June 19, 1979

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.

1. Solve for x: $3(x + 4) - x = 18$ 1._____

2. If 1 centimeter on a map represents 50 kilometers, how many centimeters will represent 225 kilometers? 2._____

3. If two angles of a triangle measure 30° and 70°, what is the measure in degrees of the third angle of the triangle? 3._____

4. Solve for y: $\frac{y}{3} + 2 = 5$ 4._____

5. If 30 students took an examination and 24 passed, what percent of the students passed the examination? 5._____

6. Solve for h: $\frac{24}{h} = \frac{16}{4}$ 6._____

7. If $\sin x = .1391$, find the measure of angle x to the *nearest degree*. 7._____

8. From $3x^2 - 7x + 12$, subtract $x^2 - 7x - 3$. 8._____

9. Express the sum of $\frac{2x}{3}$ and $\frac{3x}{4}$ as a single fraction in *lowest terms*. 9._____

10. Factor: $x^2 - 11x + 24$ 10._____

11. Find the value of $\sqrt{84}$ to the *nearest tenth*. 11._____

12. Solve for x in terms of a, b, and c: $ax - b = c$ 12._____

13. Solve for x: $0.4x + 2 = 12$ 13._____

14. Find the value of y in the following system of equations:

$$x + y = 3$$
$$x - y = 1$$

14._____

15. The perimeter of a square is 36. What is the length of one side of the square? 15._____

16. Find the value of $\frac{\tan 74}{3}$ to the *nearest tenth*. 16._____

17. Express in *lowest terms*: $\frac{2x - 10}{x^2 - 25}$ 17._____

18. A person 5 feet tall casts a shadow of 12 feet at the same time that a tree casts a shadow of 60 feet. What is the height of the tree in feet? 18._____

19. What is the slope of the line whose equation is $y + 5 = 2x$? 19._____

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

20. If the replacement set for x is {2, 3, 4, 5, 6}, the solution set of $3x + 3 = 12$ is (1) {5} (2) { } (3) {3} (4) {4/3} 20____

21. If $y = ax^2$, what is the numerical value of y when $a = 2$ and $x = 3$? (1) 12 (2) 18 (3) 25 (4) 36 21____

22. The expression $\dfrac{15K^3 - 9K^2 + 3K}{3K}$ is equivalent to

(1) $5K^3 - 3K + 1$ (2) $5K^2 - 3K$ (3) $3K$ (4) $5K^2 - 3K + K$ 22____

23. Which point lies on the graph of $2x + y = 10$? (1) (0, 8) (2) (10, 0) (3) (3, 4) (4) (4, 3) 23____

24. Which is an illustration of the distributive property?
(1) $(12 \cdot 25)(4) = (12)(25 \cdot 4)$ (2) $7n + 2 - 3n = 7n - 3n + 2$
(3) $(17)(b^2)(5) = (17)(5)(b^2)$ (4) $x(x - 2) = x^2 - 2x$ 24____

25. The length of a rectangle is 5 more than its width. If the width is represented by w, which expression represents the area of the rectangle? (1) $w^2 + 5w$ (2) $w^2 + 5$ (3) $5w^2$ (4) $4w + 10$ 25____

26. What are the numbers in the solution set of $4 \leq x < 7$ if x is an integer? (1) 5, 6 (2) 5, 6, 7 (3) 4, 5, 6 (4) 4, 5, 6, 7 26____

27. The solution set of $x^2 - x - 6 = 0$ is (1) {1, −6} (2) {5, 1} (3) {3, −2} (4) {−3, 2} 27____

28. The expression $\sqrt{300}$ is equivalent to (1) $50\sqrt{6}$ (2) $12\sqrt{5}$ (3) $3\sqrt{10}$ (4) $10\sqrt{3}$ 28____

29. A woman can paint a room in 6 hours. What portion of the room can she paint in x hours if x is less than 6? (1) $\dfrac{6}{x}$ (2) $\dfrac{x}{6}$ (3) $6x$ (4) $x + 6$ 29____

30. The product of $6x^3$ and $5x^4$ is (1) $11x^7$ (2) $11x^{12}$ (3) $30x^7$ (4) $30x^{12}$ 30____

Part II

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

31. On the same set of coordinate axes, graph the following system of inequalities and label the solution set A.

$$2y \geq x - 4$$
$$y < 3x$$

[8, 2]

32. Answer both *a* and *b*.

a Perform the indicated operation and express as a fraction in *lowest terms*:

$$\frac{x^2 - 25}{3x + 9} \cdot \frac{(x + 3)}{x^2 + 10x + 25}$$

[5]

b Solve for y and check:

$$\frac{5y}{3} - \frac{3y}{2} = 2$$

[4, 1]

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.*]

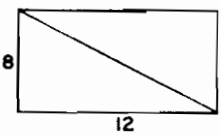
a Juan wants to change his $10 bill into equal numbers of nickels, dimes, and quarters. How many of each kind of coin will he receive? [5]

b Sue jogged at an average rate of 8 miles per hour from her home to her school. She walked back home at 4 miles per hour. If the round trip took 3 hours, how far is it from her home to the school? [5]

34. Find three consecutive positive odd integers such that the square of the smallest exceeds twice the largest by 7. [*Only an algebraic solution will be accepted.*] [5, 5]

35. Jennifer invested $5,000, part at 6% and the remainder at 8%. The annual income from the 8% investment is $260 greater than the annual income from the 6% investment. Find the amount invested at *each* rate. [*Only an algebraic solution will be accepted.*] [5, 5]

36. In the accompanying diagram, the length of the rectangle is 12 and the width is 8.



a Find to the *nearest degree* the measure of the angle formed by a longer side and the diagonal. [5]

b Find to the *nearest integer* the length of the diagonal. [5]

37. The replacement set for x for each open sentence below is $\{-2, -1, 0, 1, 2, 3\}$. 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 $4x - 2 > 2x + 2$

b $2x^2 = 8$

c $3 + 4x = 0$

d $|x| = 1$

e $3x + 1 = 1$