Examination June, 1976 Ninth Year Mathematics

Elementary Algebra

PART ONE *Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided.*

1. Solve for x: $.3x = 1.2$ 1_____

2. Solve for x: $4x + 3 = 2x + 4$ 2_____

3. If 10 percent of a number is 14, what is the number? 3_____

4. Find the value of $|-5| - |2|$ 4_____

5. Solve for x: $5(x - 2) = 3x + 4$ 5_____

6. Solve for x: $\frac{x+1}{8} = \frac{9}{24}$ 6_____

7. If x apples cost 25 cents, express in terms of x the number of apples which can be bought for 75 cents. 7_____

8. If ½ inch represents 3 feet in a scale drawing, then how many inches will represent 24 feet? 8_____

9. Express as a trinomial the product of $(x + 1)$ and $(3x + 1)$. 9_____

10. What is the y-intercept of the line whose equation is $y = -3x + 4$? 10_____

11. Find the positive square root of 18 to the *nearest tenth*. 11_____

12. If $a = 1$ and $b = 2$, find the value of $3a^3b^2$. 12_____

13. Solve for y in terms of c, d, and h: $dy - c = h$ 13_____

14. From $5x^2 - 2x + 3$ subtract $3x^2 + 4x + 3$. 14_____

15. The lengths of the sides of a triangle are represented by $x + 4$, $2x - 2$, and $3x - 1$. Express the perimeter of the triangle in terms of x. 15_____

16. Express the sum of $\sqrt{27} + 5\sqrt{3}$ as a single term in radical form. 16_____

17. Factor: $6a - 9$ 17_____

18. Two numbers are in the ratio of 5:1 and their *difference* is 28. What is the *smaller* number? 18_____

19. The length of the hypotenuse of a right triangle is 13. If the length of one leg is 12, find the length of the other leg. 19_____

DIRECTIONS (20-30): *Write in the space provided the* numeral *preceding the expression that best completes* each *statement or answers* each *question.*

20. Which is equivalent to $\frac{8}{x} - \frac{3}{x}$?

(1) 5 (2) $5x$ (3) $\frac{5}{x}$ (4) $-\frac{5}{x}$ 20_____

21. Which ordered pair is the solution of this system of equations?

$$x + 2y = 6$$
$$x - y = 3$$

(1) (1,4) (2) (2,2) (3) (5,2) (4) (4,1) 21_____

22. If $\cos x = .8710$, what is the measure of angle x to the *nearest degree*?

(1) 29° (2) 30° (3) 60° (4) 61° 22_____

23. The multiplicative inverse of $\frac{2}{3}$ is

(1) 1 (2) $\frac{3}{2}$ (3) $-\frac{2}{3}$ (4) 0 23____

24. Which ordered pair is in the solution set of $x + 2y > 7$?

(1) (5,1) (2) (2,6) (3) (3,1) (4) (7,0) 24____

25. The product of $5y^2$ and $4y^3$ is

(1) $9y^5$ (2) $9y^6$ (3) $20y^5$ (4) $20y^6$ 25____

26. The equation $x + 4 = 4 + x$ is an illustration of the

(1) associative property of addition
(2) commutative property of addition
(3) symmetric property of equality
(4) reflexive property of equality 26____

27. The result of multiplying $\frac{x^2 - 1}{x}$ by $\frac{4x^2}{x + 1}$ is

(1) $\frac{x - 1}{4x^3}$ (3) $4x(x + 1)$

(2) $\frac{(x^2 - 1)(x + 1)}{4x^3}$ (4) $4x(x - 1)$ 27____

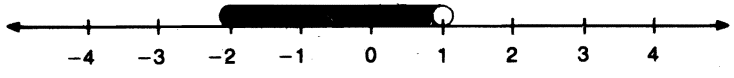
28. The solution set of the equation $x^2 - 5x + 6 = 0$ is

(1) {2,3 (2) {2} (3) {3} (4) {−2,−3} 28____

29. Which statement is true about the graph of the equation $y = 3$?

(1) It is parallel to the x-axis.
(2) It is parallel to the y-axis.
(3) It has a slope of 3.
(4) It passes through the origin. 29____

30. Which inequality is represented by the graph below?



(1) $-2 \geqslant x > 1$ (3) $-2 < x \leqslant 1$
(2) $-2 \leqslant x \leqslant 1$ (4) $-2 \leqslant x < 1$ 30____

PART TWO *Answer four questions from this part. Show all work unless otherwise directed.*

31. Solve graphically and check:

$$\begin{aligned} y &= 3x + 1 \\ x &= y - 3 \end{aligned} \qquad [8,2]$$

32. A side of a square is 7 feet longer than a side of an equilateral triangle. The perimeter of the square is twice the perimeter of the triangle. Find the length of a side of the triangle. [*Only an algebraic solution will be accepted.*] [5,5]

33. Tickets for a high school dance cost \$.50 each if purchased in advance of the dance, but are \$.75 each if bought at the door. For the dance, 100 tickets were sold and \$60 was collected. How many tickets were sold at the door? [*Only an algebraic solution will be accepted.*] [5,5]

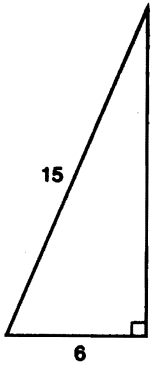
34. Find algebraically the solution set of the following system of equations and check:

$$\begin{aligned} \frac{x}{y+1} &= \frac{2}{3} \\ x + y &= 9 \end{aligned} \qquad [8,2]$$

35. As shown in the accompanying diagram, a 15-foot ladder is leaning against a wall of a building. The bottom of the ladder is 6 feet away from the wall on level ground.

a Find, to the *nearest degree*, the acute angle that the ladder makes with the ground. [5]

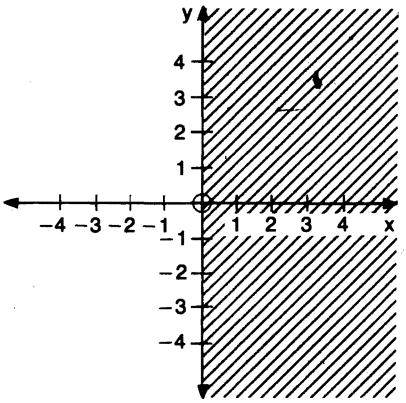
b Find, to the *nearest foot*, the distance from the top of the ladder to the ground. [5]



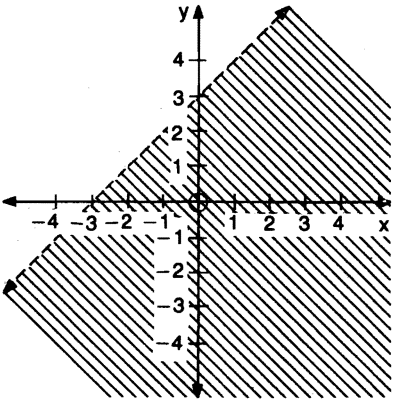
36. Find a positive number which is 42 less than its square. [*Only an algebraic solution will be accepted.*] [5,5]

37. On your answer paper, write the letters *a* through *e*. Next to *each* letter, write the *number* of the equality or inequality which is shown by the graph. [10]

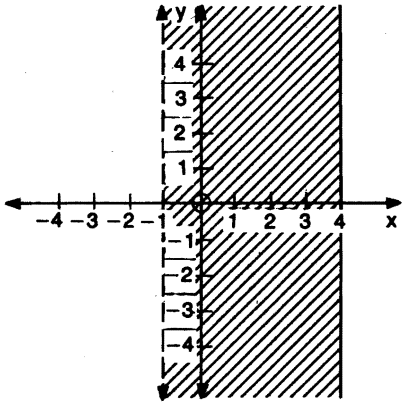
a (1) $y \leq 0$
(2) $y \geq 0$
(3) $x \leq 0$
(4) $x \geq 0$



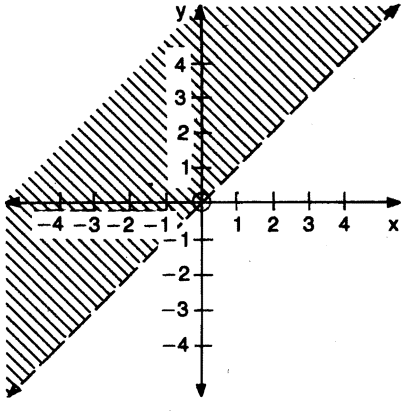
b (1) $y < 3$
(2) $y < x + 3$
(3) $y > x + 3$
(4) $y > 3x + 3$



c (1) $-1 < x \leq 4$
(2) $-1 \leq x < 4$
(3) $-1 < x < 4$
(4) $-1 \leq x \leq 4$



d (1) $y > x$
(2) $x > y$
(3) $x > 0$
(4) $y > 0$



e (1) $y = x$
(2) $y = -x$
(3) $y = |x|$
(4) $y = -|x|$