

IEA(MATHS-NZ)/A/267
Revised Wellington, January 1980

Second International Mathematics Study

Deuxième Etude Internationale en Mathématiques



KNOWLEDGE OF MATHEMATICS

BOOKLET 2

CORE TEST

POPULATION A

POPULATION A

INSTRUCTIONS FOR STUDENTS

FOR OFFICIAL
USE ONLY

This is a test on different topics in mathematics. Since it is an international test, you may find some questions which are not familiar to you. You should not be discouraged by this. Please go on to other questions which are more familiar. Then, if you have time later, you may come back to questions which you left out.

Country	01-02	_____
Study	03-04	_____
Population	05	_____
Stratum	06-07	_____
School	08-10	_____
Class	11-12	_____
Student Identity	13-15	_____
Instrument	16-18	_____
Card	19	_____

On this test, three pieces of information are required for each question. The following examples will help you see how to give this information.

Example 1.

27 - 19 is equal to

- (A) 8
- B 12
- C 16
- D 18
- E None of these

Mathematics needed to answer this question was taught:

this year _____
before X
never _____

Calculator used:

yes X
no _____

Since $27 - 19 = 8$, the letter A is circled.

Suppose you were taught this before the present school year. You would place a check mark on the line as shown.

Suppose you used your calculator in answering the question. You would place an "X" on the line, as shown.

Please turn the page.

Population A - Instructions
Page 2

Please do the next example to make sure you know how to give the required information.

Example 2.

3×5 is equal to

- A 8
- B 15
- C 35
- D 385
- E None of these

Mathematics needed to
answer this question
was taught:

this year _____

before _____

never _____

Calculator used:

yes _____

no _____

Are you using a calculator for this test?

Yes _____

No _____

If you marked "No" you may ignore the "Calculator used" question for the individual problems.

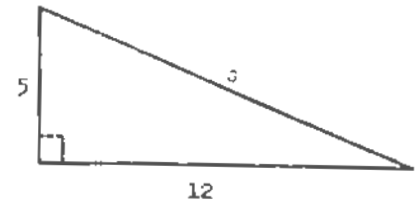
1.



Which of the following sequences of numbers is in the order in which they occur from left to right on the number line?

- A $0, \frac{1}{2}, -1$
- B $0, -1, \frac{1}{2}$
- C $-1, -\frac{1}{2}, 0$
- D $-1, 0, -\frac{1}{2}$
- E $-\frac{1}{2}, -1, 0$

2.



What is the value of s ?

- A 7
- B 13
- C 15
- D 17
- E None of these

3.

Alexandra walked from Riverview to Bridgeport, which are 3.1 kilometers apart. During her walk she lost her watch, went back 1.7 kilometers to find it, and then continued in the original direction until she reached Bridgeport. How many kilometers had Alexandra walked altogether when she arrived at Bridgeport?

- A 1.4
- B 4.8
- C 6.5
- D 8.2
- E None of these

4.

$(-2) \times (-3)$ is equal to

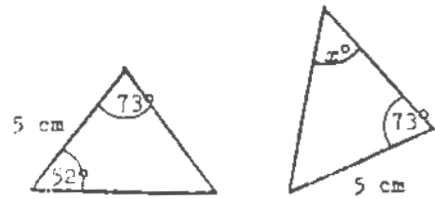
- A -6
- B -5
- C -1
- D 5
- E 6

5.

In which diagram below is the second figure the image of the first figure under a reflection in a line?



5.



The triangles shown above are congruent. The measures of some of the sides and angles are as shown.

What is x ?

A 52

B 55

C 65

D 73

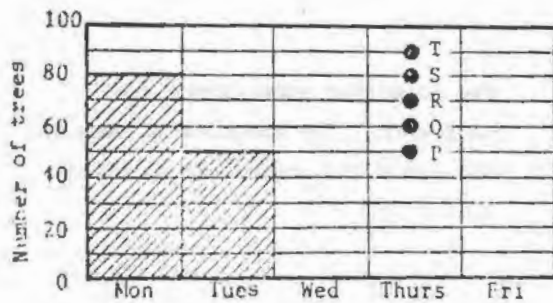
E 75

7.

Here is a table that shows the number of trees planted along a highway in a week.

Days of the Week	Mon	Tues	Wed	Thurs	Fri
Number of Trees Planted	80	50	60	90	75

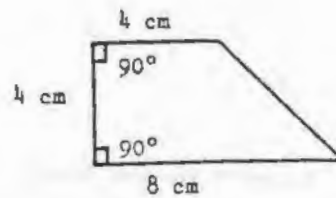
On the diagram below, the graph for the first two days' plantings has been drawn.



If the graph were completed, which point would indicate the top of the bar on Thursday?

- A P
- B Q
- C R
- D S
- E T

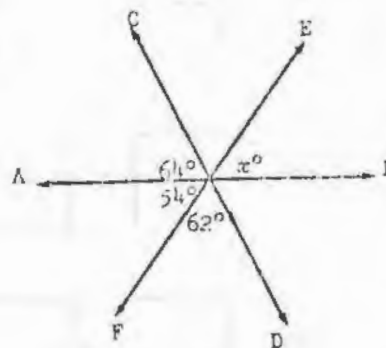
8.



There is a brass plate of the shape and dimensions shown in the figure above. What is its area in square centimeters?

- A 16
- B 24
- C 32
- D 64
- E 96

9.



\overleftrightarrow{AB} , \overleftrightarrow{CD} , and \overleftrightarrow{EF} are intersecting straight lines as shown above. The measures of certain angles are shown. x is equal to

- A 54
- B 62
- C 64
- D 126
- E 128

10.

Simplify: $5x + 3y + 2x - 4y$

- A $7x + 7y$
- B $8x - 2y$
- C $6xy$
- D $7x - y$
- E $7x + y$

12.

If $P = LW$ and if $P = 12$ and $L = 3$, then W is equal to

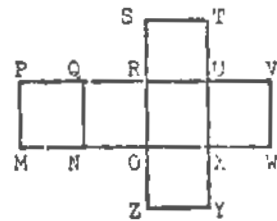
- A $\frac{3}{4}$
- B 3
- C 4
- D 12
- E 36

11.

What is the volume of a rectangular box with interior dimensions 10 cm long, 10 cm wide, and 7 cm high?

- A 27 cm^3
- B 7 cm^3
- C 140 cm^3
- D 280 cm^3
- E 700 cm^3

13.



The diagram shows a cardboard cube which has been cut along some edges and folded out flat. If it is folded to again make the cube, which two corners will touch corner P?

- A corners Q and S
- B corners T and Y
- C corners W and Y
- D corners T and V
- E corners U and Y

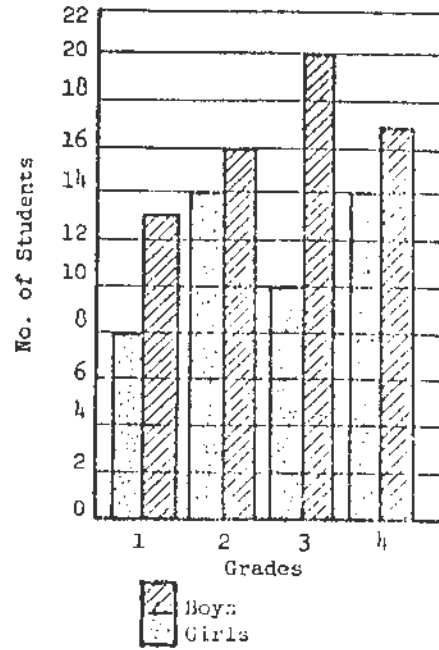
14.

Which of the following is a pair of equivalent fractions?

- A $\frac{5}{8}$ and $\frac{2}{3}$
- B $\frac{5}{6}$ and $\frac{2}{3}$
- C $\frac{4}{5}$ and $\frac{14}{15}$
- D $\frac{3}{5}$ and $\frac{9}{15}$
- E $\frac{1}{2}$ and $\frac{14}{24}$

15.

STUDENTS IN GRADES 1, 2, 3, AND 4



Which of these is a TRUE statement about the information shown on the graph?

- A Grade 2 is the smallest class
- B Grades 2 and 4 have the same number of students
- C Grade 3 has twice as many boys as girls
- D Grade 4 has more girls than boys
- E Grade 1 has as many boys as there are girls in Grade 4

16.

$$Q = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

$$R = \{3, 5, 7, 9, 11, 13\}$$

$$S = Q \cap R$$

There are 9 elements in set Q and 6 in set R. How many elements are there in set S?

- A 16
- B 11
- C 7
- D 4
- E 2

17.

$\frac{2}{5} + \frac{3}{8}$ is equal to

- A $\frac{5}{13}$
- B $\frac{5}{40}$
- C $\frac{6}{40}$
- D $\frac{16}{15}$
- E $\frac{31}{40}$

18.

0.40×6.38 is equal to

- A .2552
- B 2.452
- C 2.552
- D 24.52
- E 25.52

19.

On level ground, a boy 5 units tall casts a shadow 3 units long. At the same time a nearby telephone pole 45 units high casts a shadow the length of which, in the same units, is

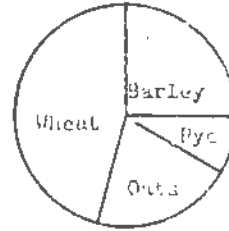
- A 24
- B 27
- C 30
- D 60
- E 75

20.

$(22 \times 18) - (47 + 59)$ is
equal to

- A 290
- B 300
- C 384
- D 408
- E 502

21.



The circle graph shows the proportions of various grain crops produced by a country. Which of the following statements is TRUE?

- A More oats than pyc is produced.
- B The largest crop is barley.
- C Equal quantities of wheat and barley are produced.
- D The smallest crop is oats.
- E Wheat and oats together make up less than half the total grain crop.

22.

If $6x - 3 = 15$
then $6x = 15 + 3$ (i)
and $6x = 12$ (ii)
and $x = \frac{12}{6}$ (iii)
and $x = 2$ (iv)

The error in the above reasoning, if one exists, FIRST APPEARS in line

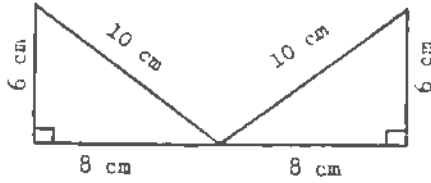
- A (i)
- B (ii)
- C (iii)
- D (iv)
- E None of these, there is no error.

23.

The value of $2^3 \times 3^2$ is

- A 30
- B 36
- C 64
- D 72
- E None of these

24.



The total area of the two triangles is

- A $6 \times 8 \text{ cm}^2$
- B $\frac{6 \times 8}{2} \text{ cm}^2$
- C $\frac{10 \times 6}{2} \text{ cm}^2$
- D $\frac{16 \times 12}{2} \text{ cm}^2$
- E $\frac{20 \times 12}{2} \text{ cm}^2$

26.

In a school of 800 pupils, 300 are boys. The ratio of the number of boys to the number of girls is

- A 3 : 8
- B 5 : 8
- C 3 : 11
- D 5 : 3
- E 3 : 5

25

Coda costs a cents for each bottle, but there is a refund of b cents on each empty bottle. How much will Henry have to pay for x bottles if he brings back y empties?

- A $ax + by$ cents
- B $ax - by$ cents
- C $(a - b)x$ cents
- D $(a + x) - (b + y)$ cents
- E None of these

27.

The arithmetic mean (average) of: 1.50, 2.40, 3.75 is equal to

- A 2.40
- B 2.55
- C 3.75
- D 7.65
- E None of these

28.

A quadrilateral MUST be a parallelogram if it has

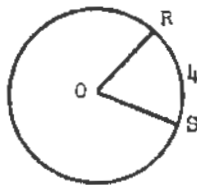
- A one pair of adjacent sides equal
- B one pair of parallel sides
- C a diagonal as axis of symmetry
- D two adjacent angles equal
- E two pairs of parallel sides

30.

Which of the following is most likely to be nearest to the weight of a normal man?

- A 0.5 kg
- B 85 kg
- C 185 kg
- D 850 kg
- E 1850 kg

32.



The length of the circumference of the circle with center at O is 24 and the length of arc RS is 4 . What is the measure in degrees of the central angle ROS?

- A 24
- B 30
- C 45
- D 60
- E 90

29.

One of the following points can be joined to the point $(-3,4)$ by a line segment which cuts NEITHER the x NOR the y axis. Which one?

- A $(-2,3)$
- B $(2,-3)$
- C $(2,3)$
- D $(-2,-3)$
- E $(4,-3)$

31.

Matchsticks are arranged as follows.



If the pattern is continued, how many matchsticks are used in making the 10th figure?

- A 30
- B 33
- C 36
- D 39
- E 42

33.

30 is 75% of what number?

- A 40
- B 90
- C 105
- D 225
- E 2250

34.

What is the square root of

$$12 \times 75?$$

- A 6.25
- B 30
- C 87
- D 625
- E 900

35.

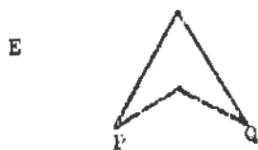
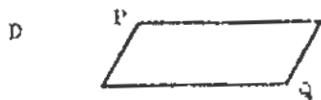
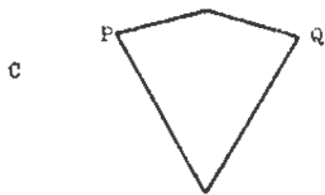
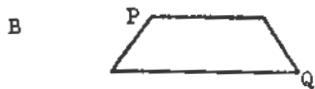
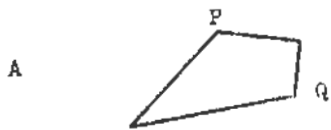
847.36

In the number in the box the digit 6 represents

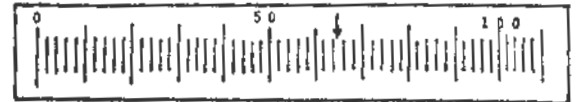
- A $6 \times \frac{1}{100}$
- B $6 \times \frac{1}{10}$
- C 6×1
- D 6×10
- E 6×100

36.

If segment \overline{PQ} were drawn for each figure shown below, it would divide one of the figures into two congruent triangles. Which figure?



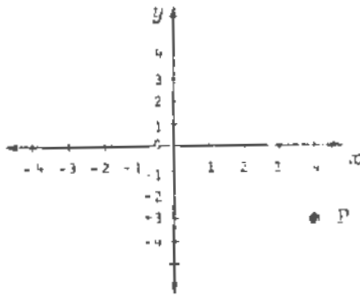
37.



On the above scale the reading indicated by the arrow is between

- A 51 and 52
- B 57 and 58
- C 60 and 62
- D 62 and 64
- E 64 and 66

38.



What are the coordinates of point P?

- A $(-3, 4)$
- B $(-4, -3)$
- C $(3, 4)$
- D $(4, -3)$
- E $(-4, 3)$

39.

The table below compares the height from which a ball is dropped (d) and the height to which it bounces (b).

d	50	80	100	150
b	25	40	50	75

Which formula describes this relation?

- A $b = d^2$
- B $b = 2d$
- C $b = \frac{d}{2}$
- D $b = d + 25$
- E $b = d - 25$

40.

The air temperature at the foot of a mountain is 31 degrees. On top of the mountain the temperature is -7 degrees. How much warmer is the air at the foot of the mountain?

- A -38 degrees
- B -24 degrees
- C 7 degrees
- D 24 degrees
- E 38 degrees

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BOOKLET 3

TEST FORM A

POPULATION A

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Example 1.

27 - 19 is equal to

- (A) 8
- B 12
- C 16
- D 13
- E None of these

Mathematics needed to answer this question was taught:

this year _____

before X

never _____

Calculator used:

yes X

no _____

Since $27 - 19 = 8$, the letter A is circled.

Suppose you were taught this before the present school year. You would place a check mark on the line as shown.

Suppose you used your calculator in answering the question. You would place an "X" on the line, as shown.

Please turn the page.

Population A - Instructions
Page 2

Please do the next example to make sure you know how to give the required information.

Example 2.

3 × 5 is equal to

- A 8
- B 15
- C 35
- D 385
- E None of these

Mathematics needed to answer this question was taught:

this year _____

before _____

never _____

Calculator used:

yes _____

no _____

Are you using a calculator for this test?

Yes _____

No _____

If you marked "No" you may ignore the "Calculator used" question for the individual problems.

1.

The cost of printing greeting cards consists of a fixed charge of 100 cents and a charge of 6 cents for each card printed. Which of the following equations can be used to determine the cost of printing n cards?

- A cost = $(100 + 6n)$ cents
- B cost = $(106 + n)$ cents
- C cost = $(6 + 100n)$ cents
- D cost = $(106n)$ cents
- E cost = $(600n)$ cents

3.

John is 4 years older than Ellen, and Ellen is 11 years younger than Monica. Monica is 12 years old. How old is John?

- A 3 years
- B 5 years
- C 14 years
- D 19 years
- E 27 years

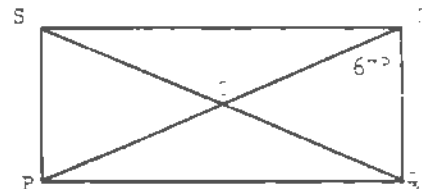
2.

m	-1	1	3	5
n	-1	3	5	9

For the table shown, a formula that could relate m and n is

- A $n = m$
- B $n = 3m$
- C $n = -m^2 + 1$
- D $n = m^2 + 1$
- E $n = 2m + 1$

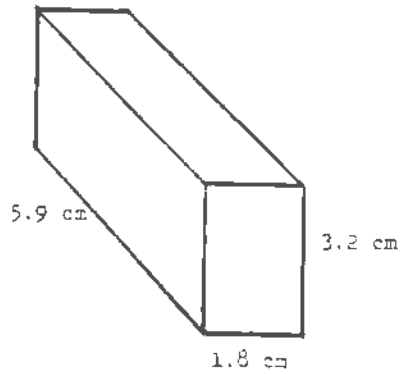
4.



In the above rectangle the measure of $\angle RCQ$ is

- A 23°
- B 45°
- C 46°
- D 54°
- E 67°

5.



The figure above shows a rectangular box. Which of the following is closest to the volume of this box?

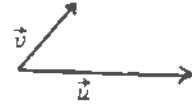
- A 16 cm^3
- B 18 cm^3
- C 28 cm^3
- D 36 cm^3
- E 48 cm^3

7.

Joe had three test scores of 78, 76 and 74, while Mary had scores of 70, 82 and 74. How did Joe's average compare with Mary's?

- A Joe's was 1 point higher
- B Joe's was 1 point lower
- C Both averages were the same
- D Joe's was 2 points higher
- E Joe's was 2 points lower

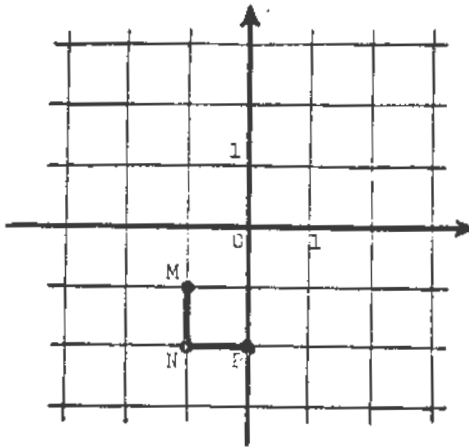
6.



\vec{u} and \vec{v} are two vectors. Which figure below represents $\vec{u} - \vec{v}$?

- A
- B
- C
- D
- E

8.



Suppose you start at point $M(-1, -1)$, move a distance of one unit to $N(-1, -2)$, then turn left and move one unit to the point $P(0, -2)$. If you again turn left and move one unit, you will now be at the point with coordinates

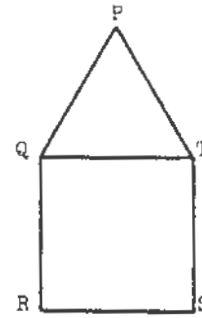
- A (1, -2)
- B (0, -3)
- C (0, -1)
- D (-1, -2)
- E None of the above

10.

There are 35 students in a class. $\frac{1}{5}$ of them come to school by bus, another $\frac{2}{5}$ come by bicycle. How many come to school by other means?

- A 7
- B 14
- C 21
- D 28
- E 35

9.

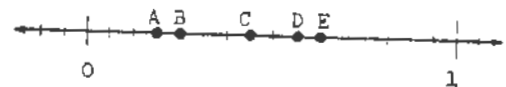


The figure QRST is a square and PQT an equilateral triangle. If $PQ = 6$ cm then the area of the square is

- A 64 cm^2
- B 48 cm^2
- C 40 cm^2
- D 36 cm^2
- E 24 cm^2

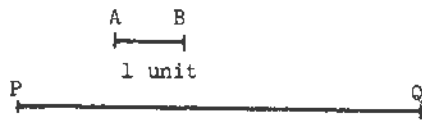
11.

Which of the points A, B, C, D, E on this number line corresponds to $\frac{5}{8}$?



- A point A
- B point B
- C point C
- D point D
- E point E

12.



The length of \overline{AB} is 1 unit.
Which is the best estimate
for the length of \overline{PQ} ?

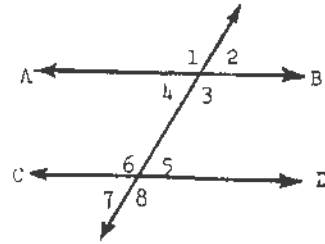
- A 2 units
- B 6 units
- C 10 units
- D 14 units
- E 18 units

14.

Which of these is the name of a
solid figure, each of whose faces
is a square?

- A cube
- B pyramid
- C tetrahedron
- D hexagon
- E cylinder

13.



Lines \overleftrightarrow{AB} and \overleftrightarrow{CD} are parallel.
Two angles whose measures must add up
to 180° are

- A $\angle 1$ and $\angle 3$
- B $\angle 4$ and $\angle 6$
- C $\angle 2$ and $\angle 5$
- D $\angle 2$ and $\angle 7$
- E $\angle 1$ and $\angle 8$

15.

A student's solution to the problem

$\frac{-2}{5} \times \frac{3}{-2} \times \frac{5}{6}$ is given below.

$$\frac{(-2) \times 3 \times 5}{5 \times (-2) \times 6} \quad (i)$$

$$= \frac{(-2) \times 3 \times 5}{(-2) \times 6 \times 5} \quad (ii)$$

$$= 1 \times \frac{3}{6} \times 1 \quad (iii)$$

$$= \frac{1}{2} \quad (iv)$$

Check the student's work and
decide if there are any errors.
In which line does any error
FIRST APPEAR?

- A line (i)
- B line (ii)
- C line (iii)
- D line (iv)
- E There is no error.
The work is correct.

16.

20% of 125 is equal to

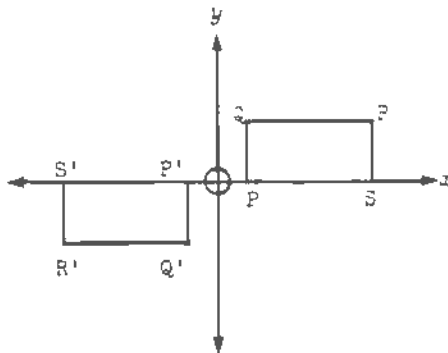
- A 6.25
- B 12.50
- C 15
- D 25
- E 50

17.

If $10^2 \times 10^3 = 10^m$ then m is equal to

- A 4
- B 5
- C 6
- D 8
- E 9

18.



PQRS is a rectangle. Its image after a transformation is the rectangle P'Q'R'S', as shown above. The transformation used could have been

- A a rotation about the origin
- B a reflection in the y -axis
- C a translation parallel to the x -axis
- D a reflection in the x -axis
- E a translation parallel to the y -axis.

19.

You wish to know whether SLOSH is the most popular soft-drink in your school. The way of finding out, from among the following, which will give results you can be most sure of, will be to

- A note the number of empty SLOSH bottles in the trash cans.
- B ask the manager of the snack bar how many cases of SLOSH he has ordered in the last month.
- C ask your friends whether they think that SLOSH is the most popular soft-drink.
- D discuss with the driver of the soft-drink delivery truck what he thinks of SLOSH.
- E keep a record of soft-drink sales in the school by brand name over a period of 1 week.

20.

If the ratio of 2 to 5 equals the ratio of n to 100, then n is equal to

- A 10
- B 20
- C 40
- D 150
- E 250

21.

The value of 0.2131×0.02958 is approximately

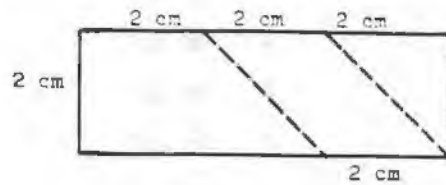
- A 0.6
- B 0.06
- C 0.006
- D 0.0006
- E 0.00006

22.

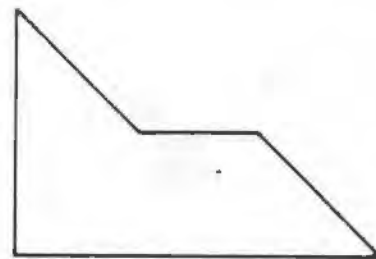
$-5(6 - 4)$ is equal to

- A 50
- B 26
- C 10
- D -10
- E -26

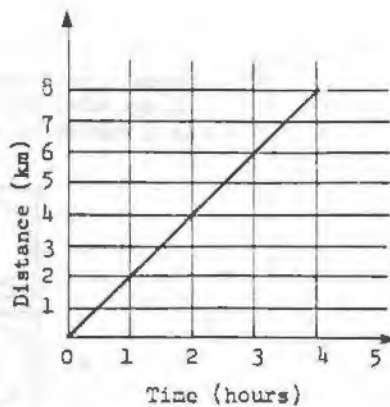
23.



The rectangle shown above is cut along the dotted lines and the three parts put together, without overlapping, to give the figure shown below.



24.



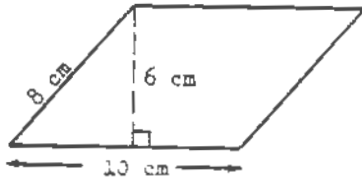
The graph shows the distance traveled by a tractor during a period of 4 hours. How fast is the tractor moving?

- A 1 kilometer per hour
- B 2 kilometers per hour
- C 4 kilometers per hour
- D 8 kilometers per hour
- E There is not enough information

The area in square centimeters of this figure is

- A 8 cm^2
- B 10 cm^2
- C 12 cm^2
- D 14 cm^2
- E 16 cm^2

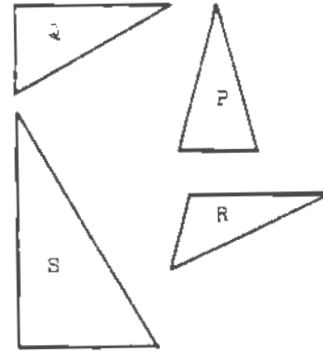
25.



What is the area of the above parallelogram?

- A 30 cm²
- B 36 cm²
- C 48 cm²
- D 60 cm²
- E 80 cm²

26.



Two of these triangles are similar. They are

- A P and R
- B P and S
- C R and S
- D Q and R
- E Q and S

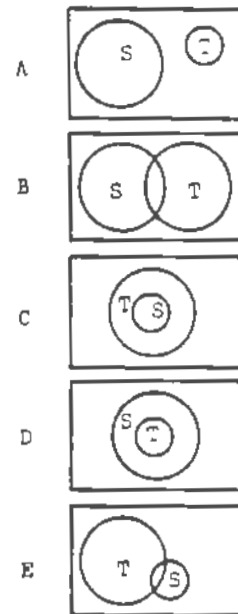
27.

$$\begin{array}{r} 1054 \\ -865 \\ \hline \end{array}$$

- A 189
- B 199
- C 211
- D 289
- E 299

28.

Which one of the following diagrams illustrates the statement, "Set S is a subset of set T"?



29.

When $x = 2$, $\frac{7x + 4}{3x + 4}$ is equal to

- A 11
- B 3
- C $\frac{11}{5}$
- D $\frac{2}{5}$
- E $\frac{7}{5}$

30.

If S is the set of points with x -coordinate greater than 3, and T is the set of points with y -coordinate greater than 2, which of the following is a member of both sets?

- A (4,3)
- B (7,4)
- C (2,8)
- D (4,-)
- E (2,4)

31.

The distance between two towns is usually measured in

- A millimeters
- B centimeters
- C decimeters
- D meters
- E kilometers

32.

Which equation is true for ALL values of n ?

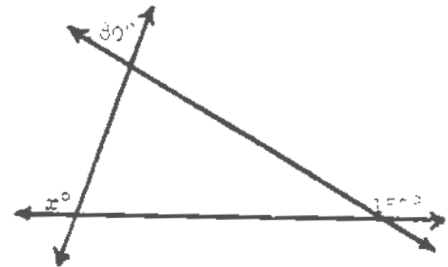
- A $2 + n = n + 2$
- B $3 + n = 4 + 2$
- C $n + 1 = 1$
- D $2n + 1 = n$
- E $n + 3 = 3n$

33.

Which of the following is equal to a quarter of a million?

- A 25,250
- B 40,000
- C $\frac{1}{4,000,000}$
- D 250,000
- E 2,500,000

34.



Three straight lines intersect as shown in the diagram. What is x equal to?

- A 30
- B 50
- C 60
- D 110
- E 150

Second International Mathematics Study

Deuxième Etude Internationale en Mathématiques



KNOWLEDGE OF MATHEMATICS

BOOKLET 4

TEST FORM B

POPULATION A

POPULATION A
INSTRUCTIONS FOR STUDENTS

FOR OFFICIAL
 USE ONLY

This is a test on different topics in mathematics. Since it is an international test, you may find some questions which are not familiar to you. You should not be discouraged by this. Please go on to other questions which are more familiar. Then, if you have time later, you may come back to questions which you left out.

Country	01-02	_____
Study	03-04	_____
Population	05	_____
Stratum	06-07	_____
School	08-10	_____
Class	11-12	_____
Student Identity	13-15	_____
Instrument	16-18	_____
Card	19	_____

On this test, three pieces of information are required for each question. The following examples will help you see how to give this information.

Example 1.

27 - 19 is equal to

- (A) 6
- B 12
- C 16
- D 18
- E None of these

Mathematics needed to
 answer this question
 was taught:

this year _____

before X

never _____

Calculator used:

yes X

no _____

Since $27 - 19 = 6$, the letter A is circled.

Suppose you were taught this before the present school year. You would place a check mark on the line as shown.

Suppose you used your calculator in answering the question. You would place an "X" on the line, as shown.

Please turn the page.

Population A - Instructions

Page 2

Please do the next example to make sure you know how to give the required information.

Example 2.

3×5 is equal to

- A 8
- B 15
- C 35
- D 385
- E None of these

Mathematics needed to
answer this question
was taught:

this year _____

before _____

never _____

Calculator used:

yes _____

no _____

Are you using a calculator for this test?

Yes _____

No _____

If you marked "No" you may ignore the "Calculator used" question for the individual problems.

1.

If $\frac{4x}{12} = 0$, then x is equal to

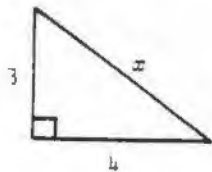
- A 0
- B 3
- C 8
- D 12
- E 16

2.

2 meters + 3 millimeters
is equal to

- A 2.0003 meters
- B 2.003 meters
- C 2.03 meters
- D 2.3 meters
- E 5 meters

3.



Which of these is a correct statement for this triangle?

- A $x^2 = 3^2 + 4^2$
- B $x^2 + 3^2 = 4^2$
- C $x = 4^2 - 3^2$
- D $x^2 = 4^2 - 3^2$
- E $x = 4 + 3$

4.

If y dollars are shared equally among four boys, how many dollars does each boy receive?

- A $y - 4$
- B $\frac{4}{y}$
- C 4
- D $\frac{y}{4}$
- E $4y$

5.

$\frac{a}{15} - \frac{b}{5}$ is equal to

- A $\frac{a-3b}{15}$
- B $\frac{5a-15b}{15}$
- C $\frac{a-b}{10}$
- D $\frac{a-b}{75}$
- E None of these

6.



Which statement can be used to find the value of y ?

- A $y = 180 - 30$
- B $y = 270 - 30$
- C $y = 270 + 30$
- D $y = 360 - 30$
- E $y = 360 + 30$

7.

Michael has a large number of wooden blocks which are cubical in shape with each edge 1 centimeter long. What is the maximum number of these blocks that can be used to fill a rectangular box with interior dimensions 10 centimeters long, 10 centimeters wide and 7 centimeters high?

- A 27
- B 77
- C 140
- D 280
- E 700

8.

1st row 1
 2nd row 1 - 1
 3rd row 1 - 1 + 1
 4th row 1 - 1 + 1 - 1
 5th row 1 - 1 + 1 - 1 + 1

What is the sum of the 50th row?

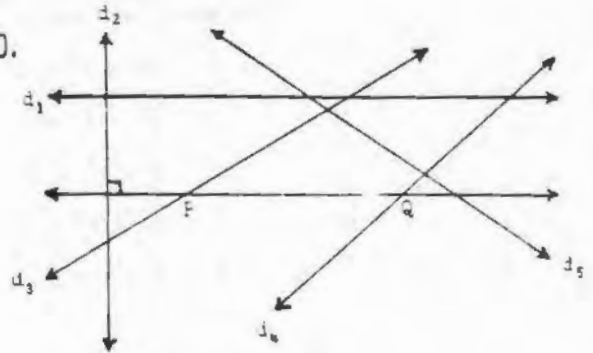
- A 0
- B 1
- C 2
- D 25
- E 30

9.

162×45 is equal to

- A 1378
- B 1458
- C 5890
- D 6290
- E 7290

10.



Among the following lines d_1, d_2, d_3, d_4, d_5 , which has no point equidistant from P and from Q?

- A d_1
- B d_2
- C d_3
- D d_4
- E d_5

11.

Which of these numbers is a prime number?

- A 11
- B 20
- C 43
- D 14
- E 18

12.

A runner ran 3,000 meters in exactly 8 minutes. What was his average speed in meters per second?

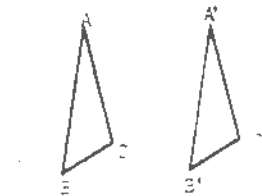
- A 3.75
- B 6.25
- C 16.0
- D 37.5
- E 62.5

13.

x , y and z are numbers greater than 0. Which of these is NOT equal to $\frac{z}{y}$?

- A $\frac{yz}{y^2}$
- B $\frac{yz}{y}$
- C $\frac{yz}{z}$
- D $\frac{yz}{z^2}$
- E $\frac{yz}{y^2}$

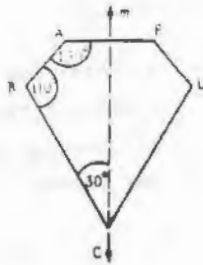
14.



Triangle ABC and triangle A'B'C' are congruent. Which of the following transformations are parallel to the line segment AA'?

- A reflection
- B glide reflection
- C rotation
- D enlargement
- E translation

15.



The line m is a line of symmetry for figure $ABCDE$. The measure of angle BCD is

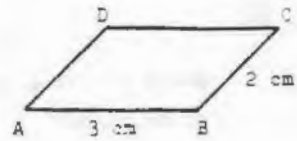
- A 30°
- B 50°
- C 60°
- D 70°
- E 110°

17.

A 15 centimeter piece is cut from a ribbon 1 meter long. What is the length of the remaining piece?

- A 85 cm
- B 115 cm
- C 985 cm
- D 1015 cm
- E 9985 cm

16.



$\overline{AB} \parallel \overline{DC}$ and $\overline{AD} \parallel \overline{BC}$. Quadrilateral $ABCD$ is a

- A rhombus
- B parallelogram
- C square
- D rectangle
- E none of the above

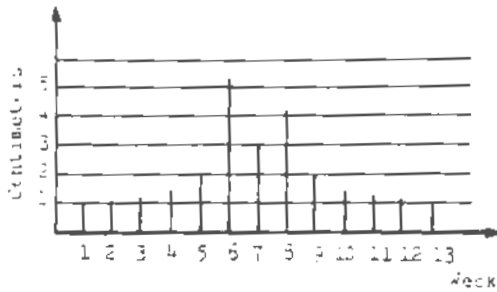
18.

Test Score	Tally	Frequency
4	/	1
5	////	3
6	//// /	6
7	////	2
8	////	4
9	////	3
10	/	1

The table shows scores for a class on a 10-point test. How many in the class made a score GREATER THAN 7?

- A 2
- B 8
- C 10
- D 12
- E 20

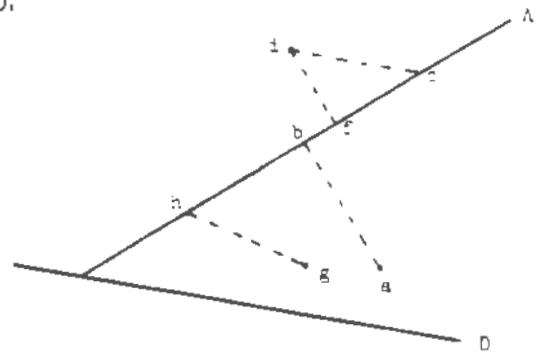
19.



In the graph, rainfall in centimeters is plotted for 13 weeks. The average weekly rainfall during the period is approximately

- A 1 centimeter
- B 2 centimeters
- C 3 centimeters
- D 4 centimeters
- E 5 centimeters

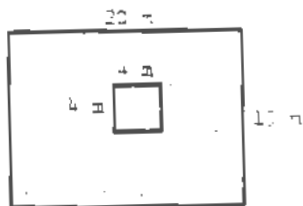
20.



If D is the direction of projection and A is the axis of projection, which of the following statements is correct?

- A $p(a) = c$
- B $p(d) = c$
- C $p(d) = e$
- D $p(g) = h$
- E $p(d) = i$

21.



A square is removed from the rectangle as shown. What is the area of the remaining part?

- A 316 m^2
- B 310 m^2
- C 164 m^2
- D 80 m^2
- E 16 m^2

22.

Since $\sqrt{2} \times \sqrt{3} = \sqrt{6}$,

$\sqrt{30}$ is equal to

- A $\sqrt{2} \times \sqrt{5}$
- B $\sqrt{2} \times \sqrt{3}$
- C $\sqrt{2} \times \sqrt{6}$
- D $\sqrt{2} \times \sqrt{3}$
- E $\sqrt{2} \times \sqrt{5}$

23.



The position on the scale indicated by the arrow is

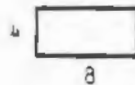
- A 1.004
- B 1.04
- C 1.03
- D 1.4
- E 1.3

24.

A painter is to mix green and yellow paint in the ratio of 4 to 7 to obtain the color he wants. If he has 28 liters of green paint, how many liters of yellow paint should be added?

- A 11
- B 16
- C 28
- D 49
- E 136

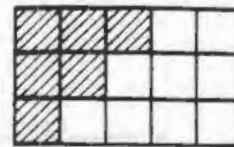
25.



One of the following figures is congruent with the figure above. Which one?

- A
- B
- C
- D
- E

26.



In the figure the little squares are all the same size and the area of the whole rectangle is equal to 1. The area of the shaded part is equal to

- A $\frac{2}{15}$
- B $\frac{1}{3}$
- C $\frac{2}{5}$
- D $\frac{3}{5}$
- E $\frac{1}{2}$

27.

Four 1-liter bowls of ice cream were set out at a party. After the party, 1 bowl was empty, 2 were half full, and 1 was three-quarters full. How many liters of ice cream had been EATEN?

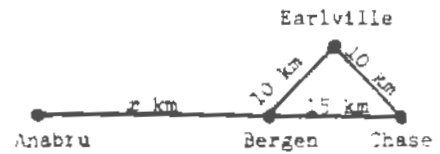
- A $\frac{3}{4}$
- B $\frac{3}{2}$
- C $\frac{2}{3}$
- D $\frac{1}{4}$
- E None of these

29.

0.00046 is equal to

- A 46×10^{-3}
- B 4.6×10^{-4}
- C 0.46×10^3
- D 4.6×10^4
- E 46×10^5

28.



The Davis family took a car trip from Anabru through Bergen to Chase. They then drove back to Bergen through Earlville, and then returned to their home in Anabru. If the total distance they drove was 115 kilometers, how far is it from Anabru to Bergen?

- A 20 kilometers
- B 35 kilometers
- C 40 kilometers
- D 75 kilometers
- E 80 kilometers

30.

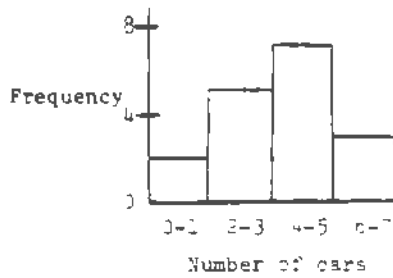


The measure of the angle shown is nearest to:

- A 155°
- B 145°
- C 50°
- D 35°
- E 15°

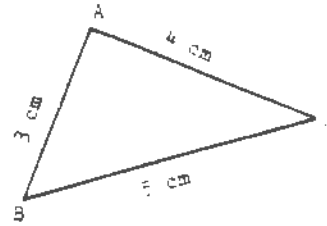
31. Here is a table of data and a graph of the same data. What is x ?

Number of Cars	Frequency
0 or 1	x
2 or 3	5
4 or 5	7
6 or 7	3



- A 2
- B 3
- C 4
- D 5
- E 6

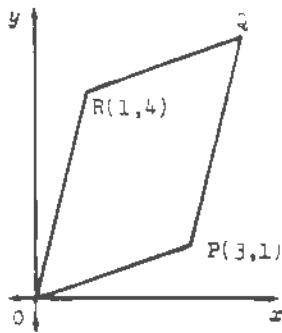
- 32.



If $\triangle XYZ$ is a triangle similar to $\triangle ABC$ but with side \overline{YZ} 10 cm long and side \overline{XZ} 8 cm long, how long is side \overline{XY} ?

- A 4 cm
- B 5 cm
- C 6 cm
- D 8 cm
- E 9 cm

- 33.

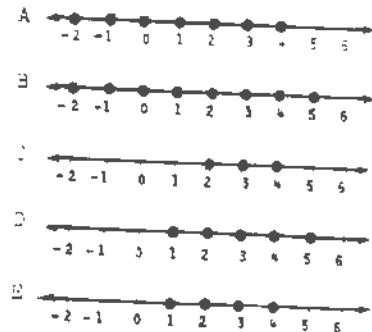


In the diagram, $OPRQ$ is a parallelogram, O is the origin, the coordinates of point P are $(3,1)$ and those of point R are $(1,4)$. What are the coordinates of point Q ?

- A $(4,5)$
- B $(5,4)$
- C $(3,4)$
- D $(4,3)$
- E $(2,7)$

- 34.

The set of integers less than 6 is represented on one of the number lines shown below. Which one?



IEA(MATHS-NZ), A-270
Revised Wellington, January 1980

Second International Mathematics Study

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KNOWLEDGE OF MATHEMATICS

BOOKLET 5

TEST FORM C

POPULATION A

POPULATION A

INSTRUCTIONS FOR STUDENTSFOR OFFICIAL
USE ONLY

This is a test on different topics in mathematics. Since it is an international test, you may find some questions which are not familiar to you. You should not be discouraged by this. Please go on to other questions which are more familiar. Then, if you have time later, you may come back to questions which you left out.

Country	01-02	_____
Study	03-04	_____
Population	05	_____
Stratum	06-07	_____
School	08-10	_____
Class	11-12	_____
Student Identity	13-15	_____
Instrument	16-18	_____
Card	19	_____

On this test, three pieces of information are required for each question. The following examples will help you see how to give this information.

Example 1.

27 - 19 is equal to

- (A) 8
- B 12
- C 16
- D 18
- E None of these

Mathematics needed to
answer this question
was taught:

this year _____
before X
never _____

Calculator used:

yes X
no _____

Since $27 - 19 = 8$, the letter A is circled.

Suppose you were taught this before the present school year. You would place an "X" on the line as shown.

Suppose you used your calculator in answering the question. You would place an "X" on the line, as shown.

Please turn the page.

Population A - Instructions

Page 2

Please do the next example to make sure you know how to give the required information.

Example 2.

3×5 is equal to

- A 8
- B 15
- C 35
- D 385
- E None of these

Mathematics needed to
answer this question
was taught:

this year _____

before _____

never _____

Calculator used:

yes _____

no _____

Are you using a calculator for this test?

Yes _____

No _____

If you marked "No" you may ignore the "Calculator used" question for the individual problems.

1.

Consider the following reasoning:

- (i) $1 > 0$
- (ii) therefore $2 > 1$
- (iii) therefore $2 \times (-1) > 1 \times (-1)$
- (iv) therefore $-2 > -1$

The error, if any, in this reasoning FIRST APPEARS in

- A line (i)
- B line (ii)
- C line (iii)
- D line (iv)
- E None of the above--there is no error in this reasoning.

3.

On a number line two points A and B are given. The coordinate of A is -3 and the coordinate of B is +7. What is the coordinate of the point C, if B is the midpoint of the line segment \overline{AC} ?

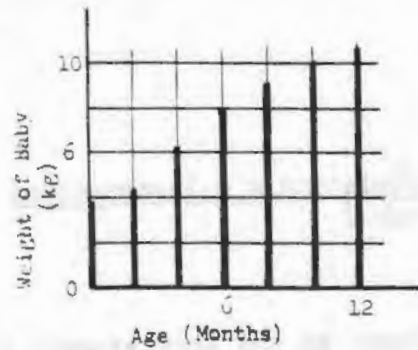
- A -13
- B $-\frac{1}{2}$
- C +2
- D +12
- E +17

5.

How many pieces of pipe each 20 meters long would be required to construct a pipeline 1 kilometer in length?

- A 5
- B 50
- C 500
- D 5000
- E 50,000

2.



The weight gain from 6 to 10 months was

- A 1 kg
- B 2 kg
- C 4 kg
- D 6 kg
- E 8 kg

4.

$$.004 \overline{)24.56}$$

In the division above, the correct answer is

- A 0.614
- B 6.14
- C 61.4
- D 614
- E 6140

6.

What is the capacity of a cubic container 10 cm by 10 cm by 10 cm?

- A 1 liter
- B 10 liters
- C 100 liters
- D 1000 liters
- E 1000 centimeters

7. If two triangles are SIMILAR, which of the following statements is TRUE?

- A Their corresponding angles MUST be congruent.
- B Their corresponding sides MUST be congruent.
- C Their corresponding sides MUST be parallel.
- D They MUST have the same area.
- E They MUST have the same shape and size.

9. Which of the following is/are TRUE?

- I $(53 \times 73) \times 17 = 53 \times (73 \times 17)$
- II $133 \times (78 + 69) = 133 \times 78 + 69$
- III $133 \times (78 + 89) = 133 \times 78 + (133 \times 89)$

- A I only
- B II only
- C III only
- D I and II only
- E I and III only

11. The length of a box was measured and found to be 9 centimeters TO THE NEAREST CENTIMETER. Which of these could have been the length of the box measured more accurately.

- A 10 cm
- B 9.9 cm
- C 9.62 cm
- D 9.6 cm
- E 8.6 cm

8. A team scores an average of 3 points per game over 5 games. How many points altogether were scored in the 5 games?

- A 15
- B 18
- C 16
- D 17
- E 19

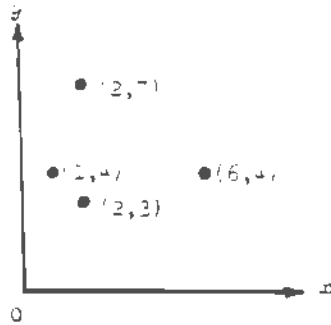
10. There are 7,000,000 girls under the age of 21 in a country with a total population of 36,000,000. If a circle graph were drawn showing the distribution of the population, the angle in the sector representing girls under the age of 21 would have measure

- A 7°
- B 20°
- C 21°
- D 70°
- E 72°

12. In a discus-throwing competition, the winning throw was 61.60 meters. The second place throw was 60.72 meters. How much longer was the winning throw than the second place throw?

- A 1.12 meters
- B 1.88 meters
- C 1.92 meters
- D 2.12 meters
- E 121.32 meters

13.



The straight line joining the points $(1, 3)$ and $(6, 7)$ cuts the straight line joining the points $(1, 4)$ and $(6, 4)$ at the point

- A $(4, 2)$
- B $(1, 4)$
- C $(2, 3)$
- D $(2, 3)$
- E $(3, 4)$

14.

The petals on 100 flowers of different kinds were carefully counted, and the results are shown in this table.

No. of petals	Frequency
10-12	5
13-15	22
16-18	48
19-21	18
22-24	7

How many of the flowers had FEWER than 19 petals?

- A 48
- B 52
- C 73
- D 75
- E 93

15.

If $x = y = z = 1$,

then $\frac{x-z}{x+y}$ is equal to

- A -2
- B -1
- C 0
- D $\frac{1}{2}$
- E 1

16.

$\frac{1}{\frac{1}{x}} - \frac{1}{\frac{1}{y}}$ is equal to

- A $\frac{x}{y}$
- B $\frac{y}{x}$
- C $\frac{x+y}{xy}$
- D $\frac{x-y}{xy}$
- E $\frac{x-y}{y}$

17.

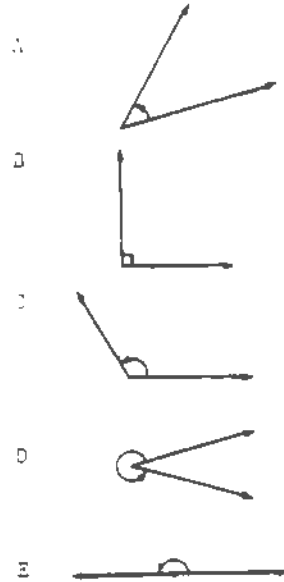
If $y = 3x - 9$ and $x = 7$, then

y is equal to

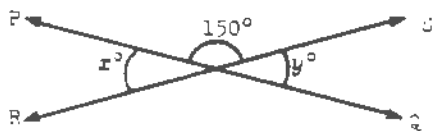
- A 3
- B 6
- C 12
- D 14
- E 18

18.

Which of the indicated angles is ACUTE?



19.



In the given figure, \overleftrightarrow{PQ} and \overleftrightarrow{RS} are intersecting straight lines, then $x + y$ is equal to

- A 15
- B 30
- C 60
- D 150
- E 300

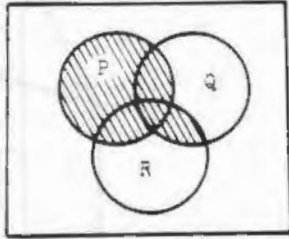
20.

In a school election with three candidates, Joe received 120 votes, Mary received 80 votes, and George received 10 votes. What percent of the total number of votes did Joe receive?

- A $\frac{1}{11}$
- B 10%
- C 11%
- D 80%
- E 120%

21.

The symbol $P \cap Q$ represents the intersection of sets P and Q and the symbol $P \cup Q$ represents the union of sets P and Q. Which of the following represents the shaded portion of the diagram below?



- A $P \cap Q \cap R$
- B $P \cup (Q \cap R)$
- C $P \cap (Q \cup R)$
- D $(P \cap Q) \cap R$
- E $(P \cup Q) \cap R$

24.

Find the value of N.

$$N = 10^3 + 10^1 + 10^0 + 10^{-2}$$

- A $N = 0$
- B $N = 20$
- C $N = 1011.01$
- D $N = 100$
- E Some other value

22.

3.23×10^5 is equal to

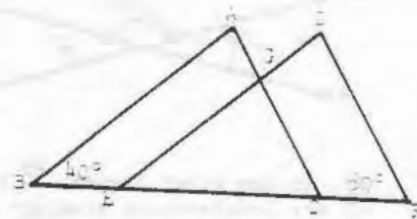
- A 0.0000323
- B 3.23000
- C 32,300
- D 323,000
- E 32,300,000

23.

$(-6) - (-8)$ is equal to

- A 14
- B 2
- C -2
- D -10
- E -14

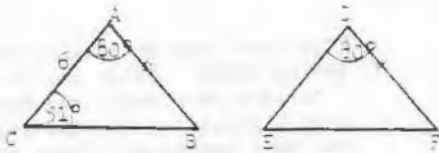
25.



In the above diagram, triangles ABC and DEF are congruent, with $BC = EF$. What is the measure of angle ECG?

- A 20°
- B 40°
- C 60°
- D 80°
- E 100°

26.



If the triangles above are congruent and $m\angle A = m\angle D = 80^\circ$, $m\angle C = 51^\circ$ and $AB \cong DF$, which of these is TRUE?

- A $m\angle F = 49^\circ$ and \overline{BC} is 6 units long
- B $m\angle F = 50^\circ$ and \overline{BC} is 6 units long
- C $m\angle F = 49^\circ$ and \overline{BC} is 5 units long
- D $m\angle F = 51^\circ$ and \overline{BC} is 6 units long
- E $m\angle F = 51^\circ$ and \overline{BC} is 5 units long

28.

"Six times a certain number (call it q) equals the sum of eight and twice the number." This can be written as

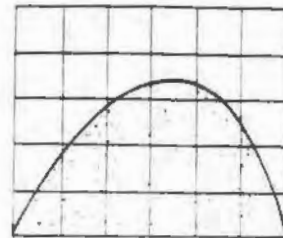
- A $6q = 2(8 + q)$
- B $6(q + 8) = 2q$
- C $6(q + 8) = 8 + 2q$
- D $6q = 8 + 2q$
- E $q = 1$

27.

In a quadrilateral, two of the angles each have measure of 110° , and the measure of a third angle is 90° . What is the measure of the remaining angle?

- A 50°
- B 90°
- C 130°
- D 140°
- E None of the above

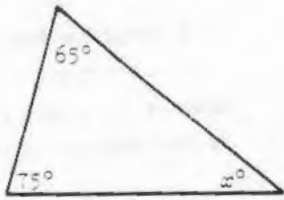
29.



Each of the small squares in the figure is 1 square unit. Which is the best estimate of the area of the shaded region?

- A 10 square units
- B 12 square units
- C 14 square units
- D 16 square units
- E 18 square units

30.



x is equal to

- A 75
- B 70
- C 65
- D 60
- E 40

32.

If $x = -3$, the value of $-3x$ is

- A -9
- B -6
- C -1
- D 1
- E 9

34.

$\frac{H}{2} < 7$ is equivalent to

- A $H < \frac{7}{2}$
- B $H < 5$
- C $H < 14$
- D $H > 5$
- E $H > 14$

31.

Peter and Paul decided to start saving money. Peter can save 3 dollars each month and Paul can save 5 dollars. At this rate, after how many months will Paul have exactly 10 dollars more than Peter?

- A 2
- B 3
- C 4
- D 5
- E 8

33.

Which of the following equals

$$7 \times (3 + 9) ?$$

- A $(7 \times 3) + (7 \times 9)$
- B $(7 \times 9) + (3 \times 9)$
- C $(7 \times 3) + (3 \times 9)$
- D 7×27
- E $21 + 9$

Second International Mathematics Study

Deuxième Etude Internationale en Mathématiques



KNOWLEDGE OF MATHEMATICS

BOOKLET 6

TEST FORM D

POPULATION A

POPULATION A
INSTRUCTIONS FOR STUDENTS

FOR OFFICIAL
 USE ONLY

This is a test on different topics in mathematics. Since it is an international test, you may find some questions which are not familiar to you. You should not be discouraged by this. Please go on to other questions which are more familiar. Then, if you have time later, you may come back to questions which you left out.

Country	01-02	_____
Study	03-04	_____
Population	05	_____
Stratum	06-07	_____
School	08-10	_____
Class	11-12	_____
Student Identity	13-15	_____
Instrument	16-18	_____
Card	19	_____

On this test, three pieces of information are required for each question. The following examples will help you see how to give this information.

Example 1.

27 - 19 is equal to

- (A) 8
- B 12
- C 16
- D 18
- E None of these

Mathematics needed to answer this question was taught:

this year _____
 before X
 never _____

Calculator used:

yes X
 no _____

Since $27 - 19 = 8$, the letter A is circled.

Suppose you were taught this before the present school year. You would place an "X" on the line as shown.

Suppose you used your calculator in answering the question. You would place an "X" on the line, as shown.

Please turn the page.

Population A - Instructions

Page 2

Please do the next example to make sure you know how to give the required information.

Example 2.

3 × 5 is equal to

- A 8
- B 15
- C 35
- D 385
- E None of these

Mathematics needed to answer this question was taught:

this year _____

before _____

never _____

Calculator used:

yes _____

no _____

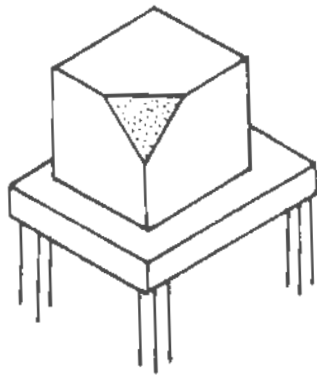
Are you using a calculator for this test?

Yes _____

No _____

If you marked "No" you may ignore the "Calculator used" question for the individual problems.

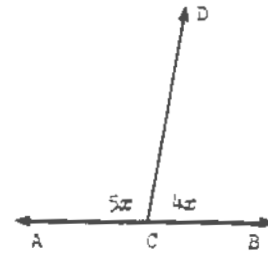
1.



The figure above shows a wooden cube with one corner cut off and shaded. Which of the following drawings shows how this cube would look when viewed from directly above it?

- A
- B
- C
- D
- E

2.



If AB is a straight line, what is the measure in degrees of angle BCD?

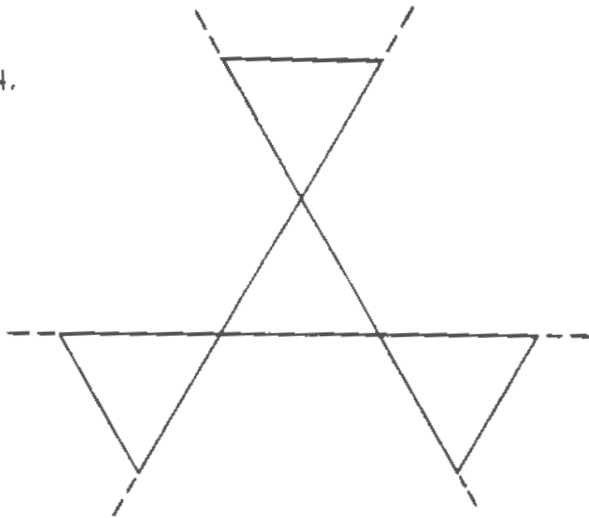
- A 20
- B 40
- C 50
- D 80
- E 100

3.

The speed of sound is approximately 340 meters per second. How long will it take before the sound of a car horn reaches your ears if the car is 714 meters away?

- A 0.21 seconds
- B 2.1 seconds
- C 21 seconds
- D 210 seconds
- E None of these

4.



Four identical equilateral triangles have been arranged as shown above. How many lines of symmetry does the resulting figure have?

- A 1
- B 3
- C 6
- D 9
- E 12

5.

Find the sum:

$$\begin{array}{r} 3 \text{ weeks } 5 \text{ days} \\ + 9 \text{ weeks } 6 \text{ days} \\ \hline \end{array}$$

- A 12 weeks 1 day
- B 12 weeks 4 days
- C 13 weeks 1 day
- D 13 weeks 4 days
- E 13 weeks 11 days

6.

$7\frac{3}{20}$ is equal to

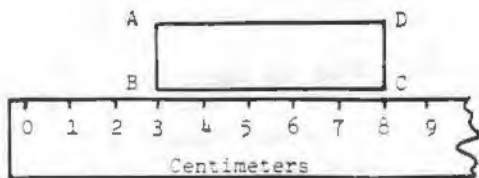
- A 7.03
- B 7.15
- C 7.23
- D 7.3
- E 7.6

7.

If there are 300 calories in 100 grams of a certain food, how many calories are there in a 30 gram portion of that food?

- A 90
- B 100
- C 300
- D 1000
- E 9000

8.



According to the scale shown, the length of side BC of a rectangle ABCD (to the NEAREST CENTIMETER) is

- A 5 centimeters
- B 6 centimeters
- C 7 centimeters
- D 8 centimeters
- E 9 centimeters

10.

$12x + 16y$ is equal to

- A $12(x + 16y)$
- B $4(3x + 16y)$
- C $4(3x + 6y)$
- D $2(6x + 16y)$
- E $12(x + 16y)$

12. $\left(-\frac{3}{4}\right) - \left(-\frac{1}{8}\right)$ is equal to

- A $-\frac{7}{8}$
- B $-\frac{5}{8}$
- C $-\frac{3}{8}$
- D $\frac{5}{8}$
- E $\frac{7}{8}$

9.

There are 227 students in a school. Every student in the school belongs to either the music club or the sports club, and some students belong to both clubs. The music club has 120 members, and 36 of those are also members of the sports club. What is the total membership of the sports club?

- A 36
- B 84
- C 107
- D 120
- E 143

11.

There are five black buttons and one red button in a jar. If you pull out one button at random, what is the probability that you will get the red button?

- A 0
- B $\frac{1}{6}$
- C $\frac{1}{5}$
- D $\frac{5}{6}$
- E 1

13.

$\sqrt{75}$ is between

- A 4 and 5
- B 5 and 6
- C 6 and 7
- D 7 and 8
- E 8 and 9

14.

A group of children was divided into 7 teams with nine in each team. Later, the same group of children was divided into teams with seven in each team. How many teams were there then?

- A 7
- B 6
- C 3
- D 10
- E 63

15.

$\frac{\frac{3}{4} \times 3}{\frac{3}{4}}$ is equal to

- A $\frac{21}{12}$
- B $\frac{9}{12}$
- C $\frac{10}{21}$
- D $\frac{6}{35}$
- E $\frac{21}{35}$

16.

One bell rings every 3 minutes, a second bell rings every 12 minutes. They both ring at exactly 12 o'clock. In how many minutes will they next ring together?

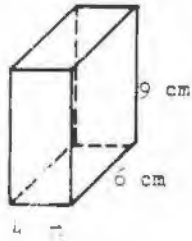
- A 9
- B 12
- C 20
- D 24
- E 36

17.

A solid plastic cube with edges 1 centimeter long weighs 1 gram. How much will a solid cube of the same plastic weigh if each edge is 2 centimeters long?

- A 9 grams
- B 4 grams
- C 3 grams
- D 2 grams
- E 1 gram

18. What is the SURFACE AREA of this solid rectangular box?



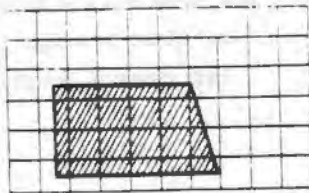
- A 50 square centimeters
- B 100 square centimeters
- C 114 square centimeters
- D 216 square centimeters
- E 270 square centimeters

19.

Which of the following is FALSE when a, b, c are different real numbers

- A $(a + b) + c = a + (b + c)$
- B $ab = ba$
- C $a + b = b + a$
- D $(abc) = a(bc)$
- E $a - b = b - a$

20.



1 square unit

The area of the shaded figure, to the nearest square unit, is

- A 23 square units
- B 20 square units
- C 18 square units
- D 15 square units
- E 12 square units

21.

A bowling ball travels d meters per second. The distance in meters traveled in t seconds is given by $d=4t$. In the table below x is equal to

t	d
0	0
1	4
2	8
3	x
4	16

- A 6
- B 10
- C 12
- D 14
- E None of these

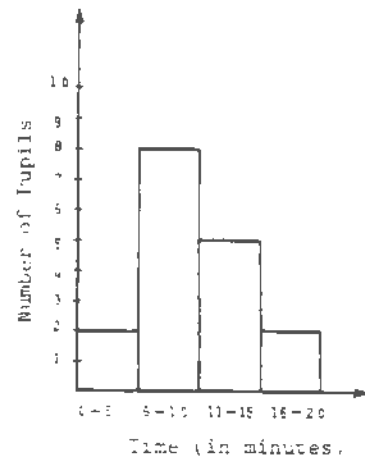
22.

Which of the following operations with whole numbers will always give a whole number?

- i Addition
- ii Multiplication
- iii Division

- A i only
- B ii only
- C iii only
- D i and ii only
- E ii and iii only

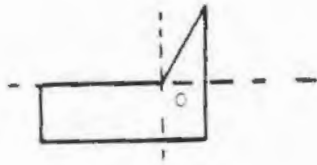
23.



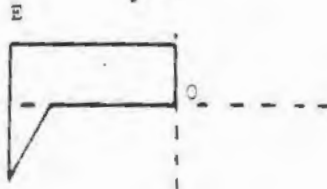
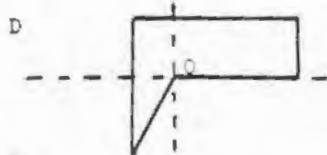
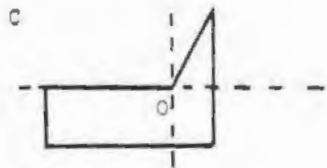
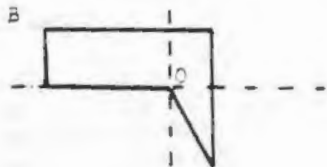
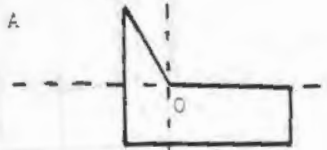
The graph shows the time of travel of pupils from home to school. How many pupils must travel for MORE than 10 minutes?

- A 2
- B 3
- C 4
- D 5
- E 10

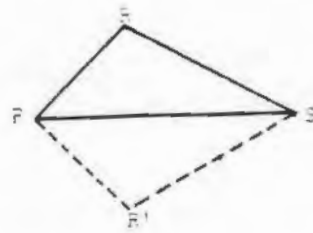
24.



A half-turn about O is applied to the figure above. Which of the figures below is the result?



25.



If $\triangle PRS$ maps onto $\triangle PR'S$ under a reflection (flip) over line \overline{PS} , which of these statements about lengths must be true?

- A length of \overline{RS} = length of \overline{SR} plus length of $\overline{PR'}$
- B length of \overline{RS} = length of $\overline{PR'}$
- C length of \overline{RS} = length of $\overline{R'S}$
- D length of $\overline{R'R}$ = length of \overline{PS}
- E length of \overline{PR} = length of $\overline{PR'}$

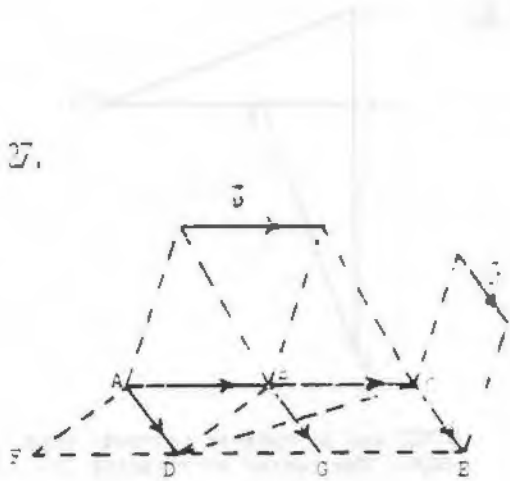
26.

x	3	6	9
y	7	a	35

The table above shows the values of x and y , where x is proportional to y . What are the values of a and b ?

- A $a = 14$ and $b = 31$
- B $a = 10$ and $b = 14$
- C $a = 13$ and $b = 31$
- D $a = 1$ and $b = 15$
- E $a = 15$ and $b = 14$

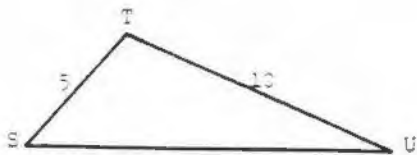
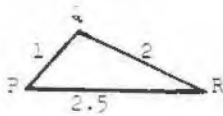
27.



Given \vec{u} and \vec{v} as shown in the figure above, what is \vec{DB} , the vector from D to B.

- A $\vec{u} + \vec{v}$
- B $\vec{u} - \vec{v}$
- C $\vec{v} - \vec{u}$
- D $\vec{v} + \vec{u}$
- E $\vec{u} + 2\vec{v}$

29.



Triangles PQR and STU are similar. How long is \overline{SU} ?

- A 3
- B 15
- C 11.25
- D 4.5
- E 2.25

28.



Which of the following is the closest approximation to the area of the rectangle with measurements given?

- A 48 m^2
- B 54 m^2
- C 56 m^2
- D 63 m^2
- E 72 m^2

30.

If $5x + 4 = 4x - 31$, then x is equal to

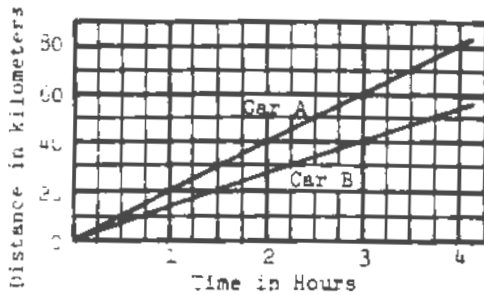
- A -35
- B -27
- C 3
- D 27
- E 35

31.

A shopkeeper has x kg of tea in stock. He sells 15 kg and then receives a new lot weighing $2y$ kg. What weight of tea does he now have?

- A $x - 15 - 2y$
- B $x + 15 + 2y$
- C $x - 15 + 2y$
- D $x + 15 - 2y$
- E None of these

Use this graph to answer questions 33 and 34.

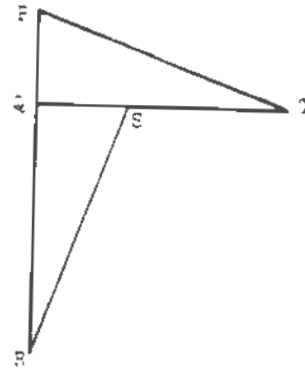


33.

Three hours after starting, car A is how many kilometers ahead of car B?

- A 2
- B 10
- C 15
- D 20
- E 25

32.



$\triangle PQT$ can be rotated (turned) onto $\triangle SQR$. The center of rotation is

- A point P
- B point Q
- C point R
- D point S
- E point T

34.

How much longer does it take for car B to go 50 kilometers than it does for car A to go 50 kilometers?

- A 1 hour 15 minutes
- B 1 hour 30 minutes
- C 2 hours
- D 2 hours 30 minutes
- E 3 hours 15 minutes