August 17, 1983

Part I

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 on the answer sheet.

1. Solve for w: -6w = 66

2. Find the value of |7| - |-7|.

<u>?____</u>

3. On a map a line segment 3 inches long represents a distance of 48 miles. Based on the same scale, how many miles long is a road which is 5 inches on the map?

4. Express in lowest terms: $\frac{16x^4y^2}{4xv^4}$

4_____

5. Solve for a: 3(a + 4) - a = 18

6. Solve for x: 0.02x = 10

7_____

7. Factor: $8a^2 + 2$

_

8. Find the positive square root of 17 to the nearest tenth.

9. Solve for x: $\frac{x+2}{5} = \frac{x-2}{3}$ 10. If $\cos A = .9156$, find the measure of angle .4 to the

10____

11. Factor: $x^2 - 0.16$

nearest degree.

11.....

12. Express the product of (2x - 2) and (x + 4) as a trinomial.

13_____

14. Factor: $2x^2 - 3x + 1$

14_____

15. What is the slope of the line whose equation is 3x - y = 1? 15_____

 $\frac{bx}{a} = a$

- 16. The point (k,4) is on the graph of the equation 3x + 2y = 14. What is the value of k?
 - 17. Find the value of $-3x^3$ when x = -2.

13. Solve for x in terms of a, b, and c:

17_____

18. Solve the following system of equations for b:

 $\begin{array}{c}
a + 3b = 5 \\
a - b = 1
\end{array}$

18

(1) {—}

Directions (19-30): Write in the space provided on the answer sheet the numeral preceding the expression that best completes each statement or answers each question.

- 19. The multiplicative inverse of 3 is (1) 1 (2) 0 (3) -3 (4) $\frac{1}{3}$ 19____
- 20. When $2x^3 x^2$ is divided by x^2 , the quotient is (1) 2x - 1 (2) $2x - x^2$ (3) $2x^3 - 1$ (4) $2x^5 - x^4$
- 21. Which is the set of all positive factors of 8? (1) {1,8} (2) {2,4} (3) {1,2,4,8} (4) {2,4,6,8} 21_
- 22. If the replacement set for x is the set of rational numbers, then the solution set for 2x + 3 = 4 is
- (2) $\{2\}$ (3) $\{-\}$ (4) $\{\frac{1}{2}\}$ 23. For which value of x is the fraction $\frac{5}{x-3}$ undefined? 1) 0 (2) -3 (3) 3 (4) -5

22

26

- (1) 0 23__
- 24. If the lengths of the legs of a right triangle are 4 and 5, then the length of the hypotenuse is (1) 41 (2) $\sqrt{41}$ (3) 3 (4) 9 24_
- 25. The expression $\frac{2x-3}{2} \frac{x}{3}$ is equivalent to

 (1) $\frac{x-6}{6}$ (2) $\frac{5x-9}{2}$ (3) $\frac{x-3}{6}$ (4) $\frac{4x-9}{6}$ 25
- 26. If one side of a square is represented by 3s 1, then the perimeter of the square is represented by (1) 12s 1 (2) 12s 4(3) $9s^2 - 1$ (4) $9s^2 - 6s + 1$
- 27. The inequality 3 + 2x > 5 is equivalent to (1) x > 1 (2) x < 1 (3) x < 4 (4) x > 4(2) x < 1
- 28. Which is the solution set for the equation (x + a)(x b) = 0? (1) $\{a,-b\}$ (2) $\{-a,b\}$ (3) $\{b\}$ (4) $\{a,-b\}$
- (1) $6\sqrt{3}$ (2) $8\sqrt{3}$ 29. The sum of $\sqrt{12}$ and $\sqrt{48}$ is
- 30. If n + 3 represents an even integer, which expression also represents an even integer? (1) n + 1 (2) n + 2 (3) n (4) n + 4

Part IJ

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

31. Solve graphically and check: x + y = 2

(3) $6\sqrt{6}$ (4) $2\sqrt{15}$

$$\begin{array}{l} x + y = 2 \\ x - y = -6 \end{array}$$
 [8,2]

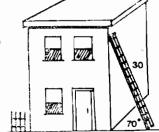
- 32. Answer both a and b.
 - a Solve algebraically and check:

$$y - \bar{x} = -1 3x + y = 11$$
 [4, 2]
b Solve for w :
$$\frac{-2w}{3} + \frac{3w}{4} = \frac{1}{2}$$
 [4]

- 33. Write an equation or a system of equations that can be used to solve each of the following problems. In each case, state what the variable or variables represent. [Solution of the equations is not required.]
 - a Find three consecutive odd integers such that the sum of the first and the third is 37 more than the second. [5]
 - b A plane left an airport flying directly east at a certain speed. At the same time, another plane left the same airport flying directly west at a speed 100 miles per hour faster than the first plane. Three hours later, the two planes were 2,100 miles apart. Find the speed of each plane. [5]
- 34. A man invests \$1,200, part at 7% and the remainder at 9%. If the 7% investment brings an annual return of \$36 more than the 9% investment, how much is invested at each rate? [Only an algebraic solution will be accepted.]

 [5, 5]
- 35. In triangle ABC the measure of angle B is three times the measure of angle A, and the measure of angle C is 12° less than twice the measure of angle A. Find the number of degrees in the measure of angle A. [Only an algebraic solution will be accepted.] [6, 4]
 - 36. Answer both a and b.
 - a A 30-foot ladder leans against a wall and makes an angle of 70° with the ground. Find to the nearest foot how high up the wall the ladder will reach. [5]

b In triangle ABC, $\angle C = 90^{\circ}$, AC = 12, and BC = 5. Find $\angle A$ to the nearest degree. [5]



37. The replacement set for x for each of the open sentences below is $\{-2,-1,0,1,2\}$. On your answer paper, write the letters a through e, and next to each write the solution set of each open sentence. [Each answer must be a subset of the replacement set.] [10]

$$a \ x^2 = 4$$

 $b \ |x| = 0$
 $c \ 3x + 2 = x + 3$
 $d \ 1 \le x \le 5$
 $e \ (x + 2)(x - 1) = 0$