

### Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the letter preceding the word or expression that best completes the statement or answers the question. [60]

1. Solve:  $3x + 5 = x - 1$       [A]  $\frac{8}{3}$     [B] 3    [C]  $-\frac{1}{3}$     [D] -3

[1] \_\_\_\_\_

2. Find the inverse of the following statement. If a figure has four sides, it is a quadrilateral.

[A] If a figure is a quadrilateral, it does not have four sides.

[B] If a figure has four sides, it is not a quadrilateral.

[C] If a figure does not have four sides, it is not a quadrilateral.

[D] If a figure does not have four sides, it is a quadrilateral.

[2] \_\_\_\_\_

3. Write the standard form of the equation of the line passing through the point  $(-5, -1)$  and perpendicular to the line  $-4x - 5y = 20$ .

[A]  $-5x + 4y = -21$

[B]  $5x - 4y = -21$

[C]  $-4x - 5y = -15$

[D]  $-4x + 5y = 15$

[3] \_\_\_\_\_

4. Jamestown Builders has a development of new homes. There are six different floor plans, five exterior colors, and an option of either a one- or a two-car garage. How many choices are there for one home?

[A] 32

[B] 90

[C] 60

[D] 68

[4] \_\_\_\_\_

5. Divide:  $\frac{x^2-1}{x-9} \div (x+1)$

- [A]  $\frac{x-1}{x-9}$     [B]  $\frac{(x+1)(x-1)}{x-9}$     [C]  $\frac{x+1}{x-9}$     [D]  $\frac{x-9}{x-1}$

[5] \_\_\_\_\_

6. Last year a large trucking company delivered about 4.5 million loads of goods at an average value of \$22,500 per load. What was the total value of goods delivered? Express your answer in scientific notation.

- [A]  $\$4.5 \times 10^{11}$     [B]  $\$10.125 \times 10^{10}$   
 [C]  $\$45.0 \times 10^{10}$     [D]  $\$1.0125 \times 10^{11}$

[6] \_\_\_\_\_

7. Simplify the product:  $(2cd^2)^2(cd)^2$

- [A]  $2c^4d^6$     [B]  $2c^3d^6$     [C]  $4c^4d^4$     [D]  $4c^4d^6$

[7] \_\_\_\_\_

8. Tell whether  $y$  varies directly as  $x$ . If so, write a function rule for the relationship shown by the data.

$x$	$y$
-3	-14.4
-1	-4.8
1	4.8

- [A] yes,  $y = 11.4x$     [B] no  
 [C] yes,  $y = 4.8x$     [D] yes,  $y = 3.8x$

[8] \_\_\_\_\_

9. Find the measure of one of the interior angles of a regular polygon with ten sides.

- [A]  $144^\circ$       [B]  $162^\circ$       [C]  $18^\circ$       [D]  $36^\circ$

[9] \_\_\_\_\_

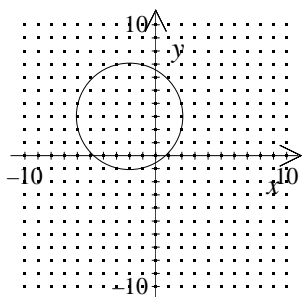
10. If 2 cans of peaches cost \$9.00, how many cans of peaches can be purchased with \$40.50?

- [A] 8      [B] 10      [C] 9      [D] 11

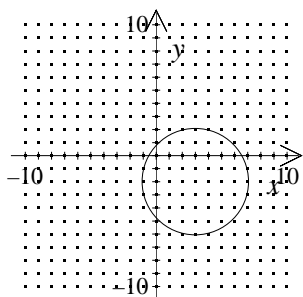
[10] \_\_\_\_\_

11. Sketch the graph of  $(x+3)^2 + (y-2)^2 = 16$

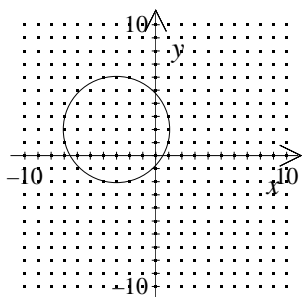
[A]



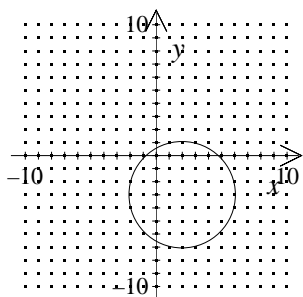
[B]



[C]



[D]



[11] \_\_\_\_\_

12. Solve for  $v$  in the equation  $S = 6u^2v$ .

- [A]  $6u^2 - S$       [B]  $S - 6u^2$       [C]  $\frac{S}{6u^2}$       [D]  $\frac{6u^2}{S}$

[12] \_\_\_\_\_

13. Describe the locus of points a distance 3 from point  $X$ .

- [A] a sphere with center  $X$  and radius 3  
[B] a plane a distance 3 from the point  $X$   
[C] a line segment with length 6 and  $X$  as the midpoint  
[D] a circle with center  $X$  and radius 3

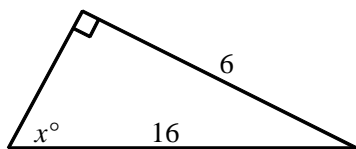
[13] \_\_\_\_\_

14. Which of the following square roots is an irrational number?

- [A]  $\sqrt{9}$       [B]  $\sqrt{\frac{1}{9}}$       [C]  $-\sqrt{16}$       [D]  $\sqrt{17}$

[14] \_\_\_\_\_

15. Solve for  $x$  to the nearest degree.



- [A] 68      [B] 22      [C] 21      [D] 69

[15] \_\_\_\_\_

16. Assume the statement "James is taking sociology and physics" is true.  
Which of the following statements must be true?
- [A] James is taking only sociology.  
[B] James is taking neither sociology, nor physics.  
[C] James is taking only physics.  
[D] James is taking both sociology and physics.

[16] \_\_\_\_\_

17. Which of these lengths could be the sides of a triangle?

- [A] 12 cm, 10 cm, 3 cm                      [B] 22 cm, 14 cm, 7 cm  
[C] 10 cm, 12 cm, 2 cm                      [D] 14 cm, 22 cm, 6 cm

[17] \_\_\_\_\_

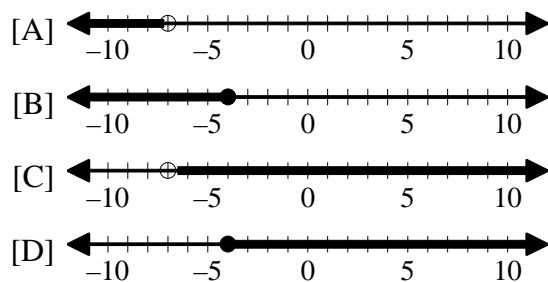
18. What is the area of a circle whose diameter is 6 centimeters?

- [A]  $9\pi \text{ cm}^2$               [B]  $6\pi \text{ cm}^2$               [C]  $36\pi \text{ cm}^2$               [D]  $12\pi \text{ cm}^2$

[18] \_\_\_\_\_

19. Graph:  $x < -7$  or  $x \leq -4$

[19] \_\_\_\_\_



20. Simplify:  $7\sqrt{3} + 6\sqrt{3} - 2\sqrt{3}$

[A]  $\sqrt{33}$

[B]  $11\sqrt{3}$

[C]  $15\sqrt{3}$

[D] 33

[20] \_\_\_\_\_

21. Find the measure, to the nearest tenth, of the diagonal of a rectangle with dimensions 18 cm by 15 cm.

[A] 23.4 cm

[B] 24.5 cm

[C] 5.7 cm

[D] 9.9 cm

[21] \_\_\_\_\_

22. Factor:  $x^2 + 6x + 8$

[A]  $(x - 4)(x + 2)$

[B]  $(x + 4)(x - 2)$

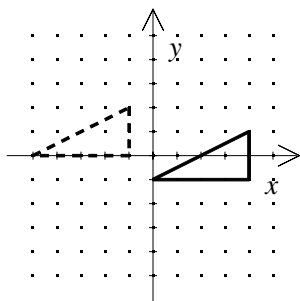
[C]  $(x - 4)(x - 2)$

[D]  $(x + 4)(x + 2)$

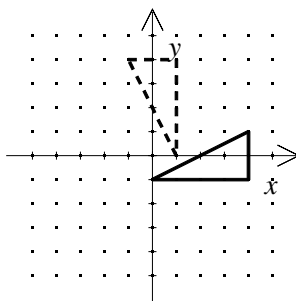
[22] \_\_\_\_\_

23. Which graph represents a translation?

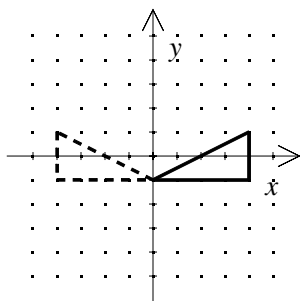
[A]



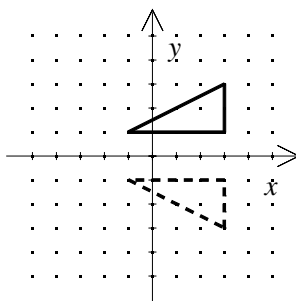
[B]



[C]



[D]



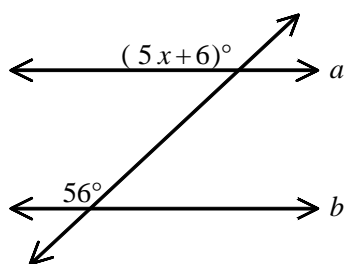
[23] \_\_\_\_\_

24. If the replacement set is the set of integers, find the solution set for the inequality  $x + 2 \geq 9$ .

[A] {11, 12, 13,...}   [B] {7, 8, 9,...}   [C] {7}   [D] {5, 6, 7,...}

[24] \_\_\_\_\_

25. What must be the value of  $x$  for  $a$  to be parallel to  $b$ ?



[A]  $\frac{62}{5}$

[B]  $\frac{1}{10}$

[C] 10

[D]  $\frac{5}{62}$

[25] \_\_\_\_\_

26. What property is illustrated by the fact that  $(88.8 \cdot 7.1) \cdot 8.4 = 88.8 \cdot (7.1 \cdot 8.4)$ ?

[26] \_\_\_\_\_

[A] commutative property for multiplication

[B] zero property for multiplication

[C] associative property for multiplication

[D] identity property for multiplication

27. If  $\frac{24}{4}$ ,  $\frac{9}{3}$ ,  $\frac{18}{2}$ , and  $\frac{13}{5}$  are placed in order from least to greatest, which would be first?

[A]  $\frac{9}{3}$

[B]  $\frac{18}{2}$

[C]  $\frac{13}{5}$

[D]  $\frac{24}{4}$

[27] \_\_\_\_\_

28. The sales of a brand of sneakers rose from \$5 billion to \$5.8 billion. Find the percent increase to the nearest whole percent.

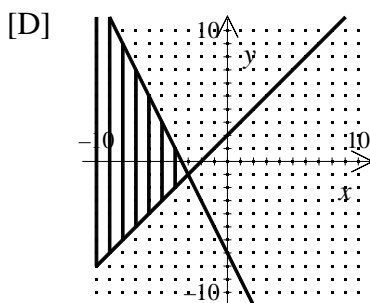
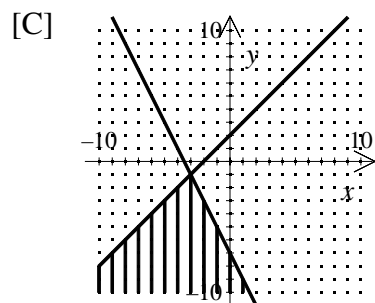
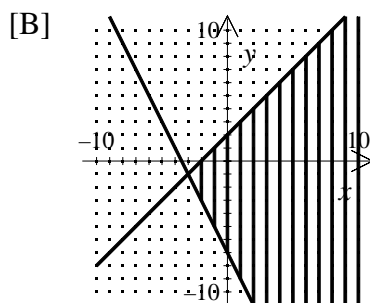
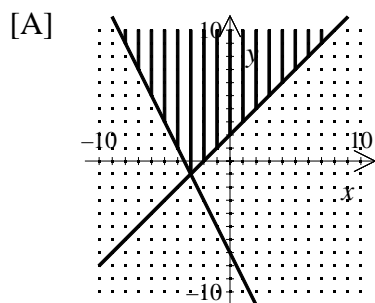
[A] 14%                      [B] 1.4%                      [C] 1.6%                      [D] 16%

[28] \_\_\_\_\_

29. Solve the system graphically:

$$y \leq -2x - 7$$

$$y \leq x + 2$$



[29] \_\_\_\_\_

30. Subtract:  $(-4x^2 - x - 1) - (-2x^2 - 7x + 2)$

[A]  $-2x^2 + 6x + 1$

[B]  $-2x^2 + 6x - 3$

[C]  $-2x^2 - 8x + 1$

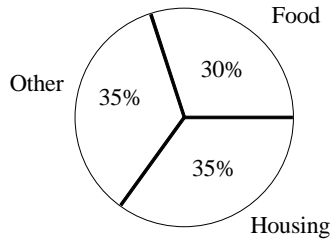
[D]  $-2x^2 - 6x - 3$

[30] \_\_\_\_\_

## Part II

Answer all questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [10]

31. The circle graph below represents a family's monthly budget. If the total monthly income is \$2300, how much is spent on food?



[31] \_\_\_\_\_

32. Six cards are drawn in succession and without replacement from a standard deck of 52 cards. How many sets of six cards are possible?

[32] \_\_\_\_\_

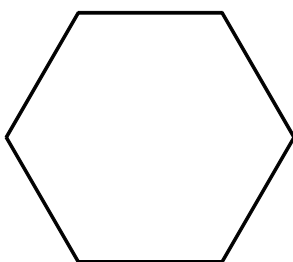
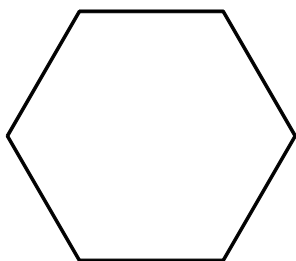
33. Candace's test scores are 77, 87, 63, and 80. What score does she need on the last test in order to average 80 on her tests?

[33] \_\_\_\_\_

34. A coin is tossed and a die is rolled. What is the probability that the coin shows tails and the die shows a 1?

[34] \_\_\_\_\_

35. For the figure below, draw all the lines of symmetry. If there are none, write "none".



[35] \_\_\_\_\_

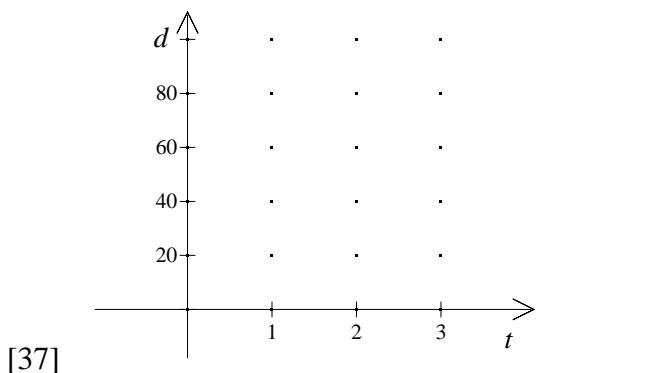
### Part III

**Answer all questions in this part. Each correct answer will receive 3 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [6]**

36. Jane has \$2.50 in nickels and dimes. She has twice as many dimes as nickels. How many nickels and how many dimes does she have?

[36] \_\_\_\_\_

37. If an object is dropped from a height of 97 feet, the function  $d = -16t^2 + 97$  gives the height of the object after  $t$  seconds. Graph this function. Approximately how long does it take the object to reach the ground ( $d = 0$ )?



#### Part IV

**Answer all questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [8]**

38. The length of a rectangle is 2 feet greater than three times its width. Find the length and width of the rectangle if its area is 85 square feet.

[38] \_\_\_\_\_

39. At the local ballpark, the team charges \$7.50 for each ticket and expects to make \$1800.00 in concessions. The team must pay its players \$2655.00 and pay all other workers \$1575.00. Each fan gets a free bat that costs the team \$3.00 per bat. Write the income and expense equations and find how many tickets must be sold to break even.

[39] \_\_\_\_\_