QUESTIONNAIRE Mathematics Test 7. Population 3a OUESTION 1 The expression |x - 1| = 1 implies that A. x is between 0 and 2 D. x is 0 B. x is either 0 or 2 C. x is less than 2 E. x is 2 QUESTION 2 6 4 When (1 + p) is expanded, the coefficient of p is A. 6 B. 10 C. 15 D. 20 E. 30 QUESTION 3 What is the converse of the statement, "If two angles are vertically opposite, then they are equal" ? A. If two angles are vertically opposite, then they are not equal. B. If two angles are equal, hen they are vertically opposite. C. If  $\hat{A} \times \hat{A} = \hat{A} \times \hat{A}$  and  $\hat{A} \times \hat{A} = \hat{A} \times \hat{A}$ . D. If two angles are not vertically opposite, then they are not equal. E. If two angles are not equal, then they arc not vertically opposite. QUESTION 4 Suppose you have proved the two theorems: I. If p then q. II. If s then not q. Which of the following theorems is implied by theorems I and II ? A. If p then s. D. If s then not p. B. If not p then not q. E. If not s then q. C. If p or q then s. QUESTION 5 A train travelled a certain distance at a constant speed. Had the speed

been 8 m.p.h. greater, the trip would have taken one hour less. Had the speed been 12 m.p.h. Iess the trip would have taken two hours more. How many miles did the train go?

## QUESTION 6

A wholesale merchant bought a television set at a certain price and then sold it to a retail merchant at an increase of P per cent. of this price. The retail merchant sold the set to a consumer for P per cent. more than he paid for it. If the customer paid 65 per cent. more than the price originally paid by the wholesale merchant, then P satisfies the equation:

A.  $1 + \frac{2P}{---} = 1.65$ B.  $(1 + \frac{P}{---}) = 1.65$ D.  $1 + P\hat{y} = 1.65$ D.  $1 + P\hat{y} = 1.65$ D.  $1 + P\hat{y} = 1.65$ E. 1 + 2P = 1.65

QUESTION 7 If a relation R is such that xRy and yRz implies xRz for each x, y, and z of a given set, the relation R is said to be transitive on that et. Which of the following relations are transitive?

<pre>I. "is father of" II. "is contemporary of" III. "is admirer of" IV. "is multiple of" V. "is perpendicular to"</pre>	
A. II, IV and V	D. II and IV
B. I and II C. Il, III and IV	E. V only

QUESTION 8 In the figure shown to the right, which vector is a graphical [Picture] representation of the complex number 4 - 2i?

QUESTION 9 Solve 0 < xý - 3x + 3 < 7 QUESTION 10 A relation R from a set S to a set T is a function if and only if given an xîS there exists at most one yîT such that xRy. [ Picture ] Which of the following relations are functions ? x divides y I. II. x has y for mother III. x is parallel to y IV. x has y for double x has y as majorant (i.e., x < y) v. VI xý = y A. I, II and IIIB. II, IV and VC. II, IV and VI D. IV, V and VI E. I, IV and V QUESTION 11 What is the equation whose roots are the squares of the roots of  $x\dot{y} - 5x + 3 = 0$ ? A.  $x\dot{y} - 19x + 9 = 0$ D.  $x\dot{y} + 19x - 9 = 0$ B.  $x\dot{y} + 19x + 9 = 0$ E.  $x\dot{y} - 9x + 19 = 0$ C.  $x\dot{y} - 20x + 9 = 0$ QUESTION 12-13 / 2 Questions 12 and 13. Six operations are defined as follows: 1 2 3 The operation A = ( ), for example, means that the numbers  $2 \quad 3 \quad 1$ in the upper row are transformed into the digits in the lower row, so that  $1 \rightarrow 2$  (1 becomes 2),  $2 \rightarrow 3$  (2 becomes 3), and  $3 \rightarrow 1$  (3 becomes 1). A.B shows that operation B is to be performed after operation A; that is, according to A,  $1 \rightarrow 2$ ,  $2 \rightarrow 3$ ,  $3 \rightarrow 1$ , and then, according to B, 2 -> 1, 3 -> 2, 1 -> 3. Therefore, A.B will be 1 -> 2 -> 1, 2 -> 3 -> 2, and  $3 \rightarrow 1 \rightarrow 3$ . This produces the same outcome as 123 F = ( ); let us write this A.B = F.1 2 3 In like manner, A.C is 1 -> 2 -> 3, 2 -> 3 -> 2, 3 -> 1 -> 1, and is the same as D; that is to say, A.C = D.

12. Which one operation is equal to C.D ?

13. What operation must be performed after operation B so that the combined operations are to be the same as operation F?

QUESTION 14 If  $\boldsymbol{x}$  and  $\boldsymbol{y}$  belong to the set of real numbers and sets P, Q and R are defined as follows,  $\begin{array}{l} \mathbb{P} \ = \ \left\{ \left( x \, , \, \, y \right) \ \middle| \ x \dot{y} \ + \ y \dot{y} \ = \ 4 \right\} \\ \mathbb{Q} \ = \ \left\{ \left( x \, , \, \, y \right) \ \middle| \ x \ - \ y \ = \ 2 \right\} \end{array}$  $R = \{ (x, y) \mid (xy + yy - 4) (x - y - 2) = 0 \},\$ [ Note: the character n denotes the character for an intersection of sets ] Γ : the character u denotes the character for a union of sets 1 Which of the following is true? D.  $R = \{ \}$  (the empty set) A. R = P n QB. R = P u QC.  $R = \{(2, 0) (0, 2) (-2, 0) (0, -2)\}$  E.  $R = \{(2, 0) (0, -2)\}$ QUESTION 15 | 4 2 1 | The value of | 0 0 1 | i | 1 1 0 | is A. -2 B. 0 C. 2 D. 7 E. 9 QUESTION 16 Each root of  $x\dot{y} - 2x + 5 = 0$  differs from the cube of the other by a

positive constant c. What is the value of c ?

QUESTION 17

4 2 Two of the roots of the equation x - 27x - 14x + 120 = 0 are 2 and 5. Find the two other roots of the equation.