint does the curve y= 3x**2 - x**3 5 505 1 0 2 15 2 15 5 14 16 27 105 How many four digit numbers .ss than 2467 1 701 3 9 7 03 7 03 7 29 106 The function f s defined by i(x) = e3 504 1 0 3 15 3 15 5 14 16 27

107 Intgr [(x-1)**1/2]dx is equal to 1 506 1 0 6 17 6 17 5 14 17 27 108 The value of $\lim(h - 0)[(2+h)**1/^{2} - 2**1/2)] / h$ is 2 503 2 1 7 08 7 08 5 14 20 21 28 109 Given that 3 (x) $f'(x) = x^{**2} - 5$, and f(2) = 1, 5 505 3 1 5 C4 5 04 5 14 17 21 29 110 The function f is defined for all real numbers by 2 503 3 0 4 17 4 17 5 14 22 29 111 The intersection of a cylinder with a plane through 4 505 4 0 3 16 3 16 5 14 16 25 112 The function f defined by $f(x) = x^{**4} + 4x^{**3} + 4x^{**2} + 5$ 2 505 1 0 5 13 5 13 5 14 16 27 113 Inter 1-2 $[x - (1/x^{*/2})]dx$ is equal to 2 506 1 0 4 04 4 04 5 14 17 28 114 The function f is defined by $f(x) = intgr 0-x [(1 + u^{*2})^{*1/2}]^{*1}$ 5 506 2 0 5 06 5 06 5 14 17 28 115 This figure shows the graph of y = f(x), a being less than b. 3 508 2 1 3 03 3 03 5 14 17 21 28 116 Intgr 0-1 [12x / (2x**2 + 1)**2] is equal to 3 506 2 0 2 07 2 07 5 14 17 28 117 The curve defi.ed by $y=x^{**3} - ax + b has a relative minimum$ 3 505 3 0 7 11 7 11 5 14 16 29 118 If $x = 2\cos t$ and $y = \sin t$, find dy/dx 4 504 3 0 5 15 5 15 5 14 16 29 119 Which of the following graphs has these features: 1 505 4 0 4 16 4 16 5 14 16 25 120 The area enclosed between the curve $y = 2x^{**3} - 6x^{**2} + 3$ 5 508 1 0 8 06 8 06 5 14 27 12 The mappings F, G. H from the real line R o 403 1 0 6 14 6 14 4 27 122 F is an even function and is differentiable at 0. 4 505 2 0 5 17 5 17 5 14 16 22 28 123 Which complex transformation 's associated with 1 409 3 0 3 09 3 09 4 10 22 29 124 In the affine Euclidean glane, the coordinates 3 505 1 0 4 06 4 06 4 14 16 22 27

75

- 125 An examination consists of 13 questions 3 701 2 0 8 10 8 10 7 28
- 120 In the Euclidean plane, the coordinates of a moving point m 4 406 2 0 7 09 7 09 4 10 28
- 127 5**2n + 5**n, where n is a natural number 4 202 3 0 2 13 2 13 2 29
- 128 In the plane E, T(subscript v) is the translation 3 409 3 0 1 11 1 11 4 10 22 29
- 129 In how many ways can one arrange on a bookshelf 1 701 3 0 1 06 1 06 7 29
- 130 Let 1 and m be two intersecting lines in the Euclidean plane 2 409 1 0 6 06 6 06 4 10 29

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- 131 Consider the three points in the Euclidean plane: 4 403 2 0 4 08 4 08 4 10 11 29
- 132 Let f be the mappings from the complex plane c 5 409 2 0 5 08 5 08 4 10 28
- 133 For which of the following values of m is 2 403 1 0 7 14 7 14 4 10 27
- 134 Let e be the Euclidean plane and f be the mapping 5 409 1 0 2 03 2 03 4 10 22 29
- 135 If z =(3**1/2 +i)/2, then z**60 is equal to 5 205 2 0 3 11 3 11 2 02 04 28

.

136 Consider the subspaces of the vector space R(3)4 405 2 0 8 05 8 05 28 3. Definitions of International Subtests

3.1 POPULATION A

(199 items)

Content: Arithmetic

001 Natural numbers

N items = 10

Items are:

.

ID Partial text

001 $(22 \pm 18) - (147 \pm 59)$ is equal to Matchsticks are arranged as follows. If the pattern is 002 011 1054 - 865 042 Which of the following is equal to a quarter of a million 073 162 + 47 is equal to (Triangular array of 1's) What is the sum of the 50th row? 074 Which of the following is (are) true? 105 Peter and Paul decided to sit t saving money. Peter can save 106 Which of the fo, ...wing operations with whole numbers will 136 138 A group of children was divided into 7 teams with nine in

002 Common fractions

N items = 12

Items are:

ID Partiaï text

003 2/5 + 3/8 is equal to Which of the following is a pair of equivalent fractions? 004 Which of the points A, B, C, D, E on this number line 043 044 There are 35 students in a class. 1/5 of them come to school 075 In the figure the little squares are all the same size and Four 1-liter bowls of ice cream were set out at a party 076 107 $1 \frac{2}{5} - \frac{1}{2}$ is equal to (3/5)/(2/7) is equal to 139 *165 Which is the closest estimate for the answer to 5 3/7 + 6 5/8*186 1/2 + 1/4 is equal to 3/8 - 1/5 is equal to *187 The picture shows some black and some white marbles. Of all *188

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003 Decimal fractions
     N items = 13
     Items are:
       ID
             Partial text
             C.40 + 6.38 is equal to
       005
       006
             Alexander walked from Riverview to Bridgeport, which are
       007
             (847.36) in the number in the box, the digit 6 represents
       045
             The value of 0.2131 * 0.02958 is approximately
             The position on the scale indicated by the arrow is
       077
       078
             A runner ran 3,000 meters in exactly 8 minutes. What was
       108
             .004)24.56. In the division above, the correct answer is
       109
             In a discus-throwing competition, the winning throw was 61.60
       140
             7 3/20 is equal to
       141
             The speed of sound is approximately 340 meters per second
      *182
             Which of the following is thirty-seven thousandths?
      *183
             74.236 rounded to the nearest hundredth is
      *184
             The large square has area 1 square unit. The area of the
004 Ratio, proportion, percentage
     N items = 17
     Items are:
       ID
            Partial text
             In a school of 800 pupils, 300 are boys. The ratio of the
      068
      009
             30 is 75% of what number?
            20% of 125 is roual to
      046
      047
            If the ratio of 2 to 5 equals the ratio of n to 100, then in
      079
            A painter is to mix green and yellow paint in the ratio of
      110
            In a school election with three candidates, Joe received 120
      142
            The table above shows the values of x and y, where x is
      143
            If there are 300 calories in 100 grams of a certain food,
      *177
            Candidate A received 70 percent of the votes cast in an
     *178
            72% is equal to
     *179
            What is 20 as a percent of 80%?
            $150 is divided in the ratio of 2 to 3. The smaller of the
     *180
     *181
            A model boat is built to scale so that it is 1/10 as long as
     *189
            1/5 is equal to
     *190
            Cloth is sold by the square meter. If 6 square meters of
            The price of an article was $100. The price was first
     *191
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79

*192 A car takes 15 minutes to travel 10 kilometers. What is the

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005 Number theory
     N items = 3
     Items are:
       ID
             Partial text
             Which of these numbers is a prime number?
       080
             Which of the following equals 7 * (3 + 9).
       111
             One bell rings every 8 minutes, a second bell rings every 12
       144
006 Exponents
     N items = 3
     Items are:
       ID
             Partial text
       010
             The value of 2^{**3} * 3^{**2} is
             If 10**2 * 10**5 is equal to
       048
             3.23 * 10**5 is equal to
       012
008 Square roots
     N items = 3
     Items are:
       ID
             Partial text
             What is the square root of 12 * 75?
      011
             Since 4 * 9 = 36, the square root of 36 is equal to
      081
       145
             The square root of 75 is between
009 Dimensional analysis
    N items = 1
     Items are:
      ID
            Partial text
                           ,
      146
            Find the sum: 3 weeks 5 days + 9 weeks 6 days
```

80

1.2

Content: Algebra

101 Integers N items = 7Items are: ID Partial text 012 (-2) * (-3) is equal to The air temperature at the foot of a mountain is 31 degrees. 013 -5(6 - 4) is equal to 043 John is 4 years older than Ellen and Ellen is 11 years 050 The set of integers less than 5 is represented on one of the 082 113 (-6) - (-8) is equal to The first error, if any, in this reasoning occurs in 114 102 Rationals N items = 4Items are: ID Partial text 104 Which of the following sequences of numbers is in the order A student's solution to the problem...check the student's 051 a, b, and c are numbers greater than 0. Which of these 083 (-3/40 - (-1/8) =147 103 Integer exponents N items = 2Items are: ID Partial text 084 0.00046 is equal to 172 Find the value of n. $n = 10^{**3} + 10^{**1} + 10^{**0} + 10^{**}(-2)$ 104 Foi Julas N items = 9Items are: ID Partial text 015 Simplify: 5x + 3y + 2x - 4ySoda costs a cents for each bottle, but there is a refund 016 The cost of printing greeting cards consists of a fixed If y dollars are hared equally among four boys, how many 052 085

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If x = 3, the value of -3x is
        115
              If x = y = z = 1, then 9x - z / (x = y) is equal to
        116
              Which of the following is false when a, b, and c are
       148
              A shopkneper has x kg of tea in stock. He sells 15 kg and
       149
      *195
              A number x is multiplied by itself and the result is added to
105 Polynomials
     N items = 3
     Items are:
       ID
             Partial text
       053
             When x = 2, (7x + 4) / (5x - 4) is equal to
       088
             a/15 - b/5 is equal to
             12x = 16y =
       150
106 Equations and inequations
     N items = 9
     Items are:
       ID
             Partial tex1
       017
             If p = 1w and if p = 12 and 1 = 3, then w is equal to
             The error in the above reasoning, if one exists, first
       018
       054
             Which equation is true for all values of n?
       086
             If \frac{1}{x}/12 = 0, then x is equal to
             The Davis family took a car trip from Anabru through Bergen
Six times a certain number ( 11 it q) equals the sum of
       087
       117
             (x/2) 7 is equivalent to
       113
             If 5x + 4 = 4x - 31, then x is equal to
       151
             The sentence 'A number x decreased by 6 is less than 12' can
      *196
107 Relations and functions
     N items = 4
     Items are:
       ID
             Partial text
       019
             The table below compares the height from which a ball is
             For the table shown, a formula that could relate m and n is
       055
             If y = 2x - 5 and x = 2, then y =
       119
             A bowling ball travels 4 meters per second. The distance in
       152
```

82

and the second

110 Finite sets N items = 1Items are: ID Partial text 020 There are 9 elements in set Q and 6 in set R. How many Which one of the following diagrams illustrates the statement 056 The symbol P intersect Q represents the intersection of sets 120 There are 227 boys in a school. Every boy in the school 153 Content: Geometry 201 Classification of plane figures N items = 6Items are: ID Partial text 021 A quadrilateral must be a parallelogram if it has 022 AB, DC, AD, EF are intersecting straight lines as shown The figure QRST is a square an POT and POT an equilateral 057 triangle 089 AR // DC and AC // BC. Quadrilateral ABCD is a Which of the indicated angles is acute? 121 Four identical equilateral triangles have been arranged as 154 202 Properties of plane figures N items = 8Items are: ID Partial text The length of the circumference of the circle with center at 023

83

1023 The Tength of the Circumference of the Circle with center at
1058 Lines AB and CD are parallel. Two angles whose measures
1059 Three straight lines intersect as shown in the diagram.
190 The line M is a line of symmetry for figure ABCDE. The
122 (Triangle with 2 angles given) X is equal to
123 In a quadrilateral, two of the angles each have measure of
128 If, in the given figure, PQ and RS are intersecting straight
155 If AB is a straight line, what is the measure in degrees of

203 Congruence of plane figures N items = 4Items are: ID Partial text If segment 20 were drawn for each figure shown below, it 024 The triangles shown above are congruent. The measures of One of the following figures is congruent with the figure 025 091 124 If the triangles above are congruent and M angle A = 204 Similarity of plane figures N items = 6Items are: ID Partial text On level ground, a boy 5 units tall cast a shadow 3 units **J26** Two of these triangles are similar. They are If triangle XYZ is a triangle similar to triangle ABC but 060 092 If two triangles are similar, which of the following 125 156 Triangles POR and STU are similar. How long is SU? The picture above shows how Pedro used a short tree to find *197 205 Geometric constructions N items = 1Items are: ID Partial text Among the following lines D, D2, D3, D4, D5, which has no 176 206 Pythagorean triangles N items = 3 Items are: ID Partial text 027 Right triangle with 2 sides given what is the value of S? Which of these is a correct statement for this triangle? 093 (Trapezoid with dimensions) X is equal to 8193

207 Coordinates N items = 7Items are: ID Partial text 028 What are the coordinates of point P? 029 One of the following points can be joined to the point (-3,4)If S is the set of points with x-coordinates greater than 3 061 In the diagram, OPOR is a parallelogram, 0 is the origin The straight line joining the points 92, 30 and 92, 70 cuts 094 126 Suppose you start at point M (-1,-1), move a distance of one 169 175 On a number line two points A and B are given. The coordinate 208 Simple deductions N items = 2Items are: ID Partial text 062 In the above rectangle the measure of angles ROQ Which statement can be used to find the value of Y? 095 127 In the above diagram, triangles ABC and DEF are congruent, 209 Informal transformations N items = 54Items are: ID Partial text If triangle PRS maps onto triangle PR'S under a reflection 157 In which diagram below is the second figure the image of the 030 063 PQRS is a rectangle. Its image after a transformation is 096 Triangle ABC and triangle A'B'C' are congruent and their 158 Triangle POT can be rotated (turned) onto triangle SQR. The 211 N items = 1 Items are: ID Partial text 064 What is the name of the solid figure, each of whose faces

303 Representation of data

N items = 7

Items are:

ID Partial text

O33 The circle graph shows the proportion of various grain crops O34 Which of these is a true statement about the information O66 The graph shows the distance traveled by a tractor during a O98 Here is a table of data and a graph of the same d>ta. What is 129 There are 7,000,00C girls under the age is a country 160 Three hours after starting, car a is how many km ahead of car How much longer does it take for car b to go 50 kilometers

304 Interpretation of data

N items = 6

Items are:

ID Partial text

The arithmetic mean (average of: 1.50, 2.40, 3.75) is equal to
Joe had three test scores of 78, 76 and 74, while Mary had
In the graph, rainfall in centimeters is plotted for 13 weeks
The weight gain from 6 to 10 months was
A team scores an average of 3 points per game over 5 games
The graph shows the time of travel by pupils from home to

306 Outcomes and events

N items = 1

Items are:

ID Partial text

163 There are five black buttons and one red button in a jar. If

Content: Measurement

401 Standard units

N items = 5

Items are:

ID Partial text

036 Which of the following is...to the weight of a normal man? 068 The distance between two towns is usually measured in

100 2 meters + 3 millimeters is equal to A 15 centimeter piece is cut from a ribbon 1 meter long. What 101 133 How many pieces of pipe each 20 meters long would be required 402 Estimation N items = 6Items are: ID Partial text 038 On the above scale the reading indicated by the arrow is 069 The length of AB is 1 unit. Which is the best estimate for 102 The measure of the angle shown is nearest to 134 Each of the small squares in the figure is 1 square unit According to the scale shown, the length of side BC of a 164 167 The area of the shaded figure, to the nearest square unit, is 403 Approximation N items = 3Items are: ID Partial text 072 The figure above shows a rectangular box. Which of the The length of a box was measured and found to be 9 cm to the 135 Which of the following is the closest approx. to the area of 165 404 Determination of measures (areas, volumes, etc.) N items = 11Items are: ID Partial text 037 The total area of the two triangles is What is the volume of a rectangular box with interior 039 040 There is a brass plate of the shape and dimensions shown in 070 What is the area of the above parallelogram? The rectangle shown above is cut along the dotted lines, and 071 103 A square is removed from the rectangle as shown. What is the 104 Michael has a large number of woodca blocks which are cubical 136 What is the capacity of a cubic container 10 cm by 10 cm by What is the surface area of this solid rectangular box? 166 A solid plastic cube with edges 1 cm long weighs 1 gram. 168 *194 What is the area of triangle rod? *199 The area of a shaded circle is what part of the area of the

*In longitudinal version of test only. Not included in international subscores.

3.2 POPULATION B

(136 Items)

Content: Sets and Relations 102 Set Operations N Items = 2Items are: ID Partial test If x and y are sets, then $(x \cup y)$ intersects (x intersect y)The symbol (p(intersects)q) represents the intersection 001 031 104 Functions N Items = 5Items are: ID Partial text Let a function f be defined by f(x,y) = x. Let g = A function f with domain (1,2,3) is defined 016 045 The inverse of the function -(-2,0), (-1,1), (0,2), (1,3)-A real valued function f defined on a set of real numbers 061 076 A function f is defined by f(x) =091 Content: Number Systems 201 Common Laws for Number Systems N Items = 3Items are: ID Partial text 002

002 For all rational numbers a,b,c and d, a - (b + (c - d)) is 003 An operation * (on the set of real numbers) is commutative 063 A number is the multiplicative inverse

```
202 Natural Numbers
      N Items = 4
      Items are:
        ID
              Partial text
        033
              If a(subscript 1) = 1 and a(subscript n+1) = a(subscript n)
              According to one plan for travelling to Mars,
        064
              If a = 2^{**3}(x) 5^{**2}(x) 7 and b = 3^{**2}(x) 5^{**3}(x) 7^{**2}(x)
        078
              5**2n + 5**n, where n is a natural number
       *127
203 Decimals
     N Items = 3
     Items are:
        ID
              Partial text
        032
              Given that the square root of 600 is approximately 24.4949
              The speed of an object increases uniformly
        048
       094
              If a is a digit, let .a represent the number
204 Real Numbers
     N Items = 3
     Items are:
       ID
              Partial text
       004
              3a^{**1/2} \times 3a^{**-1/2} =
              If 10^{**a} = 4 then 10^{**}(1 + 2a) is equal to
       047
              If 3^{**}(x+y) = 81 and 25^{**}(x/2) = 5.
       077
205 Complex Numbers
     N Items = 6
     Items are:
       ID
              Partial text
              If x = cos(pi/6) + i sin(pi/6) then z^{**3} is equal to
The complex number z = x + iy (where x and y are real numbers)
       018
       034
              If u = 3+i, and v = -2-2i, then u/v is equal to
       062
              The complex number (1+i)**2 is equal to
       092
              Z is a complex number with the modulus (2**1/2)
       093
              If z = (3**1/2 + 1)/2, then z^{*+60} is equal to
       135
```

Content: Algebra

```
301 Polynomials
     N Items = 6
      Items are:
        ID
              Partial text
        006
              The curve defined by y = 3x (x - 2)(2x + 1) intersects the x
              P is a polynomial in x of degree m, and q is a polynomial Which of the following (x - 1), (x - 2), (x + 2), (x - 4) are
        008
        019
              The solution set for the equation (1-2x)(2+x) = 0
        066
        079
              If 2x^{**2} - 12x + 9 = 2(x-a)^{**2} + b then
        095
              When (1+p)**6 is expanded, the coefficient of
302 Quotients of Polynomials
     \aleph Items = 2
     Items are:
       TD
              Partial text
              P(n) = n^{**3} - 2n^{**2} - n + 2/(n^{**2} - 1)
       036
       065
              If (x-1) / (x^{**2} + 3x + 2) = p / (x+1) + q / (x+2)
303 Roots and Radicals
     N Items = 5
     Items are:
       ID
              Partial text
       049
              8/(3-2^{**1/2}) is equal to
              If x is a real number, then y defined by
       067
              If x(gt) 0, y(gt) 0, and x(ne) y
       080
       081
              If x and y are real numbers, for which x can you define y
       096
              Given that a (gt) o, (a^{**5})^{**1/6} is equal to
304 Equations and Inequalities
     N Items = 6
     Items are:
       ID
              Partial text
       007
              A stationer wants to make a card 8 cm long and of such a width
       021
              According to the graph, (ax + b) (gt) (cx^{**2}) when
       035
              What are all values of x for which the inequality
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050 Two mathematical models are proposed to predict the return For the equation $x^{**2} - 5x + 6 = 0$ 082 097 A freight train travelling at 50 kilometers per hour 305 Systems of Equations and Inequalities N Items = 5Items are: ID Partial text 005 Which of the following points lies in the region bounded by The number of pairs of integer values of x, y which satisfy 017 037 The equation of line 1 is y = 4x - 5038 A certain number of students are to be accommodated in a 051 A piece of wire 52 cm long is cut into two parts 306 Matrices N Items = 1Items are: ID Partial text 020 x and y are real numbers. The product of the matrices Content: Geometry 401 Euclidean Geometry N Items = 1Items are: ID Partial text 099 If UV = 2, YZ = 3, XU = 3 and UV parallel to YZ, 403 Analytic Geometry in the Plane N Items = 9Items are: ID Partial text 009 In a Cartesian coordinate system what is the equation L is the line determined by the equation ax + by = 0, and m 011 As line AB rotates about line AC in space keeping an angle 024 053 What is the equation in x and y of the curve One side of an equilateral triangle lies along the x-axis 069 The slope of the line through the two points (-1,3) and (4,-1) 92

100

*121 The mappings F, G, H from the real line R Consider the three points in the Euclidean plane: 131 For which of the following values of M is 133 405 Vector Methods N Items = 6Items are: ID Partial text 022 The rectangular coordinates of three points in a plane 040 Point B is on line AC. If AC = 3AB, then C is Find the difference: (vector B) - (vector A) of the vectors 052 098 PQRSTU is a regular hexagon in which PQ represents R is a vector which can be expressed as 100 *136 Consider the subspaces of the vector space R(3)406 Trigonometry N Items = 7Items are: ID Partial text In the interval 2 pi (le) x (le) 4 pi 010 An angle theta is known to be n between 90 degrees and 180 023 039 If $\cos theta = 1/2$, then $\cos 2(x)$ theta In the figure above, (line segment)PQ (is perpendicular to) 068 084 Which of the following pairs of angles can be used In any triangle ABC, if A, B, and C are the lengths 085 In the Euclidean plane, the coordinates of a moving point m 126 409 Transformational Geometry N Items = 5Items are: ID Partial text 123 Which complex transformation is associated with 128 In the plane E, T(subscript v) is the translation Let L and M be two intersecting lines in the Euclidean plane 130 132 Let F be the mappings from the complex plane C

a water the second second to be a second of the

134 Let E be the Euclidean plane if F be the mapping

101

Content: Elementary Functions/Calculus

501 Elementary Functions N Items = 11Items are: ID Partial text 012 Which of the following is (are) true for all values of theta 025 Which of the following is negative? Given log (base b) 2 = 1/3, log (base b) 32 is equal to 026 027 Which of these is the sketch of the graph of the function f 041 The graph of the curve $y = (2x + 1) / (x^{*}2 + 2x + 3)$ intersects The graph above is the representation of one of the following 043 For what values of x does the function 054 055 The diagram shows the sketch of the graph of the cubic function 056 A radioactive element decomposes according Let $y = 4x^{**3}$, with x and y taking positive real values If log n = n', then log n^{**2} is equal to 071 087 502 Properties of Functions N Items = 4Items are: ID Partial text Which of the following could be a sketch of the graph 013 The functions f and g are defined by f(x) = x - 1042 If xy = 1 and x(gt) 0, which of the following statements is 070 The function f, defined by f(x) - (x-1)(3x+1) - (2x-1)(x-2) - (2x-1)(x102 503 Limits and Continuity N Items = 4Items are: ID Partial text 086 The sum of the infinite geometric series $\lim(2x+1)(x+1)/(3x+2-2)$ is equal to The value of $\lim(h - 0)-(2+h)+1/2 - 2+1/2) - / h$ is 101 108 The function f is defined for all real numbers by 110

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504 Differentiation
     N Items = 4
      Items are:
        ID
              Partial text
              The function f is defined by f(x) = (3x + 1)**6.
        014
        072
              The derivative with respect to x of
        106
              The function f is defined by f(x) = e
        118
              If x = 2\cos t and y = \sin t, find dy/dx
505 Application of the Derivative
     N Items = 10
     Items are:
        ID
              Partial text
       028
              The graph of a function f has a point of inflection at
              If the graph of the equation y = 3x^{**}3 + 6x^{**}2 + kw + 9
       057
              The velocity of a body moving in a straight line
       088
       104
              At which point does the curve y = 3x^{*2} - x^{*3}
              The intersection of a cylinder with a plane through
       111
              The function f defined by f(x) = x^{**4} + 4x^{**3} + 4x^{**2} + 5
       112
              The curve defined by y = x^{*}3 - ax + b has a relative minimum
       117
       119
             Which of the following graphs has these features:
              f is an even function and is differentiable at O.
       122
       124
              In the affine Euclidean plane, the coordinates
506 Integration
     N Items = 6
     Items are:
       ID
             Partial text
       103
             Intgr 1-2 (x^{**3} - x)dx is equal to
             Intgr -(x-1)**1/2-dx is equal to
       107
       109
             Given that 3 (x) f'(x) = x^{**2} - 5, and f(2) = 1,
             Intgr 1-2 -x - (1/x^{**2})-dx is equal to
The function f is defined by f(x) = intgr 0-x - (1 + u^{**2})^{**1-}
       113
       114
             Intgr 0-1 -12x / (2x**2 + 1)**2- is equal to
       116
```

95

507 Techniques of Integration N Items = 2Items are: ID Partial text Inter (x - 1)**2 dx is equal to 015 The value of intgr $0-1 - dx/(x^{**2} - 5x + 6)$ is 073 508 Applications of Integration N Items = 5Items are: ID Partial text 029 The line z in the figure is the graph of y = f(x)044 The graph of the function f is shown above for The area enclosed between the curve $y = x^{*+4} = x^{*+2}$ 058 This figure shows the graph of y = f(x), a being less than b 115 The area enclosed between the curve $y = 2x^{**3} - 6x^{**2} + 3$ 120 Content: Probability and Statistics 601 Probability N Items = 3Items are: Partial text ID A set of 24 cards is numbered with the positive integers 020 Four persons whose names begin with different letters 045 089 A warning system installation consists of two independent al 602 Statistics N Items = 3Items are: ID Partial text 059 In the graph, rainfall (in centimeters) is plotted 060 The same test was given in two classes. The first class, 074 The mean of a population is 5 and its standard deviation is

96

.

603 Distributions

N Items = 1

Items are:

Partial text ID

075 A test is taken by all first year university students in a c

Content: Finite Math

701 Combinatorics

N Items = 4

Items are:

. •

TD Partial text

090 If n distinct points are marked on a circle

How many four digit numbers less than 2467 An examination consists of 13 questions 105

125

In how many ways can one arrange on a bookshelf 129

*Not included in international subscores.

4. Appropriateness Ratings Tables

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4.1 POPULATION A

e,

.05

| ID | BFL | BFR | CBC | CON | ENW | FIN | FRA | нко | HUN | IRE | ISR | JPN | LUX | NTH | NZE | SC0 | SWA | SWE | THA | USA |
|------------|--------|---------------|-----|-----|-----|---------------|-----|--------|-----|-----|-----|-----|----------|-----|-----|-----|-----|-----|-----|-----|
| 001 | 1 | 1 | 2 | 2 | 2 | . 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |
| 002 | 0 | 0 | 2 | 2 | 2 | 1 | 0 | 1 | 1 | 2 | 1 | 2 | Ú | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 003 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| 004 | 2 ′ | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| 005 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| 006 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| 007 | 2 | 2 | 2 | 2 | 2 | 0 | 2 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 |
| 008 | 1 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 |
| 009 | 0 | 0 | 2 | 2 | 2 | 0 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | I | 1 | 2 |
| 010 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | Z | 1 | 1 | 2 | 2 | 1 | 1 |
| 011 | 1 | 1 | 2 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 2 | 1 |
| 012 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | - | 1 | 1 | 2 | 2 | 2 | 1 |
| 013 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | I | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 |
| 014 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | I | 2 | I | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 |
| 015 | 2 | 2 | 2 | 2 | 1 | 2 | | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 6 | 0 | 1 | 1 |
| 016 | 2 | 2 | 2 | 2 | 2 | Ŭ | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 |
| 017 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 0 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| 018 | 2 | 2 | Ž | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | ົດ | i |
| 019 | Ţ | 1 | 0 | 2 | 1 | 2 | 1 | ň | 1 | 2 | Ō | 1 | ĭ | 2 | 2 | 1 | 1 | ō | ŏ | 2 |
| 020 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | ī | ī | ī | ŏ | 2 | ī |
| 021 | 2 | 2 | 1 | 2 | 2 | 2 | 0 | 2 | 1 | 1 | 1 | 1 | ī | î | ī | i | ī | ŏ | ō | ī |
| 522 022 | 0 | 0 | 2 | 2 | 2 | ñ | ň | 2 | î | Ô | i | î | ō | ō | ī | ī | Ō | Õ | 1 | 1 |
| 023 | ň | ñ | ñ | 2 | 1 | ĭ | 2 | 1 | ī | ŏ | î | ī | ŏ | ī | ī | ī | Õ | 1 | 2 | 1 |
| 024 | ň | ň | ň | 2 | î | ō | 1 | 2 | ī | ŏ | 1 | ´ Ī | Ō | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| 025 | ň | ñ | 2 | 2 | 2 | ŭ | ò | 2 | ī | 1 | 1 | 1 | Ō | 0 | 1 | 1 | 2 | 0 | 2 | 1 |
| 020 | õ | õ | ō | 2 | 2 | ō | ŏ | ō | ō | Ō | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 0 |
| 028 | 2 | 2 | ž | 2 | 2 | ī | 1 | 2 | 1 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| 029 | ō | ō | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| 030 | Ŏ | 0 | 0 | 2 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 |
| 031 | 0 | 0 | 2 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| 032 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | I |
| 033 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 |
| 034 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 2 | 1 | 1 | 0 | 2 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 035 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | U | 1 | 1 | 2 | 2 | 1 | 2 |
| 036 | Ö | 0 | 2 | 2 | 2 | 1 | 0 | 2 | 1 | 1 | I | ÷ | 1 | 0 | 1 | 1 | 1 | 2 | 2 | 2 |
| 037 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | Ţ | 1 | 1 I | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| 038 | 0 | 0 | 2 | 2 | 2 | 0 | 1 | 1 | I | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| 039 | 0 | 0 | 2 | 2 | 2 | 2 | I | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | ñ | 2 | 1 |
| 040 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | U T | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | ž | 1 | ī |
| 041 | 1 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | ĩ | i | 1 | i | ī | 2 | ī |
| 042 | 7 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | î | ī | i | 2 | 2 |
| 043 | 2 | () | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | ī | i | 2 | 2 | 2 | 2 |
| 044 ; | 2 | 2 | 1 | 2 | 2 | <u>د</u> 1 | 1 | 1 | 1 | 2 | 1 | 2 | ō | ī | ī | ī | ī | 2 | 2 | 1 |
| 045 | 2 1 | <u>د</u> 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | i | 1 | ĩ | ī | ī | ī | 2 | 2 | 2 | 2 |
| 040 | 1 | 1 | 2 | 2 | 1 | Ŭ | 1 | 1 | ī | 2 | î | ī | ī | ō | ī | Ī | 2 | 1 | 2 | 2 |

| ID | BFL | BFR | CBC | CON | ENW | FIN | FRA | HK0 | HUN | IRE | ISR | JPN | LUX | NTH | NZE | SC0 | SWA | S₩E | THA | USA |
|-------------|-----|-----|----------|-----|-----|-----|-----|-----|-----|-----|--------|-----|------------|--------|-----|--------|--------|--------|---------------|---------------|
| 048 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |
| 049 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | U |
| J 50 | 1 | 1 | 2 | 1 | ູ2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| 051 | 1 | 1 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 2 | 1 | 2 | 1 | 2 | 1 |
| 052 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| 053 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 054 | 2 | 2 | 1 | 2 | 0 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |
| 055 | 1 | 1 | 2 | 0 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | ' 0 | 1 | 2 | 1 | 2 | 0 | 0 | 1 |
| 056 | 1 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 |
| 057 | 1 | 1 | 2 | 2 | 1 | 2 | 0 | 2 | 1 | 1 | 1 | 1 | J | 2 | 2 | 1 | 1 | 1 | 2 | 2 |
| 058 | Ō | 0 | 0 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 059 | Ō | 0 | 0 | 2 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 060 | Ō | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 061 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | . 2 | 2 | 1 | 1 | 1 | 0 | 1 |
| 062 | Ō | 0 | 0 | 2 | 2 | 2 | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 2 | 0 |
| 063 | Ō | 0 | 0 | 2 | 1 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 1 | 2 | 0 | 0 | 0 |
| 064 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 9 | 1 | 1 |
| 065 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | Û | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| 066 | 0 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 1 |
| 067 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 |
| 068 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 2 |
| 069 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 1 |
| 070 | Ō | 0 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| 071 | Ō | 0 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 |
| 072 | 1 | 1 | 1 | 2 | 1 | 2 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| 073 | ī | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 1 |
| 074 | Ō | Ō | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | C | 1 |
| 075 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| U76 | Ō | Ō | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 077 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 |
| 078 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | -2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 079 | 1 | 1 | 2 | 2 | 2 | 0 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 2 |
| 080 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 081 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| 082 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| 083 | 1 | 1 | 2 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| 084 | 0 | 0 | 2 | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| 085 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 086 | 2 | 2 | 0 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 9 | 1 | 1 |
| 087 | 2 | 2 | 1 | 2 | 2 | 0 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | Ţ | 2 | 2 |
| 880 | 2 | 2 | 0 | 0 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | Ž | U | Ų | 0 |
| 089 | 1 | 1 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 09 0 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 0 | 1 | 1 | 0 | 2 | 1 | ļ | 1 | 1 | 1 | 1 |
| 091 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | U | 1 | 1 | 1 | 0 | U 1 | 2 | 1 |
| 092 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | · IJ | U | Ţ | i | U | T | 2 | 1 |
| 093 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | Ö | 1 | 0 | 1 | 0 | Û | 1 | U | 1 | U | 1 | 2 | 0 1 |
| 094 | 0 | C | <u>)</u> | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | U | 1 | 1 | Ţ | 4 | 1 | 2 | 1 |
| 095 | 0 | 0 | 2 | 2 | 1 | 2 | 0 | 2 | 1 | 1 | 1 | Ţ | 1 | Ĩ | 1 | 1 | 1 | 1 | 2 | U T |
| 096 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | Ō | 1 | Ū | 1 | 1 | Û | Ů | 1 | 人 1 | 2 | 1 | U 2 | 1 |
| 097 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 2 | 1 | 1 | U | Ţ | U | 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| 098 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | U | 1 | U | U A | 1 | 1 | 2 | 1 | <u>د</u> | 2 |
| 099 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 2 | 0 | Ŭ | U , | 1 | U | U | 1 | 1 | 2 1 | 1 | 2 | <u>د</u> 1 |
| 100 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 1 | 1 | Z | 1 | 1 | T | T | T | T | Ŧ | Ŧ | 6 | * |

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| | ID | BFL | BFR | CBC | CON | ENW | FIN | FRA | нко | HUN | IRE | ISR | JPN | LUX | NTH | NZE | SC0 | SWA | SWE | THA | USA |
|---|-----|-----|-----|-----|--------|------------|--------|--------|-----|--------|-----|-----|-----|-----|--------|--------|-----|--------|--------|-----|--------|
| | 101 | 0 | 0 | 2 | 2 | 2 | 2 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 |
| | 102 | 1 | 1 | 0 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | ļ | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 |
| | 103 | 1 | 1 | 2 | 2 | 2 | 4 | 1 | 1 | 1 | 2 | î | 1 | 1 | 1 | 1 | î | î | 2 | 2 | ĩ |
| | 105 | 1 | 1 | 1 | 2 | 1 | 1 | , î | î | î | 2 | ī | ī | ī | 2 | ī | ī | 2 | 2 | 2 | 1 |
| | 106 | 2 | 2 | 2 | 2 | 2 | ī | 1 | 2 | ī | 2 | 1 | ī | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| ţ | 107 | Ž | Ž | 1 | 2 | 2 | ī | 2 | ī | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 |
| , | 108 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 - | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| | 109 | 1 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| | 110 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| | 112 | 1 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | ç | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 |
| | 112 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | ī | ī | î | 2 | î | ī | 2 | 2 | 2 | ō |
| | 114 | 2 | ź | ō | õ | ō | ō | ī | 2 | ī | ī | ī | ī | ī | 1 | 1 | 1 | Ō | 1 | 0 | 0 |
| | 115 | 1 | 1 | 2 | 0 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 0 |
| | 116 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 1 | 2 | 1 |
| | 117 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1. | 0 | 1 | 1 | 1 | 2 | 0 | 2 | 0 |
| | 118 | 2 | 2 | 0 | 2 | 1 | 1 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 1 | 1 | 2 | 0 | 2 | 1 |
| | 119 | 2 | 2 | 2 | 2 | U 1 | 2 | 0 | 2 | n T | 2 | ň | 1 | 1 | 1 | 1 | 1 | Ō | ŏ | ō | ō |
| | 120 | 1 | 1 | 2 | 1 | ĩ | 2 | ŏ | ĭ | ĩ | î | 1 | î | ī | ī | ī | ī | 1 | ī | 1 | 1 |
| | 122 | Ō | ō | 2 | 2 | 2 | Ž | ī | ī | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| | 123 | 0 | 0 | D | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Q | 1 | 0 |
| | 124 | 0 |) | 2 | 1 | 0 | 1 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 2 | 1 |
| | 125 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 0 |
| | 120 | 0 | 0 | 0 | 2 | 1 | 2 | ň | 2 | 1 | ñ | 1 | ī | Ō | 1 | î | î | ō | ō | 2 | Ō |
| | 127 | ñ | 0 | 2 | 2 | 2 | 2 | õ | 2 | i | ĩ | ī | ī | ĩ | ī | ī | ī | ĩ | 1 | 2 | 1 |
| | 129 | ŏ | ŏ | ī | ī | ī | ī | ĩ | ž | ī | Ō | Ō | 1 | Û | 0 | 1 | 1 | 1 | 1 | 2 | 1 |
| | 130 | ī | Ĩ | 2 | 2 | 1 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | Ì |
| | 131 | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| | 132 | 0 | 0 | 2 | 1 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| | 133 | 1 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | i | î | 2 | ĩ |
| | 134 | ň | Ô | 2 | 1 | 2 | 2 | ĭ | î | î | 2 | î | ī | ī | ī | 2 | ī | ī | 1 | 2 | 1 |
| | 125 | ĩ | ĩ | 2 | 2 | ī | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 1 | 1 |
| | 137 | 1 | 1 | 0 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| | 138 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 2 | 2 | 2 | 1 |
| | 139 | 2 | 2 | 2 | 2 | 2 | U 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | ī |
| | 140 | 2 | 2 | 2 | 2 | 1 | 1 | ñ | 1 | 1 | 2 | ō | 1 | î | i | î | ī | Ô | 2 | 2 | 2 |
| | 142 | 1 | 1 | 2 | 2 | î | Ô | ĭ | î | î | 2 | ĭ | ī | ī | ī | ī | ī | Ō | 1 | 0 | 2 |
| | 143 | ī | ī | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 2 |
| | 144 | 1 | 1 | Õ | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| | 145 | 0 | 0 | 2 | 1 | 1 | Õ | Ő | 1 | 0 | Ő | 1 | 0 | • 2 | 1 | U 1 | 1 | U 1 | U N | 2 | 1 |
| | 145 | 1 | 1 | 2 | 1 1 | 1 | 2 | U 2 | 1 | 1 | 2 | 1 | 1 | 1 | י 1 | 1 | 1 | Ō | 1 | 2 | i |
| | 14/ | 2 | 2 | ñ | 2 | 1 | 1 | 1 | Õ | 1 | 2 | Ô | i | î | Ō | î | ī | ĩ | Ō | 2 | ī |
| | 149 | 2 | 2 | ž | Ž | ź | ź | ź | Ž | ī | 2 | Ő | 1 | Õ | ĺ | 1 | 1 | 2 | 0 | 2 | 0 |
| | 150 | 2 | 2 | Ĩ | Ō | <u>,</u> 1 | 0 | 2 | 1 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| | 151 | 2 | 2 | 1 | 0 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 0 |
| | 152 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | L T |
| | 153 | 2 | 2 | 2 | 0 | 1 | Z | 0 | 0 | T | Z | U | Ţ | I | T | T | T | U | U | U | ÷ |

Asi all' interacionation

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101

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| ID | BFL | BFR | CBC | c 21. | Eag | Fall | FRA | RK0 | HUH | 1RE | ISR | JPN | LUX | NTH | NZE | SCO | SMA | SWE | THA | USA |
|--|---------------------------------------|--|---|--------------------------------|---|--|---|--|--|--|--|---|--|---|--|---|--|---|--|---|
| ID 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 180 181 182 183 | GFL 000000010111110220202011111122 | BFR 0000 00 10 11 11 10 220 20 20 11 11 11 22 | CBC 1 10 10 02 12 11 11 2 10 00 10 11 02 22 22 22 22 22 22 22 22 22 22 22 22 | 222222222222210000021022222222 | | Fall 1 1 0 1 0 1 2 2 1 0 1 2 2 1 1 0 1 1 1 1 1 9 9 9 9 9 9 9 9 9 9 9 9 9 | FIA 21020000000000000000000000000000000000 | N:0 22020112011212200000209999999999999999 | | 1RE 1 0 0 0 1 0 0 1 0 2 1 2 1 2 0 0 2 1 0 0 1 0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | ISR 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 | JPN 1 1 1 1 1 1 2 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 | LUX 0200000000000000000000000000000000000 | NTH 1 1 0 2 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 | NZE 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | SCO 11111111111000001102222222222222222222 | SWA 110220222011010200202109999999999999999 | SWE 101101111221120002001099999999999999999 | THA 0220022220122221000000022222222222 | USA 0 1 1 0 0 1 1 1 1 1 2 2 1 2 1 2 1 2 0 0 0 0 |
| 183 184 185 186 187 188 189 190 191 | 2 2 2 2 2 2 1 1 | 2 2 2 2 2 2 1 1 1 | 2922222222 | 22222222222 | 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 9 9 9 9 9 9 9 9 9 9 9 9 9 | 2 2 2 2 2 2 2 2 2 2 2 2 1 | 9999999999999 | 9 a 9 9 9 9 9 9 9 9 9 9 9 | 9 9 9 9 9 9 9 9 9 9 9 | 9 9 9 9 9 9 9 9 9 9 9 9 | 1 2 2 1 2 1 1 2 | 999999999999 | 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 2222222222 | 999999999 | 9999999999 | 222222222 | 2 1 2 2 1 2 2 1 2 2 1 |
| 192 193 194 195 196 197 198 | 2 0 1 2 2 0 0 | 2 0 1 2 2 0 0 | 2212222 | 222222222 | 9 9 9 9 9 9 9 9 9 9 9 | 9 9 9 9 9 9 9 9 9 9 | 2 0 1 1 1 0 1 | 9 9 9 9 9 9 9 9 9 9 9 9 | 9 9 9 9 9 9 9 9 9 9 | 9 9 9 9 9 9 9 9 9 9 | 9 9 9 9 9 9 9 9 9 9 | 1 1 1 1 1 1 | 999999999 | 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 99999999 | 2 1 2 2 1 2 1 | 9 9 9 9 9 9 9 9 9 9 9 9 | 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 2 2 2 2 2 2 2 2 1 2 | 2 0 1 0 1 1 1 |

4.2 POPULATION B

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| ID | BFL | BFR | CBC | CON | ENW | FIN | FRA | HKO | HUN | IRE | ISR | JPN | LUX | NZE | SC 0 | SWA | THA | USA |
|-------|-----|-----|----------|--------|--------|-----|-----|-----|--------|-----|-----|--------|---------------|-----|-------------|-----|-----|-----|
| 001 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 0 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| 002 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 0 | 1 | 2 | 1 | Ţ | U | 2 | 2 | 2 | Ţ | 1 |
| 003 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 0 | Z | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| 004 | 1 | 1 | 2 | 9 | 2 | 2 | 2 | 1 | ļ | Z | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| 005 | 2 | 2 | 2 | 2 | 2 | 2 | Ţ | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 2 |
| 006 | 1 | • | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 0 |
| 007 | 1 | 1 | 2 | Z | 2 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 |
| 800 | 1 | 1 | 0 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 |
| . 009 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | î | 2 |
| 010 | 2 | 1 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | î | 1 | ī | ō | 2 | ī | ī |
| 012 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | ī | 2 | ī | î | 2 | 2 | 2 | 2 | ī | 2 |
| 012 | 1 | 1 | 2 | ñ | 2 | 2 | 2 | 2 | î | 1 | î | 2 | 2 | ī | 2 | 2 | 1 | 2 |
| 013 | 1 | 1 | ñ | 2 | 2 | 2 | 2 | 1 | î | 2 | ī | ī | 2 | 2 | 2 | 1 | 0 | 1 |
| 014 | 2 | 2 | ň | 2 | 2 | 2 | 2 | î | î | ī | - | ī | 2 | 2 | 2 | 2 | 1 | 1 |
| 016 | 1 | 1 | ĩ | 2 | 1 | 1 | ī | 2 | ī | Ō | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 2 |
| 017 | ī | ī | ī | 2 | 2 | 2 | 1 | ī | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 |
| 018 | ī | ī | ī | 2 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 2 | 0 | 1 | 0 | 1 |
| 019 | ī | 1 | Ĩ | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 2 |
| 020 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 1 |
| 021 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| 022 | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 0 | 1 | 2 | 1 | 2 | 2 | 1 | 1 |
| 023 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 024 | 2 | 2 | 1 | 2 | 1 | 2 | 0 | 1 | 1 | 0. | 1 | 1 | 0 | 2 | . 1 | 2 | 1 | 1 |
| 025 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| 026 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| 027 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 1 2 | 1 | 1 | 0 | 2 | 1 | ň | Ô | 2 |
| 028 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | ŏ | ī |
| 029 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 1 | ň | 1 | ī | ī | 2 | 2 | ō | ī | ĩ | 1 |
| 021 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | ŏ | 2 | ī | ī | 2 | 2 | 2 | 1 | 1 | 1 |
| 032 | 1 | 1 | 1 | 2 | î | î | ī | ī | ī | 2 | 1 | 1 | ī | 2 | 2 | 2 | 0 | 0 |
| 032 | 1 | 1 | ñ | ñ | î | 2 | 2 | ī | ī | 1 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 1 |
| 034 | i | î | 2 | 2 | 1 | ī | ī | 2 | Ō | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 |
| 035 | ī | ī | ō | 9 | ī | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| 036 | 1 | ī | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| 037 | ī | 1 | 0 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 2 | 2 | 2 | 1 | 1 |
| 038 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 0 |
| 039 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| 040 | 1 | 1 | 0 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 0 | 2 | 1 | 2 | 2 | 1 | 1 | 1 |
| 041 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | Ţ | 2 | 2 | 2 | 1 | 1 | 1 |
| 042 | 1 | 1 | 0 0 | 2 | 1 | Ž | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 |
| 043 | 1 | 1 | 2 | 1 1 | Z | 1 | 2 | 7 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | ō | ī |
| - 044 | 2 | 2 | U | 2 | 1 | 2 | 2 | 2 | 0 T | 1 | 1 | 1 1 | <u>د</u> 1 | 2 | 2 | 2 | ĩ | 2 |
| 045 | 1 | 1 | 0 | 2 | 1 1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | ī | ō |
| 040 | 1 | 1 | 1. | 4.2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | ī | ī | ī |
| 047 | 1 | 1 | 2 | 2 | 2 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | ī | 1 |
| 040 | 1 | 1 | 0 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | i | i | 2 | ī | 2 | 1 | ī | 1 |
| 772 | * | * | v | - | • | - | - | - | - | - | - | - | - | _ | | | | |

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| ۔ باد | BFL | 71 <i>8</i> | C' C | 00% | ENW | FIN | FRA | HK0 | HUN | IRE | ISR | JFN | LUX | NZE | SCO | Sha | THA | USA |
|----------|--------|-------------|--------|-----|--------|----------|-----|----------|----------|----------|----------|----------|-----|----------|-----|-----|----------|--------|
| 103 | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 1 |
| 104 | 1 | 1 | 0 | 0 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| 105 | 2 | 2 | 0 | 2 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 2 | 1 | 2 | 1` | 1 | 1 | 0 |
| 106 | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 0 | 1 |
| 107 | 2 | 2 | r | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 0 | 1 |
| 108 | 1 | 1 | 0 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 |
| 109 | 2 | 2 | 0 | ·2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| 110 | 1 | 1 | 2 | 0 | 1 | 2 | 1 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 0 | 1 |
| 111 | 2 | 2 | 0 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 |
| 112 | 1 | 1 | 0 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| 113 | 2 | 2 | 0 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 0 | 1 |
| 114 | 2 | 2 | 0 | 0 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 0 | 1 |
| 115 | 2 | 2 | 0 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 0 | 1 |
| 116 | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 2 | 0 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | U | Ţ |
| 117 | 1 | 1 | 0 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| 118 | 2 | 2 | 0 | 2 | 2 | 1 | 9 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | U | 1 |
| 119 | 1 | 1 | 0 | 2 | 2 | 2 | 0 | 2 | 1 | 1 | 1 | 1 | 0 | 2 | Ţ | 2 | U | 1 |
| 120 | 2 | 2 | 0 | 2 | 2 | 1 | 9 | 2 | 1 | 1 | 1 | 1 | Ţ | 2 | 1 | 2 | 0 | 1 L |
| 121 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | Ū, | Ĩ | 1 | 1 | 1 | 1 | 0 | 1 |
| 122 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 2 | 1 | U 1 | 1 | Z | 1 | 1 | 1 | 1 | 0 | 0 |
| 123 | 0 | 0 | 0 | 9 | 0 | Õ | 1 | 2 | 0 | 1 | Ŭ | U | 1 | 1 | 0 | 0 | 0 | 0 |
| 124 | 0 | 0 | 0 | 0 | 0 | Û | 2 | 2 | U | 1 | 0 | 1 | 2 | 1 | 1 | 2 | 1 | 1 |
| 125 | 0 | 0 | 0 | 9 | Ū | 2 | 2 | Z | U | 1 | 1 | 1 | | 1 | 0 | 2 | <u> </u> | 1 |
| 126 | 0 | 0 | 0 | 0 | 1 | Ţ | 2 | 2 | Ţ | 1 | 1 | 1 | 2 | <u> </u> | ň | ň | ň | ñ |
| 127 | 0 | 0 | 0 | 0 | 1 T | Ţ | 2 | 2 | L L | 1 | 1 T | 0 1 | 2 | ň | 0 | ñ | ň | ň |
| 128 | 0 | 0 | 0 | 9 | U 1 | Ţ | 2 | 1 | 0 | 2 | 0 | 1 | 2 | 1 | 1 | 2 | ĭ | 1 |
| 129 | 1 | 1 | 2 | 9 | Ţ | Ţ | 2 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | ñ | ñ | ñ |
| 130 | 0 | 0 | 0 | U | U 1 | 1 | 2 | 1 | 1 | 2 | · 1 | 1 | 2 | 1 | 1 | ň | ĭ | ĩ |
| 131 | 0 | Ű | Ţ | 9 | 1 | 1 | 2 | 2 | 0 | 0 | ^ | <u> </u> | 2 | ň | ň | ñ | ñ | ō |
| 132 | Ū, | U | U | 9 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | ĩ | 2 | 1 | ĩ | 1 | ĭ | ĭ |
| 133 | Ţ | ļ | L L | 3 | 0 T | 6 | 2 | 2 | <u> </u> | 1 | ň | 1 | 2 | n | Ō | Ō | Ō | ō |
| 134 | 1 1 | 1 | 1 | 3 | 1 | ň | 2 | 2 | 1 | 1 | 1 | i | 2 | ĭ | õ | 2 | ō | ī |
| 130 | 1 | 1 | 0 T | 2 | 0 | 0 | 2 | 2 | ñ | ō | ō | Ô | 2 | ō | Õ | ō | Ō | Ō |
| 1.50 | | 11 | 11 | | U | U | 6 | <u> </u> | ~ | U | ~ | u | - | | - | - | - | - |

5. Indices of Intended Coverage

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- B - the state

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Second St.

5.1 Content Totals

| System | 000 | 400 | 100 | 300 | 200 | MEANS |
|----------|------|------|------|------|-----|-------|
| NZE | .93 | 1.00 | 1.00 | 1.00 | .92 | .96 |
| SC0 | 1.00 | 1.00 | .93 | 1.00 | .92 | .96 |
| JPN | .95 | 1.00 | .95 | .78 | .90 | .93 |
| ENW | . 98 | 1.00 | .88 | .83 | .85 | .91 |
| HUN | .93 | 1.00 | .93 | .83 | .88 | .91 |
| CON | 1.00 | 1.00 | .69 | .89 | .88 | .89 |
| THA | .95 | 1.00 | .71 | .78 | .73 | .83 |
| NTH | .89 | .88 | .88 | .61 | .75 | .82 |
| USA | 1.00 | 1.00 | .67 | 1.00 | .57 | .82 |
| CBC | .97 | .96 | .83 | .94 | .49 | .81 |
| HKO | .97 | .92 | .75 | .83 | .67 | .80 |
| SWA | .87 | .88 | .78 | .89 | .65 | .79 |
| FIN | .80 | .91 | .75 | .83 | .71 | .78 |
| SWE | .87 | .96 | .72 | 1.00 | .57 | .78 |
| IRE | .93 | .92 | 1.00 | .67 | .38 | .77 |
| ISR | .91 | 1.00 | .70 | .00 | .73 | .73 |
| FRA | .87 | .65 | .90 | .28 | .49 | .70 |
| BFL | .90 | .69 | .95 | .17 | .20 | .64 |
| BFR | .90 | .69 | .95 | .17 | .20 | .64 |
| LUX | .93 | .79 | .73 | .22 | .23 | .60 |
| MEAN | .92 | .91 | .83 | .69 | .64 | .80 |
| N. ITEMS | 62 | 26 | 42 | 18 | 51 | 199 |

KEY:

000 = Arithmetic 100 = Algebra 200 = Geometry 300 = Statistics 400 = Measurement

5.1.1 000 Arithmetic (No Items for 007)

| System | 001 | 006 | 003 | 005 | 004 | 001 | 009 | 008 | MEANS |
|----------|------|------|------|------|------|------|------|------|-------------|
| CON | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1 00 |
| SCO | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| USA | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1,00 |
| ENW | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .67 | .9 8 |
| CBC | 1.00 | 1.00 | 1.00 | .67 | 1.00 | .90 | 1.00 | 1.00 | .97 |
| JPN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .00 | .95 |
| THA | 1.00 | 1.00 | 1.00 | 1.00 | .94 | .80 | 1.00 | 1.00 | .95 |
| HUN | 1.00 | .67 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .33 | .93 |
| IRE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .00 | .93 |
| LUX | 1.00 | 1.00 | .90 | 1.00 | .88 | .90 | 1.00 | 1.00 | .93 |
| NZE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .00 | .93 |
| HKO | 1.00 | 1.00 | .80 | 1.00 | 1.00 | .90 | 1.00 | .67 | .91 |
| ISR | 1.00 | 1.00 | .90 | .33 | 1.00 | 1.00 | 1.00 | .67 | .91 |
| BFL | .92 | 1.00 | 1.00 | 1.00 | .94 | .80 | 1.00 | .33 | .90 |
| BFR | .92 | 1.00 | 1.00 | 1.00 | .94 | .80 | 1.00 | .33 | .90 |
| NTH | 1.00 | 1.00 | 1.00 | 1.00 | .75 | .70 | 1.00 | 1.00 | .89 |
| SWA | 1.00 | 1.00 | .90 | 1.00 | .88 | .90 | 1.00 | .00 | .87 |
| SWE | 1.00 | 1.00 | 1.00 | 1.00 | .88 | .90 | .00 | .00 | .87 |
| FRA | 1.00 | 1.00 | .85 | 1.00 | 1.00 | .70 | .00 | .33 | .87 |
| FIN | .88 | 1.00 | .90 | 1.00 | .50 | 1.00 | 1.00 | .00 | .80 |
| MEAN | .99 | .98 | .96 | .95 | .94 | .91 | .90 | .52 | .92 |
| N. ITEMS | 12 | 3 | 13 | 3 | 17 | 10 | 1 | 3 | 62 |

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001 = Natural Numbers

002 = Common Fractions

003 = Decimal Fractions 004 = Ratio, Proportion, Percentage 005 = Number Theory

006 = Exponents 007 = Other Number Systems

008 = Square Roots 009 = Dimensional Analysis

5.1.2 100 Algebra (No Items for 108, 109, 111, 112)

| and the second se | | | | | | | | | |
|---|------|------|------|------|------|------|------------------|------|-------|
| System | 101 | 102 | 104 | 106 | 107 | 105 | 110 | 103 | MEANS |
| IRE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| NZE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| BFL | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .00 | .95 |
| BFR | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .00 | .95 |
| JPN | 1.00 | 1.00 | .89 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | .95 |
| HUN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .75 | .00 | .93 |
| SCO | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .67 | 1.00 | .00 | .93 |
| FRA | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .00 | 1.00 | .90 |
| ENW | .86 | .50 | 1.00 | .88 | 1.00 | 1.00 | .75 | 1.00 | .88 |
| NTH | 1.00 | 1.00 | .88 | .88 | 1.00 | .67 | 1.00 | .00 | .88 |
| CBC | .86 | 1.00 | .89 | .67 | .75 | .67 | 1.00 | 1.00 | .83 |
| SWA | .86 | .75 | .75 | 1.00 | 1.00 | .67 | .25 | .50 | .78 |
| FIN | .71 | 1.00 | .88 | .75 | 1.00 | .33 | .50 | .50 | .75 |
| НКО | 1.00 | .75 | .88 | .75 | .75 | 1.00 | .00 | .50 | .75 |
| LUX | 1.00 | .75 | .75 | .63 | .25 | .67 | 1.00 | .50 | .73 |
| SWE | 1.00 | 1.00 | .63 | .86 | .50 | .67 | .00 | 1.00 | .72 |
| THA | .86 | 1.00 | .89 | .89 | .50 | .67 | -00 | .00 | .71 |
| ISR | 1.00 | .75 | .63 | .88 | 1.00 | .00 | .00 | 1.00 | .70 |
| CON | 1.00 | .75 | .63 | .88 | 1.00 | .00 | .00 | 1.00 | .70 |
| USA | .43 | 1.00 | .67 | .56 | 1.00 | .67 | .75 | .50 | .67 |
| MEAN | .92 | .90 | .88 | . 88 | .88 | .75 | .61 [.] | .50 | .83 |
| N. ITEMS | 7 | 4 | 9 | 9 | 4 | 3 | 4 | 2 | 42 |

101 = Integers 102 = Rationals 103 = Integer Exponents 104 = Formulas 105 = Polynomials 106 = Equations and Inequations 107 = Relations and Functions 108 = Systems of Linear Equations 109 = Finite Systems 110 = Finite Sets 111 = Flowcharts and Programming

112 = Real Numbers

5.1.3 200 Geometry (No Items for 210, 213, 214)

| System | 201 | 202 | 207 | 203 | 211 | 208 | 212 | 204 | 209 | 206 | 215 | 205 | MEANS |
|----------|------|------|------|------|------|------|------------|------|------|------|-----|------|-------|
| NZE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | . 50 | .25 | 1.00 | .92 |
| SCO | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .25 | .00 | .92 |
| JPN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .25 | .00 | .92 |
| CON | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .67 | .25 | .00 | .90 |
| HUN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .50 | 1.00 | 1.00 | .50 | .25 | .00 | .88 |
| ENW | 1.00 | 1.00 | 1.00 | .75 | 1.00 | .75 | .50 | 1.00 | 1.00 | 1.00 | .25 | .00 | .85 |
| NTH | 1.00 | .88 | .86 | 1.00 | 1.00 | 1.00 | 1.00 | .00 | .75 | 1.00 | .25 | .00 | .75 |
| ISR | 1.00 | 1.00 | .86 | 1.00 | .00 | .75 | .00 | 1.00 | .25 | 1.00 | .00 | .00 | .73 |
| THA | .67 | 1.00 | .71 | 1.00 | 1.00 | .75 | 1.00 | 1.00 | .00 | 1.00 | .00 | .00 | .73 |
| FIN | 1.00 | .88 | 1.00 | .75 | 1.00 | 1.00 | -50 | .00 | .75 | .00 | .25 | 1.00 | .71 |
| HKO | .83 | 1.00 | 1.00 | 1.00 | .00 | . 75 | .00 | 80 | .25 | .00 | .00 | .00 | .67 |
| SWA | 1.00 | .88 | 1.00 | .00 | 1.00 | .75 | .50 | .20 | 1.00 | .00 | .25 | .00 | .65 |
| SWE | .67 | .50 | .86 | .75 | .00 | .50 | 1.00 | .80 | .50 | .00 | .00 | .00 | .57 |
| USA | .83 | .75 | .57 | .75 | 1,00 | .25 | 1.00 | .83 | .00 | .33 | .00 | .00 | .57 |
| CBC | .83 | .63 | .43 | .50 | 1.00 | .50 | .67 | .33 | .00 | .67 | .25 | .00 | .49 |
| FRA | .33 | .63 | .86 | .75 | .00 | .50 | .67 | .00 | .75 | .00 | .25 | 1.00 | .49 |
| IRE | 1.00 | .63 | .14 | .00 | 1.00 | .25 | .50 | .20 | .25 | .00 | .25 | .00 | .38 |
| LUX | .50 | .50 | .29 | .25 | .00 | .25 | .00 | .00 | .00 | .00 | .00 | .00 | .23 |
| BFL | .67 | .13 | .29 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .75 | .00 | .20 |
| BFR | .67 | .13 | .29 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .75 | .00 | .20 |
| MEAN | .85 | .78 | .74 | .67 | ,65 | .65 | .59 | .56 | .52 | .43 | .22 | .15 | .64 |
| N. ITEMS | 56 | 8 | 7 | 4 | 1 | 4 | 3 | 6 | 4 | 3 | 4 | 1 | 51 |

General States

201 Classification of plane figures 202 = Properties of plane figures 203 = Congruence of plane figures 204 = Similarity of plane figures 205 = Geometric constructions 206 = Pythagorean triangles 207 = Coordinates 208 = Simple deductions 209 = Informal transformations 210 = Relations in space 211 = Solids 212 = Spatial visualization 213 = Spatial orientation 214 = Decomposition of figures

215 = Transformational geometry

| | and the second sec | | | | | |
|----------|--|------|-------------|------|------|-------|
| System | 304 | 302 | 303 | 301 | 306 | MEANS |
| NZE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| SCO | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| SWE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| USA | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| CBC | 1.00 | 1.00 | 1.00 | .00 | 1.00 | .95 |
| CON | 1.00 | 1.00 | .8 6 | 1.00 | .00 | .89 |
| SWA | 1.00 | 1.00 | 1.00 | .00 | .00 | .89 |
| ENW | 1.00 | .67 | .86 | 1.00 | .00 | .83 |
| FIN | .83 | 1.00 | 1.00 | .00 | .00 | .83 |
| нко | .33 | 1.00 | .86 | 1.00 | .00 | .83 |
| HUN | .83 | 1.00 | 1.00 | .00 | .00 | .83 |
| JPN | .83 | 1.00 | .71 | 1.00 | .00 | .78 |
| THA | .67 | 1.00 | 1.00 | .00 | .00 | .78 |
| IRE | .83 | 1.00 | .57 | .00 | .00 | .67 |
| NTH | .67 | .67 | .43 | 1.00 | 1.00 | .61 |
| FRA | .17 | .33 | .29 | 1.00 | .00 | .28 |
| LUX | .67 | .00 | .00 | .00 | .00 | .22 |
| BFL | .50 | .00 | .00 | .00 | .00 | .17 |
| BFR | .50 | .00 | .00 | .00 | .00 | .17 |
| ISR | .00 | .00 | .00 | .00 | .00 | .00 |
| MEAN | .77 | .73 | .68 | .50 | .30 | .69 |
| | | | | | ••• | |
| N. ITEMS | 6 | 3 | 7 | 1 | 1 | 18 |

5.1.4 300 Statistics (No Items for 305, 307, 308, 309)

KEY:

301 = Data collection 302 = Organization of data 303 = Representation of data 304 = Interpretation of data 305 = Combinatorics 306 = Outcomes and events 307 = Counting of sets 308 = Mutually exclusive events 309 = Complementary events

111

| System | 403 | 404 | 402 | 401 | MEANS |
|----------|------|------|------|------|-------|
| CON | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ENW | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| HUN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ISR | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| JPN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| NZE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| SCO | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| THA | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| USA | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| CBC | 1.00 | 1.00 | .83 | 1.00 | .96 |
| SWE | 1.00 | .90 | 1.00 | 1.00 | .96 |
| НКО | 1.00 | 1.00 | .83 | .80 | .92 |
| IRE | 1.00 | .90 | .83 | 1.00 | .92 |
| FIN | 1.00 | 1.00 | .67 | 1.00 | .91 |
| NTH | 1.00 | 1.00 | 1.00 | .40 | .88 |
| SWA | 1.00 | .70 | 1.00 | 1.00 | .88 |
| LUX | 1.00 | 1.00 | .50 | .60 | .79 |
| BFL | .67 | .67 | .83 | .60 | .69 |
| BFR | .67 | .67 | .83 | .60 | .69 |
| FRA | .67 | .92 | .50 | .20 | .65 |
| MEAN | .95 | .94 | .89 | .86 | .91 |
| N. ITEMS | 3 | 12 | 6 | 5 | 26 |

5.1.5 400 Measurement

KEY:

1.1

401 = Standard units 402 = Estimation 403 = Approximation 404 = Areas, volumes, etc.

| PO | PU | LA | TI | [ON | 16 |
|----|----|----|----|-----|----|
| - | _ | | | | |

| 5.2 | Content | Totals |
|-----|---------|--------|
|-----|---------|--------|

| System | 300 | 100 | 500 | 200 | 600 | 400 | 700 | MEANS |
|----------|------|------|------|------|------|-----|------|-------|
| нко | 1.00 | 1.00 | .98 | .95 | .86 | .93 | 1.00 | .96 |
| NZE | 1.00 | 1.00 | 1.00 | .95 | 1.00 | .75 | 1.00 | .04 |
| IRE | 1.00 | .86 | .91 | 1.00 | 1.00 | .86 | 1.00 | .93 |
| JPN | .92 | .86 | .98 | .95 | 1.00 | .82 | 1.00 | .93 |
| ENV | 1.00 | .71 | .98 | 1.00 | 1.00 | .75 | .75 | .92 |
| FRA | .92 | 1.00 | .91 | .95 | 1.00 | .89 | 1.00 | . 92 |
| LUX | .92 | 1.00 | .91 | .95 | .86 | .89 | 1.00 | .92 |
| FIN | .96 | 1.00 | .96 | .95 | 1.00 | .71 | 1.00 | .91 |
| BFL | 1.00 | 1.00 | .96 | .95 | .29 | .68 | .75 | .87 |
| BFR | 1.00 | 1.00 | .96 | .95 | .29 | .68 | .75 | .87 |
| ISR | .96 | 1.00 | .98 | 1.00 | .86 | .61 | .00 | .87 |
| CON | 1.00 | 1.00 | .83 | .76 | 1.00 | .77 | 1.00 | .86 |
| USA | .88 | .86 | .96 | .84 | .86 | .68 | .50 | .85 |
| SCO | 1.00 | 1.00 | .91 | .79 | .43 | .61 | 1.00 | .83 |
| SWE | .92 | .71 | .89 | .84 | .86 | .64 | .75 | .82 |
| HUN | .92 | .71 | .96 | .63 | .29 | .71 | .00 | .78 |
| THA | .86 | 1.00 | .63 | .63 | .57 | .59 | .00 | .66 |
| CBC | .84 | 1.00 | .39 | .84 | .14 | .50 | .25 | .57 |
| MEAN | .95 | .93 | .89 | .89 | .74 | .73 | .71 | .86 |
| N. ITEMS | 25 | 7 | 46 | 46 | 7 | 28 | ۵ | 136 |

3,1 . 100 = Sets and Relations

200 = Number Systems 300 = Algebra

400 = Geometry

500 = Elementary Functions and Calculus 600 = Probability and Statistics 700 = Finite Mathematics

5.2.1 100 Sets and Relations (No Items for 101, 103, 105)

| System | 102 | 104 | MEANS |
|----------|------|------|-------|
| BFL | 1.00 | 1.00 | 1.00 |
| BFR | 1.00 | 1.00 | 1.00 |
| CBC | 1.00 | 1.00 | 1.00 |
| CON | 1.00 | 1.00 | 1.00 |
| FIN | 1.00 | 1.00 | 1.00 |
| FRA | 1.00 | 1.00 | 1.00 |
| нко | 1.00 | 1.00 | 1.00 |
| ISR | 1.00 | 1.00 | 1.00 |
| LUX | 1.00 | 1.00 | 1.00 |
| NZE | 1.00 | 1.00 | 1.00 |
| sco · | 1.00 | 1.00 | 1.00 |
| THA | 1.00 | 1.00 | 1.0 |
| IRE | 1.00 | .80 | .δυ |
| JPN | 1.00 | .80 | .86 |
| USA | 1.00 | .80 | .86 |
| ENW | 1.00 | .60 | .71 |
| HUN | .00 | 1.00 | .71 |
| SWE | 1.00 | .60 | .71 |
| MEAN | .94 | .92 | .93 |
| N. ITEMS | 2 | 5 | · 7 |

KEY:

A Shant Care

101 = Set Notation 102 = Set Operations 103 = Relations 104 = Functions 105 = Infinite Sets

| System | 204 | 203 | 205 | 201 | 202 | MEANS |
|----------|------|------|------|------|------|-------|
| ENW | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| IRE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ISR | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| BFL | 1.00 | 1.00 | 1.00 | 1.00 | .75 | .95 |
| BFR | 1.00 | 1 30 | 1.00 | 1.00 | .75 | .95 |
| FIN | 1.00 | 1.00 | .83 | 1.00 | 1.00 | .95 |
| FRA | 1.00 | 1.00 | 1.00 | .67 | 1.00 | .95 |
| HKO | 1.00 | 1.00 | 1.00 | .67 | 1.00 | .95 |
| JPN | 1.00 | 1.00 | 1.00 | .67 | 1.00 | .95 |
| LUX | 1.00 | 1.00 | 1.00 | .67 | 1.00 | .95 |
| NZE | 1.00 | 1.00 | 1.00 | 1.00 | .75 | .95 |
| USA | 1.00 | .67 | .80 | 1.00 | 1.00 | .88 |
| CBC | 1.00 | 1.00 | .83 | 1.00 | .50 | .84 |
| SWE | 1.00 | 1.00 | 1.00 | .67 | .50 | .84 |
| SCO | 1.00 | 1.00 | .50 | 1.00 | .75 | .79 |
| CON | 1.00 | .67 | 1.00 | .67 | .50 | .76 |
| HUN | 1.00 | 1.00 | .17 | .33 | 1.00 | .63 |
| THA | 1.00 | 1.00 | . 40 | .50 | .33 | .63 |
| MEAN | 1.00 | .96 | .86 | .82 | .82 | .89 |
| N. ITEMS | 3 | 3 | 6 | 3 | 4 | 19 |

5.2.2 200 Number Systems

KEY:

1

201 = Common Laws for Number Systems 202 = Natural Numbers

203 = Decimals 204 = Real Numbers 205 = Complex Numb ~

5.2.3 300 Algebra (No Items for 307)

| | | | | | and the second | | |
|----------|------|------|---------------|------|--|---------------|-------|
| System | 302 | 301 | 303 | 305 | 304 | 306 | MEANS |
| BFL | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| BFR | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| CON | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ENW | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| нко | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| IRE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| NZE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1 .0 0 | 1.00 |
| SCO | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| FIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .00 | .96 |
| ISR | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .00 | .96 |
| FRA | 1.00 | 1.00 | 1.00 | 1.00 | .67 | 1.00 | 92 |
| HUN | 1.00 | .83 | 1.00 | 1.00 | 1.00 | .00 | .92 |
| JPN | 1.00 | 1.00 | 1.00 | .80 | .83 | 1.00 | .92 |
| LUX | 1.00 | 1.00 | 1.00 | 1.00 | .67 | 1.00 | .92 |
| SWE | 1.00 | 1.00 | .80 | 1.00 | 1.00 | .00 | .92 |
| USA | 1.00 | 1.00 | .80 | .80 | .80 | 1.00 | .88 |
| THA | 1.00 | .75 | 1.00 | .80 | .80 | 1.00 | .86 |
| CBC | 1.00 | .83 | .80 | .80 | .83 | 1.00 | .84 |
| MEAN | 1.00 | .97 | · . 97 | .96 | .92 | .78 | . 95 |
| N. ITEMS | 2 | 6 | 5 | - 5 | 6 | 1 | 25 |

301 = Polynomials 302 = Quotients of Polynomials 303 = Roots and Radicals 304 = Equations and Inequalities 305 = Systems of Equations and Inequalities 306 = Matrices 307 = Groups, Rings, and Fields

| System | 406 | 401 | 403 | 4/)5 | 409 | MEANS |
|----------|------|-------------|------|------|------|-------|
| нко | 1.00 | 1.00 | 1.00 | 1.00 | .60 | .93 |
| FRA | .71 | 1.00 | .89 | 1.00 | 1.00 | .89 |
| LUX | .71 | 1.00 | .89 | 1.00 | 1.00 | .89 |
| IRE | 1.00 | 1.00 | .89 | .83 | .60 | .86 |
| JPN | 1.00 | 1.00 | 1.00 | .83 | .20 | .82 |
| CON | .86 | 1.00 | .71 | 1.00 | .00 | .81 |
| LNW | 1.00 | 1.00 | .89 | .67 | .20 | .75 |
| NZE | 1.00 | 1.00 | .89 | .83 | .00 | .75 |
| FIN | 1.00 | .00 | .89 | .67 | .20 | .71 |
| HUN | 1.00 | 1.00 | .89 | .67 | .00 | .71 |
| USA | 1.00 | 1.00 | .78 | .67 | .00 | .68 |
| BFL | .86 | 1.00 | .78 | .67 | .20 | .68 |
| BFR | .86 | 1.00 | .78 | .67 | .20 | .68 |
| SWE | .86 | 1.00 | .67 | .87 | .00 | .64 |
| ISR | 1.00 | 1.00 | .89 | .17 | .00 | .61 |
| SCO | .71 | 1.00 | .78 | .67 | .60 | .61 |
| T۲۹ | .80 | .0 0 | .88 | .67 | .00 | .59 |
| CBC | .86 | 1.00 | .67 | .17 | .00 | .50 |
| MEAN | .90 | .89 | .84 | .72 | .24 | .73 |
| I. ITEMS | 7 | 1 | 9 | 6 | · 5 | 28 |

5.2.4 400 Geometry (No Items for 402, 404, 407, 408)

KEY:

401 = Euclidean Geometry 402 = Affine/Projective Geometry 403 = Analytic Geometry 404 = 3-Dimensional Geometry 405 = Vector Methods 406 = Trigonometry 407 = Finite Geometry 408 = Elements of Topology 409 = Transformational Geometry

| System | 501 | 502 | 504 | 503 | 508 | 506 | 505 | 507 | MEANS |
|--------|------|------|------|------|------|------|------|------|-------|
| NZE | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ENW | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .90 | 1.00 | .98 |
| HKO | .91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .98 |
| ISR | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .90 | 1.00 | .98 |
| JPN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .90 | 1.00 | .98 |
| BFL | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .80 | 1.00 | .96 |
| BFR | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .80 | 1.00 | .96 |
| FIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .80 | 1.00 | .96 |
| HUN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | - 86 | .90 | 1.00 | .96 |
| USA | .91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .90 | 1.00 | .96 |
| FRA | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .70 | .50 | .91 |
| IRE | .82 | 1.00 | 1.00 | .75 | 1.00 | 1.00 | .90 | 1.00 | .91 |
| LUX | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | .70 | .50 | .91 |
| SCO | .91 | 1.00 | 1.00 | .75 | 1.00 | 1.00 | .90 | .50 | .91 |
| SKE | .91 | 1.00 | .75 | 1.00 | 1.00 | 1.00 | .80 | .50 | .89 |
| CON | .91 | .75 | 1.00 | .50 | 1.00 | .83 | .70 | 1.00 | .83 |
| THA | 1.00 | 1.00 | 1.00 | 1.00 | .00 | .00 | .75 | .00 | .63 |
| CBC | .91 | .75 | .00 | .50 | .20 | .00 | .20 | .00 | .39 |
| | | | | | | | | | |
| MEAN | .96 | .97 | .93 | .92 | .90 | .87 | .81 | .78 | .89 |
| ITEMS | 11 | 4 | 4 | 4 | 5 | 6 | 10 | 2 | 46 |

5.2.5 500 Elementary Functions and Calculus (No Items for 509, 510)

501 = Elementary Functions

502 = Properties

503 - Limits/Continuity

504 = Differentiation

505 * Applications of the Derivative

506 = Integration

507 = Techniques of Integration

508 = Applications of Integration 509 = Differential Equations

510 = Sequences/Series of Functions

| System | 601 | 602 | 603 | MEANS |
|----------|------|------|------|-------|
| CON | 1.00 | 1.00 | 1.00 | 1.00 |
| ENW | 1.00 | 1.00 | 1.00 | 1.00 |
| FIN | 1.00 | 1.00 | 1.00 | 1.00 |
| IRE | 1.00 | 1.00 | 1.00 | 1.00 |
| JPN | 1.00 | 1.00 | 1.00 | 1.00 |
| NZE | 1.00 | 1.00 | 1.00 | 1.00 |
| FRA | 1.00 | 1.00 | .00 | .86 |
| HKO | 1.00 | .67 | 1.00 | .86 |
| ISR | 1.00 | 1.00 | .00 | .86 |
| LUX | 1.00 | 1.00 | .00 | .86 |
| SWE | 1.00 | .67 | 1.00 | .86 |
| USA | .67 | 1.00 | 1.00 | .86 |
| THA | .67 | .67 | .00 | .57 |
| SC0 | .33 | .67 | .00 | .43 |
| BFL | .67 | .00 | .00 | .29 |
| BFR | .67 | .00 | .00 | .29 |
| HUN | .00 | .67 | .00 | .29 |
| CBC | .00 | .33 | .00 | .14 |
| MEAN | .78 | .76 | .50 | .73 |
| N. ITEMS | 3 | 3 | 1 | 7 |

5.2.6 600 Probability and Statistics (No Items for 604, 605)

KEY:

601 = Probability

602 = Statistics

603 = Distributions

604 = Statistical Inference

605 = Bivariate Statistics

| System | 701 | MEANS |
|-------------|------|-------|
| CON | 1.00 | 1.00 |
| F IN EDA | 1.00 | 1.00 |
| ГКА 1170 | 1.00 | 1.00 |
| TDE | 1.00 | 1.00 |
| JPN | 1 00 | 1.00 |
| LIIX | 1.00 | 1.00 |
| N7F | 1.00 | 1.00 |
| SCO | 1.00 | 1.00 |
| BFL | .75 | .75 |
| BFR | .75 | .75 |
| ENW | .75 | .75 |
| SWE | .75 | .75 |
| USA | .50 | .50 |
| CBC | .25 | .25 |
| HUN | .00 | .00 |
| ISR | .00 | .00 |
| THA · | .00 | .00 |
| MEAN | .71 | .71 |
| N. ITEMS | 4 | 4 |
| | | |

5.2.7 700 Finite Mathematics

KEY:

701 = Combinatorics

6. Teacher Opportunity-to-Learn Ratings Tables

State - - -

に気気に節

6.1 POPULATION A

Teacher Opportunity-to-Learn Ratings Table

| ID | BFL | CBC | CON | ENW | FIN | FRA | HUN | ISR | JPN | LUX | NTH | NZE | NGE | SWA | SWE | THA | USA |
|-------------|-----|-----|------------|------------------|----------|------------|--------------|------------|----------|-----|-----|----------|----------|----------|------------|-----------|----------|
| 001 | 07 | 100 | 100 | 93 | 100 | 99 | 99 | 87 | 100 | 90 | 96 | 94 | 88 | 95 | 80 | 97 | 98 |
| 002 | 37 | 27 | 13 | <u> </u> | 30 | 23 | 75 | 24 | 44 | 19 | 38 | 42 | 46 | 83 | 26 | 34 | 29 |
| 002 | 32 | 00 | 100 | 06 | 00 | 1.00 | 100 | 70 | 100 | 03 | 98 | 96 | 82 | 100 | 77 | 100 | 100 |
| 003 | 50 | 33 | 100 | 90 | 00 | 00 | 100 | 81 | 200 | 93 | 99 | 96 | 88 | 100 | 86 | 100 | 100 |
| 004 | 94 | 33 | 100 | ,70 | 33 | <i>33</i> | 100 | 77 | 08 | 95 | 99 | 92 | 07 | 100 | qq | 99 | 100 |
| 005 | 93 | 33 | 23 | 94 | 100 | 22 | 100 | <u>91</u> | - 90 | 01 | 01 | 82 | 84 | 00 | 92 | 90 | 87 |
| 006 | 95 | 88 | 30 | 83 | 92 | 00 | 100 | 00 | 37 | 01 | 95 | 02 | 63 | 100 | 9 <u>7</u> | 90 | 95 |
| 00/ | 83 | 90 | 33 | 93 | 93 | 92 | 37 | 67 | 30 | 51 | 60 | 37 | 80 | 77 | 41 | 90 | 92 |
| 800 | 02 | 84 | 93 | /1 | 00 21 | 93 | 100 | 07 | 90 | Q1 | 88 | 58 | 79 | 73 | 81 | 89 | 91 |
| 009 | 87 | 00 | 21 | 00 | 06 | 91 | 07 | 20 | | 01 | 87 | 28 | 97 | 94 | 27 | 94 | 93 |
| 010 | 93 | 90 | 30 | 00 5 <i>C</i> | 90 | 33 | 37 | 03 | 55 01 | 51 | 67 | 21 | 01 | 74 | 04 | 38 | 57 |
| 011 | 0/ | 5/ | 00 | 50 | 100 | 100 | 42 | 40 | 00 | 57 | 07 | 03 | 06 | 54 54 | 52 | 100 | 93 |
| 012 | 90 | 100 | 89 | 84 | 100 | 100 | 33 | 34 | 33 | 70 | 5.5 | 93 | 74 | 00 | 00 | <u>81</u> | 01 |
| 013 | 90 | 96 | 94 | 85 | 90 | 98 | 100 | 33 | 99 | 70 | 94 | 31 | 74 | 100 | 90 | 05 | 91 QA |
| 014 | 32 | 94 | 79 | 85 | 99 | 90 | 98 | 88 | 100 | 00 | 100 | 70 | 02 | 100 | 50 | 95 71 | 10 |
| 015 | 75 | 69 | 64 | 84 | 91 | 97 | 99 | 8/ | 81 | 00 | 20 | 70 | 00 76 | 07 | 20 | 91 91 | 75 |
| 016 | 66 | 58 | 27 | 45 | 54 | 59 | 100 | /5 | 97 | | 20 | 2/ | 70 | 100 | 20 | 02 | 22 |
| 017 | 83 | 93 | 89 | - 77 | 83 | 9/ | 97 | 84 | 94 | 00 | 07 | 02 52 | 00 | 100 | 44 62 | 02 | 71 |
| 018 | 58 | 91 | 78 | 73 | 49 | 63 | 100 | 84 | 100 | 00 | 92 | 23 | 0/ | 94 07 | 16 | 30 | 13 |
| 019 | 94 | 83 | 38 | 42 | 3/ | 78 | 99 | 54 | /9 | 32 | 31 | 29 | 40 | 0/ | 27 | 33 | 73 |
| 020 | • • | | • • | 64 | 83 | ••• | 51 | /3 | 80 | 18 | 92 | 70 | 43 | 90 | <i>21</i> | 02 | 74 |
| 021 | 71 | 76 | 73 | 69 | 41 | 82 | 100 | 61 | 20 | 00 | 92 | /0 | 0/ | 100 | 50 | 92 | 61 |
| 022 | 21 | 71 | 75 | 75 | 54 | 39 | 100 | 61 | 59 | 03 | 80 | 34 | 00 AC | 71 | - JO 16 | 27 | 23 |
| 023 | 17 | 13 | 26 | 27 | 32 | 61 | 98 | 32 | 93 | 35 | 23 | 10 | . 40 | 71 | 10 | 27 | 23 |
| 024 | 14 | 75 | 57 | 44 | 32 | 37 | 100 | 45 | 36 | 15 | /9 | 00 | 48 | 70 | 00 | 00 | 55 |
| 025 | 11 | 73 | 68 | 47 | 32 | 18 | 100 | 45 | 30 | 35 | 63 | 5/ | 68 | /5 | 04 | 50 | 20 |
| 026 | 44 | 57 | 70 | 46 | 21 | 29 | 100 | 49 | 50 | 59 | 26 | 27 | 80 | 50 | 10 | 24 | 55 |
| 027 | 08 | 76 | 48 | 54 | 03 | 04 | 43 | 44 | 02 | 28 | 62 | 27 | 50 | 20 | 00 | 41 | 55 65 |
| 028 | 12 | 78 | 57 | 82 | 84 | 62 | 100 | 82 | 95 | 38 | 97 | 91 | /0 | 100 | 03 | 25 | 27 |
| 029 | 02 | 56 | 34 | 46 | 63 | 42 | 94 | 64 | 84 | 25 | 81 | 58 | 48 | 100 | 40 | 20 | 37 |
| 0 30 | 27 | 26 | 38 | 62 | 46 | 87 | 100 | 25 | 59 | 10 | 92 | 96 | 53 | 100 | 11 | 20 | 20 |
| 031 | 84 | 28 | 30 | 6 0 | 23 | 66 | 92 | 49 | 93 | 53 | 82 | 41 | 50 | 100, | 22 | 30 | 20 |
| 032 | 28 | 52 | 6 6 | 89 | 58 | 45 | 99 | 67 | 92 | 39 | 39 | 70 | 62 | 100 | 00 | 22 | 70 01 |
| 033 | 60 | 59 | 77 | 80 | 74 | 66 | 99 | 53 | 100 | 35 | 43 | /3 | // | 100 | 54 | 73 | 01 |
| 034 | 29 | • • | 71 | 85 | 56 | 38 | 99 | 63 | 95 | 23 | 36 | // | /1 | 100 | 68 | 20 | 00 |
| 035 | 79 | 69 | 82 | 83 | 81 | 68 | 100 | 78 | 97 | 74 | 63 | 70 | 12 | 95 | 53 | 20 | 00 62 |
| 036 | 57 | 70 | 74 | 56 | 71 | 47 | 78 | 58 | 92 | 49 | 73 | 76 | 6/ | 91 | 69 | 22 | 02 |
| 037 | 86 | 80 | 78 | 82 | 53 | 96 | 9 9 | 71 | 99 | 94 | 75 | 73 | 79 | 95 | 6/ | 90 | 70 |
| 038 | 84 | 87 | 90 | 86 | 83 | 95 | 99 | 71 | 99 | 68 | 79 | 68 | 74 | 94 | 91 | 87 | 80 |
| 039 | 89 | 70 | 89 | 86 | 61 | 98 | 99 | 64 | 100 | 88 | 87 | 66 | 77 | 87 | 39 | 96 | 82 |
| 040 | 82 | 65 | 64 | 68 | 32 | 96 | 100 | 6 9 | 99 | 93 | 69 | 59 | 62 | 100 | 55 | 97 | 100 |
| 041 | 100 | 97 | 100 | 97 | 97 | 98 | 99 | 62 | 99 | 98 | 100 | 99 | 91 | 95 | 97 | 98 | 100 |
| 042 | 96 | 94 | 97 | 89 | 94 | 9 9 | 100 | 68 | 99 | 98 | 97 | 88 | 84 | 100 | 91 | 31 | 90 |
| 043 | 87 | 95 | 81 | 76 | 95 | 92 | 100 | 88 | 97 | 64 | 94 | 86 | 58 | 96 | 84 | 99 | 84 |
| 044 | 95 | 98 | 98 | 95 | 96 | 94 | 100 | 82 | 100 | 97 | 95 | 87 | 79 | 90 | 84 | 39 | 92 |
| 045 | 98 | 92 | 91 | 70 | 95 | 96 | 99 | 75 | 89 | 72 | 85 | 47 | 100 | 94 | 89 | 88 | 90 |
| 046 | 91 | 93 | 96 | 85 | 80 | 97 | 1 0 0 | 93 | 100 | 88 | 93 | 68 | 95 | · 77 | 97 | 96 | 97 |
| 047 | 88 | 86 | 90 | 71 | 42 | 98 | 100 | 57 | 89 | 52 | 55 | 41 | 78 | 60 | 30 | 98 | 92 |

| | ID | BFL | CBC | CON | ENW | FIN | FRA | HUN | 1 SR | JPN | LUX | NTH | NZE | NGE | SWA | SWE | íha | USA |
|---|-------------|------------|------------|----------|------|-----|------------|-----|------------|-----|----------|------|------------|----------|-----|--------------|-----------|-----------|
| | 048 | 78 | 97 | 68 | 63 | 84 | 99 | 51 | 59 | 57 | 71 | 77 | 48 | 78 | 73 | 30 | 66 | 75 |
| | 049 | 88 | 9 9 | 89 | 82 | 97 | 99 | 100 | 91 | 100 | 68 | 88 | 88 | 94 | 81 | 45 | 99 | 87 |
| | 050 | • • | •• | •• | 68 | 60 | • • | 88 | 78 | 98 | 73 | 81 | •• | 84 | 89 | 69 | •• | •• |
| | 051 | | •• | •• | 67 | 98 | • • | 99 | 85 | 100 | 54 | 87 | •• | 89 | 86 | 44 | •• | ••• |
| | 052 | 59 | 80 | 68 | 49 | 50 | 60 | 99 | 83 | 98 | 29 | 52 | 42 | 62 | 93 | 35 | 70 | 60 |
| | 053 | 82 | 91 | 93 | 77 | 82 | 91 | 100 | 88 | 95 | 55 | 80 | 71 | 88 | 93 | 44 | 88 | 73 |
| - | 054 | 80 | 87 | 68 | 52 | 47 | 95 | 100 | 83 | 86 | 36 | 78 | 64 | 71 | 85 | 26 | 86 | 69 |
| | 055 | 32 | 64 | 36 | 42 | 45 | 73 | 97 | 6 6 | 58 | 21 | 38 | 4 4 | 63 | 94 | 10 | 26 | 37 |
| | 056 | •• | | | 59 | 86 | | 56 | 69 | 83 | 79 | 92 | •• | 56 | 73 | 42 | :: | :: |
| | 057 | 76 | 73 | 84 | 82 | 54 | 90 | 99 | 68 | 93 | 88 | 76 | 76 | 86 | 94 | 64 | 95 | /0 |
| | 058 | 14 | 69 | 70 | 66 | 54 | 22 | 97 | 48 | 39 | 57 | 83 | 87 | 83 | 94 | 52 | 76 | 60 |
| | 059 | 13 | 63 | 69 | 65 | 41 | 26 | 100 | 49 | 52 | 36 | 73 | 72 | 81 | 100 | 38 | 67 | 43 |
| | 060 | •• | | •• | 44 | 35 | •• | 100 | 17 | 06 | 26 | 25 | •• | 76 | 86 | 18 | •• | • • |
| | 061 | •• | •• | •• | 52 | 57 | • • | 73 | 61 | 71 | 48 | 78 | ••• | 47 | 100 | 23 | | |
| | 062 | 20 | 49 | 60 | 68 | 37 | 31 | 100 | 43 | 61 | 47 | 82 | 68 | 80 | 94 | 52 | /1 | 44 |
| | 063 | 06 | 11 | 24 | 36 | 31 | 23 | 99 | 09 | 30 | 03 | 70 | 70 | 40 | 83 | 06 | 17 | 10 |
| | 064 | | •• | •• | 87 | 56 | •• | 100 | 58 | 98 | 93 | 87 | | 74 | 100 | 41 | | |
| | 065 | 22 | 18 | 36 | 39 | 21 | 09 | 36 | 24 | 45 | 13 | 23 | 38 | 41 | 80 | 25 | 34 | 33 |
| | 066 | 20 | 47 | 53 | 58 | 33 | 64 | 100 | 59 | 93 | 53 | 40 | 33 | 81 | // | 20 | 03 | 02 |
| | 067 | 65 | 82 | 96 | 84 | 80 | 85 | 99 | 77 | 96 | 88 | 45 | 70 | 89 | 90 | 20 | 02 | 90 |
| | 068 | 85 | 95 | 98 | 86 | 89 | 99 | 99 | 12 | 99 | 90 | 98 | 93 | 00 70 | 100 | 96 | 74 | 07 QA |
| | 069 | 78 | 91 | 91 | 80 | 89 | 96 | 97 | 69 | 90 | /1 | 88 | /0 | 70 | 100 | 04 | 06 | 82 |
| | 070 | 92 | 70 | 83 | 68 | 40 | 94 | 100 | 70 | 98 | 93 | 00 | 03 | 65 | 100 | 40 | 90 77 | 57 |
| | 071 | 81 | 73 | 66 | /6 | 51 | 99 | 97 | 27 | 90 | 60 05 | 70 | 56 | 80 | 24 | - 50 - 46 | 90 | 80 |
| | 072 | 87 | 69 | 88 | 11 | 100 | 95 | 90 | 02 | 100 | 90 | 25 | 00 | 77 | 100 | 90 | 90 | 100 |
| | 073 | 98 | 96 | 100 | 99 | 100 | 99 | 99 | 00 27 | 21 | 20 | 27 | 20 | 62 | 70 | 24 | 25 | 20 |
| | 074 | 48 | 20 | 29 | 42 | 44 | 34 | 47 | 21 67 | 100 | 20 | 94 | 96 | 77 | 100 | 90 | 95 | 88 |
| | 0/5 | 94 | 32 | 92 | 90 | 93 | 90 | 100 | 65 | 100 | 96 | 93 | 81 | · 81 | 89 | 83 | 86 | 85 |
| | 0/0 | 90 | 03 | 93 | 03 | 90 | 01 | 100 | 74 | 99 | 76 | 82 | 63 | 93 | 88 | 96 | 88 | 81 |
| | 070 | 10 | 00 70 | 75 | 60 | 42 | 03 | 97 | 78 | 100 | 79 | 65 | 36 | 74 | 79 | 73 | 97 | 83 |
| | 070 | 49 | 70 | 03 | 60 | 41 | 86 | 100 | 63 | 98 | 67 | 61 | 41 | 59 | 60 | 39 | 97 | 90 |
| | 0/9 | 04 | 06 | 00 | 00 | 41 | 100 | 95 | 75 | qq | 95 | 90 | 98 | 59 | 100 | 55 | 89 | 96 |
| | 000 | | 50 | 33 76 | 50 | 00 | 100 | 40 | 51 | 00 | 59 | 67 | 35 | 79 | 63 | 02 | 49 | 59 |
| | 001 | 00 | 00 | 01 | 53 | 03 | 97 | 99 | 82 | 95 | 70 | 96 | 90 | 49 | 100 | 90 | 95 | 83 |
| | 002 | 05 | 30 | 31 | 57 | 79 | 57 | 91 | 76 | 89 | 49 | 67 | ••• | 71 | 85 | 34 | | |
| | 003 | 20 | 50 | 56 | 47 | 37 | 63 | 21 | 53 | 15 | 21 | 37 | 18 | 58 | 33 | 28 | 71 | 73 |
| | 004 | 86 | 87 | 90 | 74 | 85 | 95 | 100 | 90 | 100 | 64 | 88 | 76 | 83 | 83 | 63 | 99 | 83 |
| | 086 | 20 | 94 | 89 | 77 | 81 | 93 | 100 | 83 | 99 | 61 | 81 | 77 | 74 | 94 | 66 | 100 | 79 |
| | 087 | 83 | 82 | 89 | 72 | 81 | 88 | 95 | 71 | 100 | 85 | 86 | 65 | 84 | 94 | 82 | 87 | 79 |
| | 088 | 84 | 46 | 47 | 45 | 69 | <u>9</u> 9 | 99 | 78 | 88 | 41 | 63 | 56 | 76 | 87 | 18 | 97 | 38 |
| | 089 | 97 | | 83 | 86 | 64 | 91 | 100 | 59 | 71 | 88 | 97 | 86 | 68 | 100 | 71 | 98 | 83 |
| | 090 | 25 | 44 | 51 | 57 | 36 | 43 | 99 | 33 | 70 | 18 | 85 | 94 | 69 | 95 | 20 | 60 | 34 |
| | 091 | 15 | 80 | 73 | 46 | 47 | 45 | 99 | 62 | 47 | 28 | 79 | 71 | 83 | 92 | 83 | 88 | 77 |
| | 092 | | | •• | 44 | 24 | | 98 | 13 | 03 | 08 | · 21 | • • | 46 | 60 | 07 | :: | |
| | 093 | 03 | 75 | 42 | · 57 | 03 | 05 | 44 | 43 | 01 | 24 | 60 | 31 | 82 | 55 | 04 | 37 | 54 |
| | 094 | • • | • • | •• | 43 | 36 | •• | 86 | 29 | 40 | 27 | 70 | •• | 45 | 88 | 21 | •• | |
| | 095 | · • • | • • | •• | 84 | 62 | | 100 | 59 | 100 | 63 | 78 | ••• | | 90 | 68 | | 10 |
| | 096 | 2 2 | 14 | 27 | 31 | 32 | 16 | 100 | 21 | 23 | 05 | 69 | 32 | | 92 | 04 | 33 | 13 |
| | 097 | 43 | 48 | 57 | 66 | 54 | 72 | 94 | 34 | 44 | Z4 | 22 | 72 | 00 | 70 | 37 | 42 1 Q | / 4 55 |
| | 09 8 | 13 | 39 | 39 | 65 | 47 | 35 | 69 | 35 | 43 | 80 | 1/ | /5 | 04 52 | 73 | 3C A 1 | 40 | 72 |
| | 099 | 44 | 50 | 72 | 69 | 52 | 46 | 99 | 52 | 80 | 10 | 21 | 04 | 52 | 05 | 41 | サブ | 12 |

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| ID | BFL | CBC | CON | ENW | FIN | FRA | HUN | ISR | JPN | LUX | NTH | NZE | NGE | SWA | SWE | АКТ | USA |
|-----|------------|--------------|----------|----------|----------|----------|-----------|----------|----------|-----------|------|-----------|------|-----|-----|-----|------|
| 100 | 91 | 86 | 90 | 90 | 96 | 99 | 99 | 68 | 98 | 98 | 98 | 77 | 96 | 100 | 97 | 86 | 77 |
| 101 | 97 | 91 | 98 | 96 | 99 | 99 | 99 | 69 | 99 | 98 | 99 | 92 | 67 | 100 | 98 | 97 | 82 |
| 102 | 65 | 89 | 87 | 91 | 69 | 78 | 99 | 65 | 96 | 83 | 95 | 95 | 54 | 100 | 86 | 84 | 77 |
| 103 | 82 | 78 | 88 | 90 | 66 | 95 | 99 | 73 | 100 | 99 | 88 | 79 | 88 | 100 | 77 | 97 | 79 |
| 100 | 05 | 63 | 78 | 78 | 53 | 100 | 99 | 61 | 99 | 96 | 80 | 54 | 70 | 73 | 35 | 89 | 67 |
| 105 | 01 | 03 | 03 | 73 | 97 | qq | 99 | 88 | 98 | 75 | 92 | 81 | 81 | 100 | 55 | 94 | 90 |
| 105 | 75 | 77 | 79 | 67 | 68 | 63 | 100 | 81 | 96 | 71 | 79 | 44 | 80 | 73 | 65 | 90 | 63 |
| 107 | 07 | 100 | 100 | 06 | 97 | 00 | 100 | 74 | 100 | 97 | 99 | 89 | 91 | 100 | 82 | 99 | 100 |
| 100 | 97 | 100 | 100 | 88 | 100 | 100 | 100 | 66 | 98 | 97 | 96 | 79 | 75 | 100 | 97 | 96 | 100 |
| 100 | 7/ | 00 | 100 | 00 | 00, | 200 | QQ | 68 | 100 | 98 | 98 | 96 | 75 | 100 | 99 | 97 | 98 |
| 110 | 00 | 0/ | 05 | 77 | 71 | 94 | 100 | 85 | 100 | 83 | 74 | 58 | 100 | 88 | 88 | 97 | 92 |
| 111 | 02 | 27 | 95 | 82 | 95 | ΔQ | 100 | 94 | 99 | 81 | 92 | 86 | 78 | 91 | 49 | 98 | 87 |
| 112 | 33 77 | 35 | 90 Q4 | 56 | 79 | 97 | 80 | 74 | 78 | 70 | 55 | 36 | 94 | 60 | 28 | 96 | 86 |
| 113 | 0 A | àà | 94 | 86 | 97 | aq | 100 | 93 | 100 | 77 | 90 | 95 | 98 | 95 | 53 | 99 | 93 |
| 114 | 24 | 33 | 35 | 27 | 28 | 55 | 92 | 73 | 20 | 25 | 62 | | 36 | 87 | 30 | | |
| 115 | Q7 | 05 | 89 | 80 | 04 | 97 | 100 | 43 | 100 | 62 | 88 | 90 | 100 | 89 | 44 | 99 | 83 |
| 115 | 07 | 90 | 70 | 74 | 97 | 0/ | 00 | 90 94 | | 57 | 75 | 76 | 93 | 100 | 32 | 93 | 65 |
| 117 | 67 | 05 | 73 | 50 | 64 64 | 72 | 07 | 82 | 90 | 28 | 60 | 46 | 71 | 94 | 28 | 9r | 62 |
| 11/ | 0/ 60 | 00 | 70 | 20 | 27 | 66 | 97 | 77 | 21 | 12 | 65 | 48 | 48 | 75 | 42 | 9× | 54 |
| 110 | 00 | 01 | 03 | 20 | 27 QÂ | 00 | 100 | 86 | 92 | 66 | 84 | 40 | 96 | 100 | 55 | | |
| 120 | | 50 | 20 | 0Z 10 | 70 | 02 | 100 | 66 | 52 | 77 | 63 | 81 | 38 | 75 | 18 | 12 | 45 |
| 120 | 90 | - 30 - 70 | 30 | 40 | /0 60 | 33 | 00 | 60 | 83 | 88 | Q7 | 01 | 90 | 100 | 89 | 96 | 86 |
| 121 | 00 | / 9 | 92 | 90 | 47 | 33 17 | 100 | 68 | Q4 | 68 | 01 | 99 | 90 | 100 | 82 | 88 | 82 |
| 122 | 03 | 64 | 04 74 | 33 | 4/ | 29 | 100 | 56 | 63 | 22 | 75 | 78 | 96 | 100 | 45 | 81 | 57 |
| 123 | 20 | 01 | 74 | 20 | 22 | 20 | 100 | 38 | 10 | 13 | 61 | 70 | 63 | 73 | 37 | | ••• |
| 124 | | | 20 | 29 | 23 | | 100 | 21 | 03 | 11 | 16 | 35 | 70 | 79 | 12 | 64 | 46 |
| 125 | 08 | 23 | 39 | 39 | 57 | 40 | 100 | 71 | 50 50 | 32 | 83 | 68 | 60 | 100 | 48 | 43 | 49 |
| 120 | 0/ | 70 | 4/ | 20 | 27 | 40 | 100 | 24 | 21 | 10 | 66 | 58 | 67 | 75 | 32 | 67 | 38 |
| 127 | 13 | | 39 | 39 | 29 | 10 | 100 | 54 | 66 | 23 | 84 | 01 | · 88 | 95 | 60 | 84 | 54 |
| 128 | 19 | /4 | 74 | 01 57 | 22 | 42 | 30 | 26 | 00 | 13 | 14 | 43 | 69 | 94 | 10 | 54 | 29 |
| 129 | 14 | 52 | 30 | 2/ | 24 62 | 39 | 100 | 20 63 | 90 07 | 26 | 33 | 71 | 54 | Q1 | 65 | 65 | 83 |
| 130 | 32 | 23 | 03 | 03 | 02 | 40 | 100 | 24 | 37 | 13 | 17 | 63 | 51 | 88 | 24 | 48 | 66 |
| 131 | 50 | 38 | 54 00 | 49 | 4/ | 02 | 00 | 71 | 03 | 21 | 66 | 77 | 90 | 88 | 77 | 83 | 97 |
| 132 | 89 | 89 | 33 | 85 | 07 | 00 | 37 | 70 | 100 | 04 | 00 | 86 | 85 | 100 | 97 | 95 | 79 |
| 133 | 98 | 80 | 98 | 93 | 57 | 30 | 29 07 | 10 | 100 | 22 | 65 | 71 | 52 | 100 | 51 | 65 | 48 |
| 134 | 0/ 50 | 02 | 09 | 74 | 03 | 02 75 | 07 | 56 | 71 | 28 | 86 | 56 | 60 | 100 | 91 | 82 | 75 |
| 135 | 50 | 80 50 | 91 | 75 | 90 67 | 70 | 100 | 50 | 100 | 07 | 88 | 56 | 81 | 83 | 45 | 95 | 73 |
| 130 | 99 | JZ 02 | 02 | 73 | 07 | 00 | 100 | 77 | 57 | 73 | 80 | 82 | 78 | 89 | 77 | 88 | 83 |
| 137 | 91 | 93 | 05 | 73 | 91 | 90 | 01 | 74 | 74 | 75 | 80 | 80 | 73 | 83 | 86 | 72 | 88 |
| 138 | 80 | 84 | 00 | 00 | 04 | 00 | 91 | 70 | 26 | 60 | 80 | 68 | 65 | 94 | 38 | 94 | 100 |
| 139 | 97 | 90 | 98 | /0 | 90 | 33 | 100 | 70 | 100 | 09 | 03 | 00 | 78 | 94 | 90 | 99 | - ú9 |
| 140 | 80 | 33 | 99 70 | 90 | 100 | 33 | 100 | 70 | 100 | 70 70 | 67 | 45 | 70 | 70 | 75 | 89 | 72 |
| 141 | 21 | 72 | 70 | 23 | 00 07 | 30 | 100 | 52 | 30 | 59 | 34 | 18 | 61 | 80 | 06 | 63 | 62 |
| 142 | 27 | /1 | 0/ | 33 | 2/ | 93 | 100 | 53 | 90 | 00 | 77 | 50 | 74 | 85 | 73 | 91 | 89 |
| 143 | | 8/ | 04 67 | 62 | 29 | 93 | 99 | 47 | 37 07 | 76 | . 66 | 50 | 63 | 75 | 55 | 53 | 46 |
| 144 | 00 | 54 75 | 2/ 70 | 64 | 55 | 90 17 | 24 | 47 | 00 | 73 | 73 | 36 | 73 | 20 | 02 | 40 | 62 |
| 140 | 11 | /3 | 73 | 04 | 00 | 1/ 07 | 100 | 7/ | 00 | 03 | 97 | 85 | 80 | 100 | 93 | 82 | 88 |
| 140 | 03 | ÖÖ | 22 | 32 70 | 33 32 | 0/ | 100 | 0 0 | 100 | 72 | 87 | | 78 | 80 | 39 | | |
| 14/ | 01 | •• | EA | 13 | 30 71 | · • | 200 27 | 76 | 58 | 50 | 76 | 53 | 67 | 88 | 24 | 94 | 65 |
| 140 | 05 | 20 | 24 | 43 65 | /4 E0 | | 100 | 70 | 07 | 22 | 64 | 27 | 62 | Q1 | 30 | 94 | 44 |
| 149 | 00 | 16 | 42 | 23 20 | J0 20 | 72 | 100 | 70 75 | Ω1 | 30 | 76 | 57 | 50 | 86 | 10 | | |
| 120 | | | | 00 | 00 | 00 | 7C 00 | 70 | 07 | 55 | 22 | 51 | 54 | 82 | 50 | 93 | 56 |
| 121 | <u>ل</u> م | 79 | 00 | 00 | 40 | 00 | フプ | 10 | 22 | 00 | 03 | 91 | 57 | | 50 | | |

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| ID | BFL | CBC | CON | ENW | FIN | FRA | HUN | ISR | JPN | LUX | NTH | NZE | NGE | SWA | SWE | THA | USA |
|-----|----------|----------|------------------|----------|------------|----------|----------|-----|-----|-----|-------|-----|-----|-----|-----|-----|-------------|
| 152 | 11 | 81 | 22 | 66 | 55 | 93 | 99 | 70 | 92 | 50 | 46 | 64 | 53 | 88 | 47 | 62 | 75 |
| 152 | | 01 | 02 | 59 | 72 | 50 | 74 | 68 | 91 | 83 | 76 | | 69 | 63 | 71 | | ••• |
| 153 | • • | •• | •• | 62 | 19 | •• | 99 | 27 | 49 | 05 | 81 | | 50 | 100 | 06 | | •• |
| 155 | 20 | 62 | 53 | 71 | 34 | 45 | 47 | 59 | 83 | 49 | 66 | 87 | 63 | 80 | 30 | 76 | 45 |
| 155 | 20 | 37 | JJ 17 | 43 | 25 | 75 | 100 | 18 | 05 | 17 | 17 | 27 | 59 | 82 | 08 | 54 | 49 |
| 150 | 01 | 57 | 77 | 45 49 | 31 | /5 | 100 | 20 | 50 | 13 | 88 | | 50 | 100 | 04 | | |
| 157 | 03 | 20 | 27 | 40 | 32 | 05 | 97 | 16 | 44 | 02 | 68 | 74 | 40 | 94 | 05 | 42 | 17 |
| 150 | 30 | 21 | 18 | 29 | 24 | 40 | 58 | 15 | 70 | 16 | 44 | 20 | 26 | 67 | 15 | 45 | 17 |
| 160 | 18 | 43 | 47 | 62 | 44 | 45 | 93 | 63 | 85 | 31 | 30 | 33 | 42 | 70 | 59 | 56 | 68 |
| 161 | 10 | 36 | 42 | 58 | 43 | 46 | 93 | 62 | 83 | 32 | 29 | 29 | 58 | 78 | 55 | 55 | 66 |
| 162 | 34 | 53 | 60 | 85 | 52 | 45 | 98 | 55 | 74 | 17 | 25 | 71 | 55 | 90 | 55 | 63 | 80 |
| 162 | 34 | 20 | 30 | 40 | 05 | 10 | 31 | 18 | 06 | 06 | 17 | 45 | 63 | 20 | 07 | 13 | 40 |
| 167 | 84 | 01 | 96 | 92 | G3 | 95 | 99 | 62 | 98 | 91 | 97 | 90 | 68 | 94 | 96 | 86 | 92 |
| 165 | 07 | 83 | 96 | 86 | 81 | 95 | 100 | 73 | 91 | 88 | 87 | 72 | 64 | 95 | 86 | 92 | 92 |
| 105 | 90 | 5/ | 76 | 71 | 55 | 98 | 100 | 53 | 98 | 94 | 76 | 52 | 71 | 75 | 35 | 89 | 62 |
| 167 | 81 81 | 59 | 80 | 80 | 65 | 94 | 94 | 49 | 91 | 43 | 77 | 72 | 39 | 90 | 62 | 67 | 71 |
| 169 | 79 | 42 | 55 | 53 | 51 | 95 | àà | 50 | 75 | 85 | 65 | 33 | 58 | 73 | 27 | 83 | 55 |
| 160 | 03 | 75 | 56 | 73 | 75 | 54 | 100 | 73 | 90 | 33 | 92 | 84 | 52 | 94 | 57 | 41 | 59 |
| 109 | 11 | 00 | 01 | 13 | 03 | 53 | 02 | 02 | 01 | 03 | 07 | 11 | 52 | 20 | 02 | 08 | 02 |
| 170 | 72 | 05 | 01 | 10 | 00 | 07 | 00 | 05 | 00 | 07 | 04 | 05 | 69 | ŌŌ | 02 | 15 | 03 |
| 172 | 51 | 88 | 58 | 42 | 48 | 80 | 32 | 57 | 06 | 21 | 33 | 32 | 57 | 75 | 20 | 55 | 67 |
| 172 | 25 | 12 | 50 | 1/ | - 40 05 | 16 | 00 | 03 | 03 | 07 | 07 | 11 | 25 | 00 | 04 | 10 | 02 |
| 173 | 20 | 22 | 20 | 14 | 34 | 90 | 95 | 16 | 53 | 11 | 72 | 84 | 25 | 95 | 11 | 18 | 20 |
| 1/4 | 0/ | 22 | 50 | 40 57 | 57 | 70 | 95 | 66 | 88 | 45 | 91 | 71 | -42 | 100 | 67 | 84 | 56 |
| 1/3 | 00 | 12 | 03 | 54 16 | 30 | 70 | 95 84 | 15 | 67 | 25 | 34 | 18 | 62 | 50 | 15 | 30 | 06 |
| 1/0 | 1/ | 11 | 13 | 10 | 30 | 07 | 04 | 15 | 07 | 25 | 54 | 67 | VL | | | 100 | 95 |
| 1// | 0/ | 92 | 9/ | • • | •• | 97 | •• | •• | •• | •• | •• | 72 | •• | •• | | 99 | 99 |
| 1/8 | 90 | 90 | 90 | •• | • • | 97 | •• | •• | • • | • • | •• | 68 | •• | ••• | | 99 | 96 |
| 1/9 | 0/ | 94 | 95 | •• | • • | 70 | •• | •• | •• | • • | •• | 34 | • | ••• | | 99 | 72 |
| 100 | 49 | 04 | 00 | •• | •• | 84 | •• | •• | •• | •• | ••• | 60 | ••• | | | 95 | 83 |
| 101 | | 04 | 00 | •• | •• | 90 | • • | • • | • • | •• | •• | 92 | ••• | | | 97 | 100 |
| 102 | 99 71 | 33 | 100 | •• | • • | 88 | •• | •• | • • | •• | •• | 60 | | ••• | | 91 | 100 |
| 103 | /1 | 90 | 100 | •• | •• | 03 | •• | • • | •• | •• | •• | 72 | | | ••• | 91 | 84 |
| 104 | 02 | 00 | 06 | •• | • • | 85 | •• | •• | •• | •• | | 76 | | | | 85 | 93 |
| 100 | 91 | 00 | 100 | •• | • • | 00 | •• | •• | •• | •• | | 99 | | | | 98 | 99 |
| 100 | 97 | 90 | 100 | •• | •• | 100 | • • | •• | • • | •• | ••• | 94 | | | | 97 | 10 0 |
| 10/ | 90 | 94 | 100 | •• | • • | 100 | •• | •• | •• | ••• | | 96 | | | | 96 | 9 8 |
| 100 | 93 | 97 | 100 | •• | •• | 90 Q4 | •• | •• | • • | •• | ••• | 83 | | | | 99 | 9 8 |
| 109 | 94 | 90 | 33 05 | •• | •• | 05 | •• | • • | • • | •• | ••• | 59 | ••• | | | 96 | 92 |
| 190 | 00 07 | 00 | 90 | •• | •• | 97 | • • | • • | • • | •• | •• | 46 | | | | 95 | 83 |
| 191 | 0/ 70 | 0/ 77 | ~~ 30 92 | •• | • • | 93 | •• | •• | • • | ••• | ••• | 47 | | | | 97 | 77 |
| 102 | 25 | 70 | 22 | •• | •• | 10 | •• | •• | •• | •• | | 27 | | | •• | 57 | 35 |
| 104 | 20 50 | 70 | 55 76 | •• | •• | 78 | •• | •• | •• | •• | | 71 | | | •• | 81 | 6 8 |
| 105 | 30 77 | 25 | 22 22 | • • | •• | 83 | •• | •• | •• | •• | | 48 | | | •• | 95 | 61 |
| 105 | 11 | 05 QA | 02 | •• | •• | 55 | •• | •• | •• | •• | • • • | 54 | | | | 98 | 67 |
| 107 | 47 | 04 /1 | 00 //7 | • • | •• | 16 | •• | •• | • • | | • • | 18 | ••• | | | 41 | 48 |
| 100 | 21 71 | 41 25 | 4/ 22 | •• | •• | 20 | •• | •• | •• | • | •• | 44 | | | | 46 | 21 |
| 100 | 17 | 20 | V 0 22 | •• | •• | 76 | •• | •• | •• | •• | •• | 17 | ••• | | | 52 | 38 |
| 122 | 46 | 37 | 40 | | • • | 70 | • • | • • | • • | •• | •• | | •• | | | - | |

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Teacher Opportunity-to-Learn Ratings Table

| ID | BFL | CBC | CON | ENW | FIN | HUN | ISR | JPN | NZE | SWE | THA | USA |
|--------|-----------|----------|------|-----------|-----------|-----------|-----------|------------|------------|------|-------------|------|
| 001 | .98 | .74 | .94 | .64 | .92 | .10 | .24 | .99 | .91 | .51 | .91 | .91 |
| 002 | .98 | .99 | .99 | .96 | 1.00 | 1.00 | .67 | 1.00 | .99 | .99 | .81 | 1.00 |
| 003 | .93 | .51 | 40 | .57 | .76 | .50 | .40 | .97 | .89 | .33 | .83 | .71 |
| 004 | .99 | .99 | 1.00 | .99 | .99 | 1.00 | .96 | 1.00 | 1.00 | 1.00 | .9 6 | 1.00 |
| 005 | .98 | .90 | .97 | .90 | .98 | .91 | .72 | 1.00 | .98 | .97 | .82 | .95 |
| 006 | .97 | .87 | .99 | .98 | 1.00 | .99 | .91 | 1.00 | 1.00 | .99 | .85 | .99 |
| 007 | .81 | .83 | .80 | .83 | .88 | .93 | .73 | 1.00 | .71 | .94 | .60 | .83 |
| 008 | .97 | .68 | .72 | .57 | 1.00 | .73 | .47 | 1.00 | .70 | .89 | .40 | .77 |
| 009 | .99 | .94 | 1.00 | .97 | .99 | .96 | .86 | 1.00 | 1.00 | .98 | .91 | .99 |
| 010 | .98 | .92 | .97 | .95 | .98 | 1.00 | .99 | 1.00 | .96 | 1.00 | .91 | .98 |
| 011 | .75 | .23 | .57 | .54 | .91 | .62 | .45 | .99 | .26 | .49 | .73 | .54 |
| 012 | QQ | 96 | 1.00 | .97 | .98 | .97 | .99 | 1.00 | 1.00 | .99 | .90 | .99 |
| 012 | 96 | 55 | 95 | .92 | .96 | .86 | .94 | 1.00 | .90 | .99 | .32 | .81 |
| 014 | . 50 | 15 | 1.00 | .96 | .92 | .30 | 1.00 | .97 | 1.00 | 1.00 | .90 | .53 |
| 014 | .99 QQ | .15 | 98 | .96 | .93 | .88 | .84 | .98 | 1.00 | .98 | .95 | .38 |
| 015 | .30 | .00 | 59 | .36 | .59 | .18 | .27 | .97 | .56 | .34 | .71 | .67 |
| 010 | ./3 | .70 | | .76 | .92 | .80 | .61 | 1.00 | .88 | .84 | .77 | .91 |
| 017 | -79 | ./5 | .65 | .63 | .86 | .09 | .48 | .41 | .85 | .95 | .76 | .72 |
| 010 | .70 | Q1 | 1 00 | .03 | 1.00 | .87 | .54 | 1.00 | 1.00 | .89 | .78 | .98 |
| 019 | •33 07 | .51 | 1.00 | .62 | .07 | .01 | .03 | .99 | .93 | .08 | .71 | .46 |
| 020 | . 57 | 50 | .00 | .02 | 98 | .03 | .78 | 1.00 | .91 | .90 | .54 | .65 |
| 021 | .33 | -50 | -70 | .04 | 1.00 | .89 | .26 | 1.00 | .77 | .91 | .85 | .71 |
| 022 | .33 | .50 | .50 | 97 | 96 | .98 | .99 | .99 | .99 | 1.00 | .86 | .96 |
| 023 | .97 | .30 | . 55 | .37 | .50 | . 50 | 71 | .93 | .68 | .96 | .33 | .48 |
| 024 | •00 | .20 | 1 00 | ./2 | 200 | 1 00 | ρρ | 1.00 | 1.00 | .99 | .93 | .99 |
| 020 | .55 | .90 | 1.00 | .30 | 07 | 07 | | 1.00 | .99 | .70 | .95 | .91 |
| 020 | .90 | .30 | .37 | - 30 | 02 | 81 | 90 | .84 | .95 | .83 | .58 | .79 |
| 027 | .99 | .3/ | . 55 | . 50 | .33 | .01 | .50 | | .99 | .61 | .82 | .63 |
| 028 | .94 | .1/ | .33 | - 32 | 04 | 96 | 75 | 1.00 | .99 | 1.00 | .24 | .34 |
| 029 | .94 | .05 | .93 | .30 | | | 31 | .98 | .92 | .90 | .93 | .42 |
| 030 | .57 | .03 | 30 | -75 | .0/ QQ | 12 | .25 | .99 | .97 | .65 | .92 | .95 |
| 031 | .92 | .70 | . 35 | 05 | 02 | .10 | .65 | .87 | 1.00 | 1.00 | .53 | .93 |
| 032 | .03 | .90 | . 50 | - 50 | .30 | .07 | .00 | 98 | .93 | .73 | .81 | .70 |
| 033 | .4/ | .40 | . 51 | .50 | .33 | .// | 35 | 14 | .83 | 1.00 | .59 | .53 |
| 034 | ./0 | .30 | 1 00 | -05 | 1 00 | 1 00 | .00 | 1 00 | .99 | . 98 | .93 | .99 |
| 035 | .99 | .97 | 1.00 | .30 | 1.00 | 2.00 | . 92 | 1.00 | ġġ | | .91 | .99 |
| 030 | .99 | .99 | 1 00 | .03 | 1 00 | . 50 | .50 | 1 00 | 90 | ġġ | .82 | .99 |
| 037 | .99 | • 30 | 1.00 | . 30 | 1.00 | | .00 | 1.00 | .68 | .90 | .84 | .75 |
| 038 | .01 | .03 | 1 00 | .05 | .04 | 1 00 | | 2200 | 1.00 | .97 | .92 | .97 |
| 039 | .99 | .95 | . 00 | • 37 | 1 00 | 1.00 | .33 | 1 00 | 71 | 86 | .89 | .48 |
| 040 | .97 | .23 | .90 | •/3 | 1.00 | .90 | .03 | 200 | 99 | .00 | .81 | .92 |
| 041 | .99 | .0/ | .33 | .90 | .33 | - 30 | .93 | 1 00 | 1 00 | .74 | . 92 | .96 |
| 042 | .98 | ./9 | .90 | .00 | . 34 | .20 | ./ 3 | 1.00 | 1 00 | 1.00 | .68 | .81 |
| 043 | .90 | .05 | . 33 | .9/ | .30 | ./0 | 60. 03 | - 90 AD | 2.00 | 1 00 | 31 | .34 |
| 044 | .90 | .05 | . 93 | .71 7c | .76 | .00 12 | .03 | .50 | . 50 69 | Q1 | 94 | .44 |
| 045 | .57 | .07 | 480 | ./0 | .00 | 00. 01 | .23 | 1 00 | 1 00 | 00 | . 94 | .98 |
| 045 | • 98 | .9/ | .98 | .03 | 1.00 | .32 | ./3 | 1 00 | 1.00 | 00 | .95 QA | 88. |
| 11/1 / | <u>un</u> | <u> </u> | 48 | | . 70 | . 34 | . JC | 1.00 | | | | |

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A started a started and

| ID | BFL | CBC | CON | ENW | FIN | HUN | ISR | JPN | NZE | SWE | THA | USA |
|-----|------------|-------------|-------------|------|------|------|-----|-------------|------|------|-----|------|
| 048 | .58 | .84 | .86 | .92 | .85 | .94 | .80 | .98 | .94 | 1.00 | .84 | .70 |
| 049 | .98 | .98 | 1.00 | .94 | .99 | .99 | .8/ | 1.00 | .97 | .99 | .92 | 1.00 |
| 050 | .67 | .43 | .56 | .59 | .71 | .62 | .66 | .99 | .68 | .91 | .56 | .59 |
| 051 | .86 | .92 | .96 | .92 | .93 | .96 | .66 | 1.00 | .94 | .94 | .76 | .87 |
| 052 | . 98 | .21 | .90 | .75 | .94 | .96 | .05 | .99 | .98 | .95 | .94 | .32 |
| 053 | .58 | .03 | .62 | .88 | .94 | .66 | .25 | .95 | .73 | .46 | .28 | .46 |
| 054 | .98 | .81 | .93 | .97 | 1.00 | .97 | .75 | 1.00 | .95 | 1.00 | .82 | -88 |
| 055 | . 98 | . 59 | .93 | .95 | .91 | .86 | .92 | 1.00 | 1.00 | .99 | .74 | .82 |
| 056 | .62 | .72 | .69 | .74 | .80 | .19 | .63 | .79 | .57 | .99 | .80 | .46 |
| 057 | .90 | .20 | . 98 | .94 | .91 | .53 | .75 | .89 | .96 | .91 | .61 | .56 |
| 058 | .91 | .07 | .98 | .96 | .94 | .93 | .71 | . 98 | .93 | .99 | .23 | .38 |
| 059 | .56 | .81 | .72 | .84 | .88 | .82 | .40 | .97 | .98 | .91 | .96 | .93 |
| 060 | .52 | .73 | .81 | .94 | .92 | .79 | .42 | .99 | .88 | .93 | .97 | .81 |
| 061 | .97 | .86 | .99 | .32 | .98 | .56 | .32 | .75 | 1.00 | .67 | .73 | .94 |
| 062 | .89 | 1.00 | .80 | .74 | . 99 | .10 | .47 | .9 9 | .88 | 1.00 | .87 | .96 |
| 063 | .95 | .88 | .73 | .49 | .91 | .11 | .50 | .98 | .91 | .84 | .85 | .93 |
| 064 | .59 | .85 | .92 | .86 | .82 | .75 | .51 | .99 | .90 | . 99 | .74 | .87 |
| 065 | .92 | .68 | .81 | .97 | .98 | .66 | .69 | 1.00 | 1.00 | .71 | .42 | .73 |
| 066 | .98 | 1.00 | 1.00 | .93 | 1.00 | .90 | .68 | 1.00 | .99 | .98 | .88 | 1.00 |
| 067 | .99 | .97 | 1.00 | .93 | 1.00 | .97 | .93 | 1.00 | .99 | .97 | .89 | .99 |
| 068 | .96 | .83 | .88 | .93 | .96 | 1.00 | .97 | 1.00 | .90 | .95 | .78 | .90 |
| 069 | .92 | .75 | .89 | .93 | .99 | .92 | .72 | 1.00 | .87 | .95 | .82 | -89 |
| 070 | .93 | .93 | .91 | .87 | .93 | .97 | .85 | 1.00 | .91 | .97 | .86 | .96 |
| 071 | .63 | .43 | .41 | .69 | .60 | .44 | .62 | .86 | .42 | .64 | .38 | .31 |
| 072 | .99 | .09 | 1.00 | .96 | .91 | .29 | .99 | .90 | 1.00 | .97 | .93 | .46 |
| 073 | .82 | .01 | .78 | .95 | .60 | .04 | .28 | .77 | .96 | .31 | .29 | .24 |
| 074 | .32 | .10 | .45 | .50 | .79 | .03 | .26 | .44 | .88 | .61 | .92 | .11 |
| 075 | .14 | .14 | .42 | .44 | .77 | .04 | .21 | .44 | .94 | .56 | .85 | .15 |
| 076 | .74 | .16 | .48 | .40 | .70 | .32 | .39 | .94 | .51 | .27 | .68 | .47 |
| 077 | .92 | .97 | .95 | .95 | 1.00 | 1.00 | .98 | 1.00 | .91 | .97 | .94 | .92 |
| 078 | .95 | .95 | .90 | .90 | .94 | 1.00 | .54 | 1.00 | .90 | .89 | .77 | .99 |
| 079 | .99 | .90 | .96 | .96 | .99 | .96 | .75 | 1.00 | .99 | .97 | .83 | .93 |
| 080 | .98 | .97 | .97 | .91 | 1.00 | .99 | .94 | 1.00 | .92 | .97 | .89 | •98 |
| 081 | .99 | .96 | .99 | .88 | 1.00 | 1.00 | .97 | .97 | 1.00 | .98 | .92 | .99 |
| 082 | .98 | .98 | 1.00 | .98 | 1.00 | 1.00 | .74 | 1.00 | 1.00 | 1.00 | .85 | 1.00 |
| 083 | .99 | .99 | 1.00 | .99 | .99 | .97 | .82 | 1.00 | 1.00 | .99 | .94 | 1.00 |
| 084 | .98 | .91 | .95 | .89 | .94 | .93 | .97 | 1.00 | .99 | .97 | .80 | .97 |
| 085 | .77 | .92 | .84 | .80 | .95 | .87 | .93 | 1.00 | .82 | .93 | .86 | .90 |
| 086 | .51 | .96 | .94 | .95 | .94 | .85 | .94 | .96 | .99 | .99 | .94 | .76 |
| 087 | .99 | .98 | .98 | .98 | .98 | .99 | .99 | 1.00 | 1.00 | .99 | .93 | .93 |
| 088 | .63 | .34 | .99 | .93 | .47 | .71 | .44 | .96 | .96 | .94 | .92 | .59 |
| 089 | .43 | .03 | .78 | .71 | .84 | .07 | .26 | .96 | .76 | .84 | .83 | .34 |
| 090 | .65 | .29 | .83 | .57 | .73 | .85 | .63 | .9 8 | .62 | .83 | .84 | .82 |
| 091 | .97 | .65 | .84 | . 69 | 1.00 | .81 | .46 | .92 | 1.00 | .99 | .66 | .83 |
| 002 | . 91 | 98 | .84 | .74 | .99 | .09 | .50 | 99 | .90 | 1.00 | .87 | .98 |
| 035 | . 91 R1 | .10 | .63 | .65 | .77 | .07 | .52 | .06 | .86 | 1.00 | .41 | .57 |
| 093 | 47 | . 91 | .84 | .63 | .78 | _81 | .64 | .97 | .81 | .60 | .47 | .92 |
| 034 | ·*/ 71 | 02 | 07 | 98 | 95 | .37 | .56 | _97 | .98 | .83 | .92 | .85 |
| 090 | 00 | 1 00 | . 00 | .97 | .97 | 1,00 | .98 | 1.00 | 1.00 | .94 | .97 | .99 |
| 030 | . 33 76 | 01 | . 25 | . 20 | .82 | 1.00 | .55 | 1.00 | .86 | .93 | .72 | .97 |
| 097 | | 36 | .00 | .78 | 1.00 | .96 | .02 | 1.00 | .88 | .91 | .88 | .48 |

1.1

| ID | BFL | CBC | CON | ENW | FIN | HUN | ISR | JPN | NZE | SWE | THA | USA |
|-----|------------|-----|------|-----|------|-----|------|------|------|------|------|------|
| 099 | .94 | .79 | .95 | .91 | .97 | .97 | .72 | .99 | .00 | .91 | .56 | 1.00 |
| 100 | .22 | .02 | .41 | .42 | .20 | .08 | .05 | .35 | .35 | .28 | .52 | .15 |
| 101 | .99 | .16 | .98 | .76 | .95 | .75 | 1.00 | .96 | .96 | .97 | .95 | .69 |
| 102 | .99 | .66 | .90 | .88 | 1.00 | .85 | .88 | .92 | .96 | .93 | .80 | .94 |
| 102 | 96 | 04 | .94 | .97 | .93 | .96 | .79 | .99 | 1.00 | 1.00 | .40 | .37 |
| 103 | . 30 | 28 | 90 | 94 | .92 | .96 | .99 | 1.00 | .99 | .99 | .95 | .67 |
| 105 | 60 | 06 | 97 | .69 | .88 | .17 | .57 | .99 | .56 | .88 | .94 | .50 |
| 105 | .00 | 11 | .91 | .94 | 93 | .04 | .94 | .89 | 1.00 | .96 | .40 | .39 |
| 107 | 20 | 04 | .97 | 95 | .92 | _32 | .81 | .84 | 1.00 | .96 | .87 | .36 |
| 102 | 99 | 12 | - GR | .61 | .92 | .60 | .97 | .96 | .91 | .97 | .93 | .66 |
| 100 | .50 | 16 | - 98 | 92 | .93 | .90 | .84 | 1.00 | .94 | 1.00 | .79 | .50 |
| 110 | .03 | .43 | .84 | -58 | .92 | .93 | .82 | .94 | .94 | .96 | .81 | .72 |
| 111 | 88 | 30 | .91 | .87 | .94 | .94 | .91 | .99 | .85 | .98 | .81 | .46 |
| 112 | QQ | .25 | .96 | .96 | .92 | .93 | .97 | 1.00 | .99 | .98 | .88 | .66 |
| 113 | 96 | .07 | .94 | .96 | .94 | .82 | .77 | .83 | 1.00 | 1.00 | .41 | .37 |
| 114 | 72 | 04 | .78 | .77 | .93 | .17 | .49 | .80 | .93 | .70 | .26 | .28 |
| 115 | 92 | 06 | .94 | 95 | .94 | .94 | .73 | 1.00 | .97 | .99 | .09 | .36 |
| 115 | . 52 | .00 | 93 | 92 | .93 | .14 | .51 | .76 | .97 | .66 | .31 | .33 |
| 117 | .33 | 24 | 98 | .96 | .92 | .90 | .95 | 1.00 | .96 | 1.00 | .93 | .59 |
| 119 | • 57 62 | .24 | .90 | .96 | .41 | .12 | .31 | .87 | .98 | .36 | .46 | .31 |
| 110 | -02 05 | 10 | QQ | 91 | 92 | .53 | .97 | .90 | .98 | .93 | . 58 | .53 |
| 120 | 01 | 07 | 97 | .95 | .94 | .94 | .71 | .98 | .94 | .97 | .35 | .33 |
| 121 | 61 | 14 | 58 | .19 | .37 | .09 | .02 | .83 | .40 | .18 | .46 | .12 |
| 122 | 65 | 06 | .64 | .39 | .85 | .65 | .70 | .92 | .90 | .41 | .36 | .34 |
| 122 | 24 | .00 | .27 | .10 | .09 | .01 | .06 | .09 | .41 | .11 | .40 | .06 |
| 120 | 20 | .03 | .27 | .58 | .28 | .04 | .11 | .80 | .75 | .43 | .33 | .06 |
| 125 | 62 | .01 | .99 | .68 | .85 | .08 | .50 | .99 | .52 | .93 | .93 | .41 |
| 126 | 35 | .07 | .45 | .62 | .73 | .20 | .06 | .91 | .41 | .23 | .39 | .25 |
| 127 | .00 | 28 | .45 | .39 | .50 | 50 | .85 | .90 | +6 | .35 | .79 | .34 |
| 128 | 88 | .00 | .35 | .22 | .21 | .30 | .02 | .81 | .77 | .09 | .16 | .06 |
| 120 | 65 | .03 | 99 | .66 | .85 | .07 | .53 | .99 | .36 | .92 | .97 | .49 |
| 120 | 88 | .02 | .50 | .28 | .09 | .23 | .00 | .83 | .65 | .07 | .10 | .07 |
| 131 | .00 | 41 | .61 | .54 | .84 | .68 | .45 | 1.00 | .36 | .37 | .64 | .43 |
| 132 | 40 | 07 | .35 | .21 | .17 | .01 | .01 | .04 | .30 | .10 | .25 | .05 |
| 132 | 58 | .84 | .96 | .55 | .98 | .73 | .39 | .90 | .47 | .28 | .67 | .83 |
| 134 | .74 | .02 | .71 | .35 | .16 | .32 | .11 | .88 | .44 | .14 | .31 | .18 |
| 135 | .73 | .48 | .69 | .62 | .73 | .06 | .47 | .31 | .84 | .91 | . 56 | .73 |
| 136 | . 86 | .02 | .38 | .05 | .10 | .01 | .01 | .35 | .01 | .09 | .29 | .03 |

7. Indices of Implemented Coverage

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7.1 Content Totals

| System | 000 | 400 | 100 | 200 | 300 | MEANS |
|----------|-----|-----|-----|-----|-----|-------|
| HUN | .92 | .97 | .91 | .87 | .87 | .91 |
| SWA | .85 | .92 | .87 | .80 | .83 | .85 |
| JPN | .85 | .95 | .83 | .51 | .75 | .77 |
| THA | .85 | .86 | .82 | .57 | .53 | .74 |
| FRA | .86 | .92 | .87 | .44 | .51 | .73 |
| CON | .87 | .83 | .70 | .51 | .60 | .71 |
| NGE | .79 | .71 | .73 | .64 | .64 | .71 |
| NTH | .82 | .83 | .72 | .66 | .32 | .70 |
| CBC | .86 | .75 | .83 | .50 | .48 | .68 |
| ENW | .78 | .79 | .64 | .54 | .69 | .68 |
| USA | .84 | .74 | .67 | 44 | .70 | .68 |
| NZE | .68 | 70 | .64 | 60 | .60 | .64 |
| ISR | 70 | 63 | 79 | 43 | 52 | .62 |
| RFI | 77 | .00 | 74 | 31 | 38 | 61 |
| FTN | .// | 70 | 70 | 38 | 51 | 61 |
| 1 114 | 79 | 82 | 51 | 35 | 37 | 58 |
| SWE | .66 | .68 | .44 | .36 | .47 | .52 |
| MEAN | .81 | .80 | .73 | .52 | .57 | .69 |
| N. ITEMS | 46 | 24 | 30 | 39 | 18 | 157 |

KEY:

THE DIST.

000 = Arithmetic 100 = Algebra 200 = Geometry 300 = Statistics 400 = Measurement

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| 7.1.1 | 000 | Arithmetic |
|-------|-------|------------|
| (No | items | for 007) |

| System | 002 | 009 | 003 | 005 | 001 | 006 | 004 | 800 | MEANS |
|----------|-----|------|-----|-----|-----|-----|------|-----|-------|
| HUN | .99 | 1.00 | .99 | .96 | .90 | .76 | 1.00 | .40 | 92 |
| CON | .95 | .93 | .91 | .84 | .81 | .87 | .86 | .74 | .87 |
| CBC | .96 | .88 | .90 | .81 | .79 | .97 | .85 | .66 | .86 |
| FRA | .97 | .87 | .94 | .96 | .80 | .98 | .93 | .11 | .86 |
| JPN | .91 | .99 | .97 | .98 | .79 | .78 | .97 | .00 | .85 |
| SWA | .96 | 1.00 | .92 | .89 | .90 | .76 | .75 | .42 | .85 |
| THA | .96 | .82 | .93 | .80 | .79 | .85 | .91 | .42 | .85 |
| USA | .94 | .88 | .90 | .76 | .76 | .85 | .88 | .59 | .84 |
| NTH | .95 | .97 | .87 | .83 | .80 | .73 | .69 | .69 | .82 |
| NGE | .78 | .80 | .81 | .67 | .76 | .90 | .79 | .82 | .79 |
| LUX | .87 | .93 | .88 | .84 | .72 | .77 | .73 | .63 | .79 |
| ENW | .90 | .92 | .82 | .79 | .76 | .68 | .70 | .60 | .78 |
| BFL | .94 | .83 | .79 | .84 | .81 | .83 | .72 | .09 | .77 |
| FIN | .96 | .93 | .82 | .66 | .80 | .86 | .56 | .07 | .75 |
| ISR | .77 | .74 | .74 | .72 | .65 | .74 | .71 | .48 | .70 |
| NZE | .87 | .85 | .72 | .78 | .73 | .57 | .46 | .31 | .68 |
| SWE | .78 | .93 | .90 | .53 | .70 | .28 | .57 | .03 | .66 |
| MEAN | .91 | .90 | .87 | .80 | .78 | .78 | .77 | .42 | .80 |
| N. ITEMS | 8 | 1 | 10 | 3 | 10 | 3 | 8 | 3 | 46 |

001 = Natural Numbers

002 = Common Fractions

003 = Decimal Fractions 004 = Ratio, Proportion, Percent 005 = Number Theory

005 = Number Theory 006 = Exponents 007 = Other Number Systems 008 = Square Roots 009 = Dimensional Analysis

.

7.1.2 200 Geometry (No items for 210,211,213,214)

| System | 201 | 207 | 202 | 203 | 208 | 212 | 209 | 204 | 206 | 205 | 215 | MEANS |
|----------|------|-----|-----|------|------|------|-----|------|-----|-----|-----|-------|
| HUN | î.00 | .96 | .99 | 1.00 | 1.00 | .75 | .99 | 1.00 | .43 | .84 | .24 | .87 |
| SWA | .97 | .99 | .91 | .79 | .84 | .83 | .92 | .70 | .37 | .50 | .29 | .80 |
| NTH | .89 | .89 | .72 | .74 | .74 | .63 | .75 | .20 | .61 | .34 | .22 | .66 |
| NGE | ,84 | .56 | .77 | .66 | .73 | .38 | .52 | .66 | .69 | .62 | .43 | .64 |
| NZE | .86 | .74 | .78 | .65 | .63 | .30 | .68 | .30 | .29 | .18 | .28 | .60 |
| THA | .93 | .53 | .70 | .85 | .69 | .40 | .31 | .57 | .39 | .30 | .13 | .57 |
| ENW | .81 | .64 | .68 | .46 | .53 | . 44 | .42 | .43 | .55 | .16 | .21 | .54 |
| JPN | .65 | .83 | .70 | .38 | .41 | .81 | .39 | .19 | .01 | .67 | .14 | .51 |
| CON | .81 | .51 | .63 | .66 | .59 | .24 | .29 | .52 | .45 | .13 | .22 | .51 |
| CBC | .75 | .70 | .59 | .76 | .49 | .24 | .18 | .49 | .75 | .11 | .10 | .50 |
| FRA | . 9 | .57 | .35 | .33 | .23 | .53 | .33 | .36 | .04 | .79 | .41 | .44 |
| USA | .75 | .53 | .50 | .62 | .41 | .21 | .17 | .52 | .54 | .06 | .07 | .44 |
| ISR | .64 | .71 | .51 | .51 | .38 | .32 | 8 | .29 | .43 | .15 | .06 | .43 |
| FIN | .56 | .70 | .41 | .37 | .33 | .23 | .35 | .23 | .03 | .30 | .12 | .38 |
| SWE | .67 | .56 | .44 | .69 | .42 | .18 | .06 | .12 | .05 | .15 | .05 | .36 |
| LUX | .79 | .35 | .45 | .26 | .32 | .34 | .05 | .29 | .26 | .25 | .07 | .35 |
| BFL | .71 | .22 | .27 | .13 | .16 | .61 | .14 | .44 | .05 | .17 | .29 | .31 |
| MEANS | .79 | .65 | .61 | .58 | .52 | .44 | .40 | .43 | .35 | .34 | .20 | .52 |
| N. ITEMS | 55 | 5 | 8 | 3 | 2 | 2 | 4 | ن | 2 | 1 | 4 | 39 |

201 = Classification of Plane Figures

202 = Properties of Plane Figures

- 203 = Congruence of Plane Figures
- 204 = Similarities of Plane Figures
- 205 = Geometric Constructions
- 206 = Pythagorean Triangles 207 = Coordinates
- 208 = Simple Deductions
- 209 = Informal Transformations
- 210 = Relations in Space
- 211 = Solids
- 212 = Spatial Visualization
- 213 = Spatial Orientation
- 214 = Decomposition of Figures
- 215 = Transformational Geometry

| | | | | | | and the second se | | | and the second se |
|----------|------|------|-----|-----|-----|---|-----|-----|---|
| System | 101 | 102 | 106 | 105 | 104 | 110 | 107 | 103 | MEANS |
| HUN | 1.00 | .98 | .96 | .99 | .98 | .48 | .98 | .26 | .91 |
| FRA | .99 | .90 | .83 | .95 | .87 | .93 | .81 | .71 | .87 |
| SWA | .90 | 1.00 | .90 | .90 | .90 | .75 | .90 | .54 | .87 |
| CBC | .98 | .94 | .86 | ,68 | .79 | .58 | .76 | .73 | .83 |
| JPN | .99 | 1.00 | .87 | .91 | .90 | .55 | .76 | .10 | .83 |
| THA | .95 | .95 | .94 | .92 | .88 | .12 | .42 | .63 | .82 |
| ISR | .91 | .88 | .80 | .83 | .83 | .66 | .63 | .55 | .79 |
| BFL | .89 | .32 | .77 | .83 | .77 | .91 | .57 | .37 | .74 |
| NGE | .82 | .82 | .72 | .82 | .79 | .38 | .54 | .57 | .73 |
| NTH | .92 | 1.00 | .79 | .71 | .73 | .63 | .38 | .35 | .72 |
| FIN | .95 | .99 | .59 | .75 | .74 | .78 | .46 | .42 | .70 |
| CON | .91 | .79 | .77 | .70 | .64 | .38 | .45 | .57 | .70 |
| USA | .89 | .84 | .70 | .55 | .60 | .45 | .52 | .70 | .67 |
| ENW | .79 | .85 | .64 | .61 | .64 | .48 | .50 | .44 | .64 |
| NZE | .91 | .93 | .61 | .63 | .60 | .81 | .46 | .25 | .64 |
| LUX | .72 | .65 | .52 | .48 | .47 | .77 | .34 | .21 | .51 |
| SWE | .66 | .95 | .50 | .31 | .38 | .18 | .24 | .24 | .43 |
| MEANS | .89 | .87 | .75 | .74 | .74 | .58 | .57 | .45 | .73 |
| N. ITEMS | 5 | 1 | 8 | 2 | 8 | 1 | 3 | 2 | 30 |

7.1.3 100 Algebra (No Items for 108,109,111,112)

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No is the second of the second s

101 = Integers

102 = Rationals

103 = Integer Exponents 104 = Formulas

105 = Polynomials

105 - Forynomials 106 = Equations/Inequalities 107 = Relations and Functions 108 = Systems of Linear Equations 109 = Finite Systems 110 = Finite Sets

111 = Flowcharts and Programming

112 = Real Numbers

| System | 304 | 303 | 302 | 301 | 306 | MEANS |
|----------|-----|-----|-----|------------------|-----|-------|
| HUN | .99 | .93 | .84 | .36 | .31 | .87 |
| SWA | .89 | .85 | .85 | .80 | .20 | .83 |
| J2N | .89 | .85 | .58 | .45 | .06 | .75 |
| USA | .86 | .65 | .73 | .33 | .40 | .70 |
| ENW | .81 | .66 | .68 | .39 | .40 | .69 |
| NGE | .69 | .66 | .56 | .41 | .63 | .64 |
| NZE | .70 | .52 | .68 | •38 [·] | .45 | .60 |
| CON | .60 | .52 | .59 | .36 | .30 | .60 |
| THA | .57 | .60 | .48 | .34 | .13 | .53 |
| ISR | .65 | .52 | .45 | .24 | .18 | .52 |
| FIN | .69 | .46 | .53 | .21 | .05 | .51 |
| FRA | .62 | .48 | .63 | .09 | .10 | .51 |
| CBC | .66 | .40 | .46 | .18 | .20 | .48 |
| SWE | 58 | .48 | .43 | .25 | .07 | .47 |
| BFL | .57 | .25 | .40 | .22 | .34 | .38 |
| LUX | .51 | .38 | .25 | .13 | .06 | .37 |
| NTH | .42 | .30 | 26 | .23 | .17 | .32 |
| MEAN | .70 | .56 | .55 | .32 | .24 | . 58 |
| N. ITEMS | 1 | 7 | 3 | 6 | 1 | 18 |
| | | | | | | |

7.1.4 300 Statistics (No items for 305,307,308,309)

KEY:

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301 = Data Collection

302 - Organization of Data

303 = Representation of Data

304 = interpretation of Data

- 305 = Combinatorics
- 306 = Outcomes/Events
- 307 = Counting of Sets 308 = Mutually exclusive Events

309 = Complementary Events

| System | 401 | 403 | 402 | 404 | MEANS |
|---------|-----|-----|-----|-----|-------|
| HUN | .95 | .98 | .90 | .99 | .97 |
| JPN | .98 | .87 | .94 | .96 | .95 |
| FRA | .88 | .88 | .90 | .96 | .92 |
| SWA | .97 | .93 | .95 | .88 | .92 |
| THA | .85 | .91 | .77 | .91 | .86 |
| BFL | .86 | .78 | .76 | .87 | .83 |
| NTH | .93 | .83 | .83 | .77 | .83 |
| CON | .92 | .92 | .85 | .75 | .83 |
| LUX | .87 | .74 | .63 | .92 | .82 |
| ENW | .84 | .79 | .84 | .74 | .79 |
| CBC | .85 | .79 | .81 | .65 | .75 |
| USA | .78 | .82 | .76 | .69 | .74 |
| NGE | .81 | .71 | .59 | .73 | .71 |
| FIN | .90 | .79 | .77 | .53 | .70 |
| NZE | .85 | .61 | .79 | .60 | .70 |
| SWE | .91 | .74 | .78 | .48 | .68 |
| , ISR | .67 | .64 | .60 | .63 | .63 |
| MEAN | .87 | .81 | .80 | .77 | .80 |
| . ITEMS | 5 | 3 | 6 | 10 | 24 |

7.1.5 400 Measurement

KEY:

401 = Standard Units 402 = Estimation 403 = Approximation 404 = Areas, Volumes, Etc.

7.2 Content Totals

| System | 300 | 500 | 200 | 700 | 100 | 400 | 600 | MEANS |
|----------|------|-----|-------------|------|-----|-----|-----|-------|
| JPN | 1.00 | .94 | .82 | .99 | .95 | .85 | .82 | .91 |
| NZE | .92 | .94 | .8 8 | .51 | .85 | .68 | .86 | .85 |
| FIN | .92 | .88 | .88 | .83 | .88 | .72 | .85 | .85 |
| BFL | .92 | .89 | .78 | .63 | .91 | .79 | .44 | .83 |
| SWE | .90 | .88 | .87 | .89 | .62 | .61 | .81 | .81 |
| ENW | .87 | .88 | .74 | .65 | .54 | .64 | .71 | .78 |
| THA | .78 | .66 | .75 | .92 | .79 | .62 | .91 | .71 |
| CON | .83 | .83 | .60 | .39 | .62 | .52 | .33 | .68 |
| USA | .89 | .58 | .81 | .55 | .83 | .54 | .46 | .67 |
| HUN | .86 | .58 | .81 | .55 | .83 | .54 | .46 | .64 |
| ISR | .72 | .79 | .64 | .56 | .38 | .43 | .30 | .63 |
| CBC | .83 | .35 | .74 | . 10 | .66 | .44 | .28 | .52 |
| MEAN | .87 | .78 | .76 | .74 | .71 | .62 | .59 | .74 |
| N. ITEMS | 25 | 46 | 19 | 4 | 7 | 28 | 7 | 136 |
| | | | | | | | | |

KEY:

S. M. Sameraker and Samera

100 = Sets and Relations 200 = Number Systems

300 = Algebra

400 = Geometry

500 = Elementary Functions and Calculus 600 = Probability and Statistics
7.2.1 100 Sets and Relations (No Items for 101, 103, 105)

| 102 .99 .95 .96 .94 .93 .92 .76 | 104 .93 .89 .85 .81 .79 .75 .62 | MEANS .95 .91 .88 .85 .83 .79 |
|--|--|---|
| .99 .95 .96 .94 .93 .92 .76 | .93 .89 .85 .81 .79 .75 .62 | .95 .91 .88 .85 .83 .79 |
| .95 .96 .94 .93 .92 .76 | .89 .85 .81 .79 .75 62 | .91 .88 .85 .83 .79 |
| .90 .94 .93 .92 .76 | .05 .81 .79 .75 62 | .88 .85 .83 .79 |
| .93 .92 .76 | .79 .75 .62 | .83 .83 .79 |
| .92 .76 | .75 | .00 |
| .76 | 62 | 66 |
| | • V E | .00 |
| .58 | .65 | .63 |
| .41 | .71 | .62 |
| .70 | .48 | .54 |
| .12 | .56 | .43 |
| .25 | . 43 | .38 |
| .71 | .71 | .71 |
| 2 | 5 | 7 |
| | .71 | .71 .71 2 5 |

KEY:

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101 = Set Notation 102 = Set Operations 103 = Relations 104 = Functions 105 = Infinite Sets

145

| System | 204 | 203 | 201 | 202 | 205 | MEANS |
|----------|------|------|-----|-----|------------|-------|
| FIN | . 98 | .87 | .89 | .80 | .88 | .88 |
| NZE | .96 | .92 | .93 | .80 | .86 | .88 |
| SWE | .99 | .87 | .72 | .74 | .98 | .87 |
| JPN | 1.00 | .94 | .98 | .97 | .48 | .82 |
| USA | .93 | .85 | .88 | .72 | .75 | .81 |
| BFL | .95 | .65 | .95 | .56 | .81 | .78 |
| THA | .95 | .61 | .83 | .78 | .68 | .75 |
| CBC | .97 | . 90 | .79 | .63 | .60 | .74 |
| ENW | .97 | .83 | .67 | .66 | .68 | .74 |
| ISR | .97 | .70 | .52 | .70 | .46 | .64 |
| CON | .95 | .81 | .65 | .59 | .30 | .60 |
| HUN | .98 | .87 | .54 | .75 | .08 | .56 |
| MEAN | .97 | .82 | .78 | .78 | .63 | .76 |
| N. ITEMS | `3 | 3 | 3 | 4 | 6 | 19 |
| | | | | | | |

7.2.2 200 Number Systems

KEY:

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and the second states

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201 = Laws for Number Systems 202 = Natural Numbers 203 = Decimals 204 = Real Numbers 205 = Complex Numbers

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| System | 30 3 | 301 | 302 | 305 | 304 | 306 | MEANS (Wtd.) |
|-------------|-------------|------|-----|------|------|-------|-----------------|
| .10N | 00 | 00 | 00 | 1 00 | 1 00 | | 1 00 |
| REI | | .33 | .55 | 1.00 | 1.00 | .33 | 1.00 |
| ETN | | | .95 | .00 | .05 | .97 | . 52 |
| F 10 N7C | | • 33 | .90 | .93 | .90 | .07 | .92 |
| | .30 | . 34 | .33 | .03 | .00 | .93 | .92 |
| JAE | .97 | . 32 | .00 | .93 | . 94 | .08 | .90 |
| USA EMU | . 33 | • 32 | .00 | .09 | .04 | .40 | .09 |
| | .93 | .89 | .90 | .84 | .05 | • .02 | .8/ |
| nun | .99 | .80 | .82 | .93 | .91 | .01 | .80 |
| CBC | .98 | .88 | .83 | .81 | .// | .12 | .83 |
| CUN | .9/ | .82 | .82 | .86 | .78 | .33 | .83 |
| THA | .92 | .78 | .66 | .08. | .70 | ./1 | .78 |
| ISR | .94 | .65 | .83 | .65 | .73 | .03 | .72 |
| MEANS | .97 | .88 | .87 | .87 | .84 | .44 | .87 |
| N. ITEMS | 5 | 6 | 2 | 5 | 6 | 1 | 25 |

7.2.3 300 Algebra (No items for 307)

KEY:

301 = Polynomials

302 = Quotients of Polynomials 303 = Roots and Radicals

304 = Equations and Inequalities

305 = Systems of Equations/Inequalities 306 = Matrices

۰.

307 = Groups, Rings, Fields

| System | 401 | 406 | 403 | 405 | 409 | MEANS (WTD.) |
|------------|------|-----|-----|-----|-----|-----------------|
| JPN "Fl | .99 | .98 | .96 | .78 | .53 | .85 |
| FIN | .97 | .93 | .87 | .71 | .14 | .72 |
| NZE | .96 | .87 | .64 | .62 | .51 | .68 |
| HUN | .97 | .85 | .72 | .64 | .17 | .65 |
| EXW | .91 | .88 | .70 | .58 | .23 | .64 |
| THA | .56 | .79 | .64 | .73 | .24 | .62 |
| SWE | .91 | .86 | .63 | .67 | .10 | .61 |
| USA | 1.00 | .85 | .64 | .36 | .08 | .54 |
| CON | .97 | .78 | .61 | .29 | .17 | .52 |
| CBC | .79 | .79 | .51 | .23 | .03 | .44 |
| ISR | .72 | .84 | .52 | .07 | .04 | .43 |
| MEANS | .89 | .86 | .69 | .54 | .24 | .62 |
| N. ITEMS | 1 | 9 | 6 | 7 | 5 | 28 |
| | | | | | | |

7.2.4 400 Geometry (No Items for 402, 404, 407, 408)

KEY:

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401 = Euclidean Geometry 402 = Affine/Projective

403 = Analytic Geometry

404 = Three-dimensional Geometry

405 = Vector Methods

406 = Trigonometry

407 = Finite Geometries

408 = Elements of Topology

409 = Transformational Geometry

| System | 501 | 502 | 503 | 508 | 505 | 506 | 504 | 507 | MEANS | |
|--|--|---|--|--|--|--|--|--|--|---|
| JPN NZE BFL FIN ENW SWE CON ISR HUN THA USA CBC | .95 .90 .92 .92 .92 .91 .81 .87 .81 .77 .80 .74 | .98 .94 .96 .83 .91 .83 .86 .73 .72 .92 .73 | .96 .95 .86 .93 .72 .97 .80 .93 .78 .91 .71 .42 | .98 .96 .92 .94 .95 .99 .88 .72 .93 .24 .35 .06 | .94 .93 .83 .80 .84 .82 .81 .76 .68 .72 .51 .21 | .87 .97 .90 .93 .91 .89 .84 .70 .55 .51 .37 .06 | .91 .99 .89 .79 .95 .82 .84 .81 .19 .67 .42 .10 | .88 .98 .90 .77 .96 .63 .77 .56 .46 .62 .31 .04 | .94 .94 .89 .88 .88 .88 .83 .79 .68 .66 .58 .35 | - |
| MEAN | .86 | .86 | .83 | .74 | .74 | .71 | .70 | .66 | .78 | - |
| N. ITEMS | 11 | 4 | 4 | 5 | 10 | 6 | 4 | 2 | 46 | |

7.2.5 500 Elementary Functions/Calculus (No Items for 509, 510)

KEY:

- 501 = Elementary Functions
- 502 = Properties of Functions

503 = Limits/Continuity

504 = Differentiation

- 505 = Application of the Derivative
- 506 = Integration
- 507 = Techniques of Integration
- 508 = Applications of Integration
- 509 = Differential Equations
- 510 = Sequences/Series of Functions

| System | 602 | 601 | 603 | MEANS (WTD.) |
|----------|-----|-----|------|--------------|
| THA | .95 | .90 | .85 | .91 |
| NZE | .91 | .79 | .94 | .86 |
| FIN | .86 | .86 | .77 | .85 |
| JPN | .80 | .98 | .44 | .82 |
| SWE | .82 | .88 | .56 | .81 |
| ENW | .76 | .75 | .44 | .71 |
| USA | 67 | .40 | .15 | .46 |
| BFL | .47 | .52 | .14 | .44 |
| CON | .47 | .24 | . 16 | .33 |
| ISR | .36 | .27 | .21 | .30 |
| CBC | .55 | .06 | .14 | .28 |
| HUN | .55 | .06 | .04 | .26 |
| MEANS | .68 | .56 | .40 | .59 |
| N. ITEMS | 3 | 3 | 1 | 7 |
| | | | | |

7.2.6 600 Probability and Statistics (No Items for 604, 605)

KEY:

5

601 = Probability 602 = Statistics 603 = Distributions

604 = Statistical Inference 605 = Bivariate Statistics

| System | 701 | MEANS (WTD.) |
|----------|-----|--------------|
| JPN | .99 | .99 |
| THA | .92 | .92 |
| SWE | .89 | .89 |
| FIN | .83 | .83 |
| ENW | .65 | .65 |
| BFL | .63 | .63 |
| ISR | .56 | .56 |
| USA | .55 | . 55 |
| NZE | .51 | .51 |
| CON | .39 | .39 |
| HUN | .29 | .29 |
| CBC | .10 | .10 |
| MEANS | .74 | .74 |
| N. ITEMS | 4 | 4 |
| | | |

7.2.7 700 Finite Mathematics

KEY:

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701 = Combinate s