

### 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:  $2x - 1 = x - 4$       [A]  $-3$     [B]  $-\frac{1}{3}$     [C]  $3$     [D]  $\frac{1}{2}$

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

2. Find the inverse of the following statement. If she is not tall, she will not make the basketball team.

[A] If she is tall, she will not make the basketball team.

[B] If she will not make the basketball team, she is tall.

[C] If she is not tall, she will make the basketball team.

[D] If she is tall, she will make the basketball team.

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

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

[A]  $-4x + 3y = -1$

[B]  $4x - 3y = -1$

[C]  $-3x + 4y = -8$

[D]  $-3x - 4y = 8$

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

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

[A] 81

[B] 48

[C] 29

[D] 54

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

5. Divide:  $\frac{x^2-16}{x+7} \div (x-4)$

- [A]  $\frac{(x-4)(x+4)}{x+7}$       [B]  $\frac{x+7}{x+4}$       [C]  $\frac{x-4}{x+7}$       [D]  $\frac{x+4}{x+7}$

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

6. Last year a large trucking company delivered about 5 million loads of goods at an average value of \$12,500 per load. What was the total value of goods delivered? Express your answer in scientific notation.

- [A]  $\$5.0 \times 10^{11}$       [B]  $\$50.0 \times 10^{10}$       [C]  $\$6.25 \times 10^{10}$       [D]  $\$62.5 \times 10^9$

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

7. Simplify the product:  $(2yz^4)^4(yz)^4$

- [A]  $2y^5z^{20}$       [B]  $16y^8z^{20}$       [C]  $16y^8z^8$       [D]  $2y^8z^{20}$

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

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

$x$	$y$
-2	-12.2
-6	-36.6
-10	-61

- [A] yes,  $y = 6.1x$       [B] no  
[C] yes,  $y = 5.1x$       [D] yes,  $y = 10.2x$

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

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

[A]  $60^\circ$       [B]  $120^\circ$       [C]  $150^\circ$       [D]  $30^\circ$

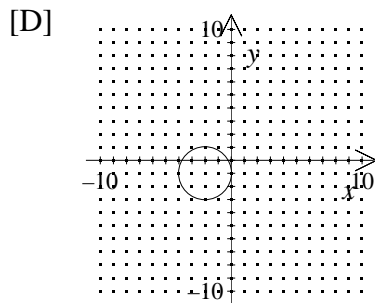
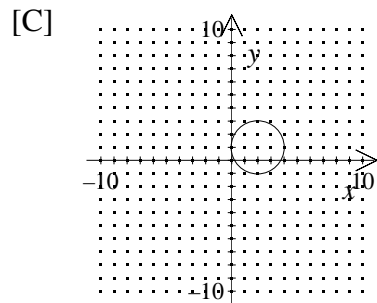
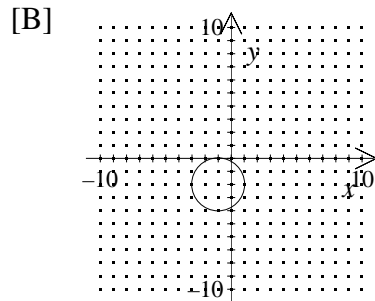
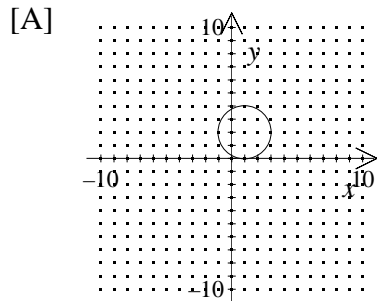
[9] \_\_\_\_\_

10. If 3 boxes of raisins cost \$20.10, how much will 8 boxes of raisins cost?

[A] \$67.00      [B] \$46.90      [C] \$60.30      [D] \$53.60

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

11. Sketch the graph of  $(x-2)^2 + (y-1)^2 = 4$



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

12. Solve for  $y$  in the equation  $A = 4x^2 + y$ .

- [A]  $A - 4x^2$       [B]  $\frac{A}{4x^2}$       [C]  $\frac{4x^2}{A}$       [D]  $4x^2 - A$

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

13. Describe the locus of points  
in a plane a distance 5 from point  $X$  in that plane.

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

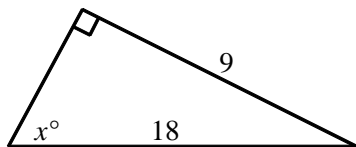
- [A] a line with  $X$  as the midpoint  
[B] a sphere with center  $X$  and radius 5  
[C] a plane a distance 5 from the point  $X$   
[D] a circle with center  $X$  and radius 5

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

- [A]  $\sqrt{64}$       [B]  $-\sqrt{36}$       [C]  $\sqrt{\frac{1}{64}}$       [D]  $\sqrt{21}$

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

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



- [A] 63      [B] 30      [C] 60      [D] 27

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

16. Assume the statement "Michael is taking fencing or biology" is true.

Which of the following statements must be false?

[A] Michael is taking neither fencing, nor biology.

[B] Michael is taking only biology.

[C] Michael is taking only fencing.

[D] Michael is taking both fencing and biology.

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

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

[A] 4 cm, 13 cm, 19 cm

[B] 9 cm, 10 cm, 18 cm

[C] 9 cm, 9 cm, 18 cm

[D] 13 cm, 5 cm, 19 cm

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

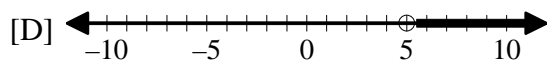
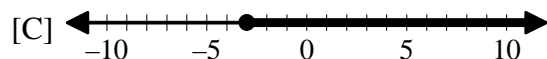
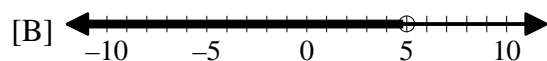
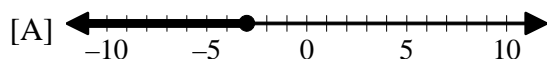
18. What is the area of a circle whose diameter is 16 centimeters?

[A]  $256\pi \text{ cm}^2$     [B]  $16\pi \text{ cm}^2$     [C]  $32\pi \text{ cm}^2$     [D]  $64\pi \text{ cm}^2$

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

19. Graph:  $x < 5$  or  $x \leq -3$

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



20. Simplify:  $5\sqrt{2} + 7\sqrt{2} - 5\sqrt{2}$

[A]  $7\sqrt{2}$

[B] 14

[C]  $17\sqrt{2}$

[D]  $\sqrt{14}$

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

21. Find the measure, to the nearest tenth, of the diagonal of a rectangle with dimensions 11 cm by 5 cm.

[A] 13.2 cm

[B] 9.8 cm

[C] 4 cm

[D] 12.1 cm

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

22. Factor:  $x^2 + 10x + 21$

[A]  $(x - 7)(x - 3)$

[B]  $(x + 7)(x + 3)$

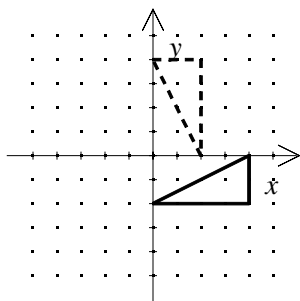
[C]  $(x - 7)(x + 3)$

[D]  $(x + 7)(x - 3)$

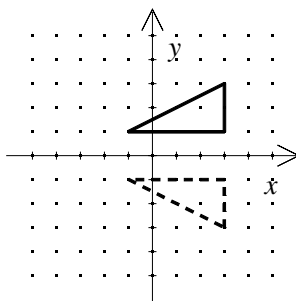
[22] \_\_\_\_\_

23. Which graph represents a translation?

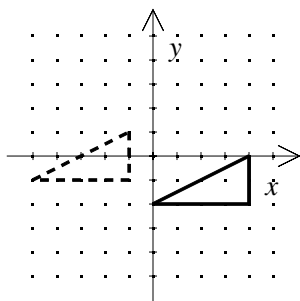
[A]



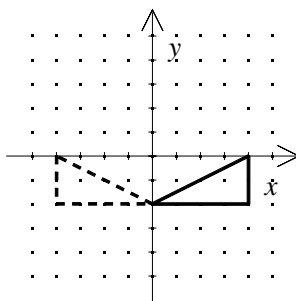
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[C]



[D]



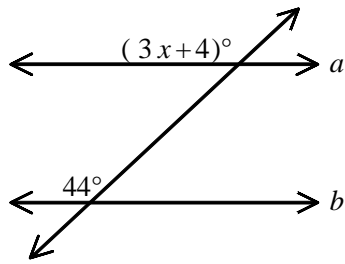
[23] \_\_\_\_\_

24. If the replacement set is the set of integers, find the solution set for the inequality  $x + 5 > 12$ .

[A] {17, 18, 19,...}    [B] {9, 10, 11,...}    [C] {8, 9, 10,...}    [D] {7}

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

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



- [A]  $\frac{40}{3}$       [B]  $\frac{3}{40}$       [C]  $\frac{1}{16}$       [D] 16

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

26. What property is illustrated by the fact that  $(59.8 \cdot 8.8) \cdot 0 = 0$ ?

- [A] associative property for multiplication  
[B] zero property for multiplication  
[C] identity property for multiplication  
[D] commutative property for multiplication

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

27. If  $\frac{10}{8}$ ,  $\frac{20}{6}$ ,  $\frac{17}{3}$ , and  $\frac{24}{7}$  are placed in order from least to greatest, which would be first?

- [A]  $\frac{10}{8}$       [B]  $\frac{24}{7}$       [C]  $\frac{20}{6}$       [D]  $\frac{17}{3}$

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



28. The sales of a brand of sneakers rose from \$3 billion to \$3.4 billion. Find the percent increase to the nearest whole percent.

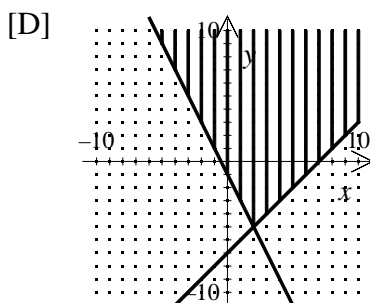
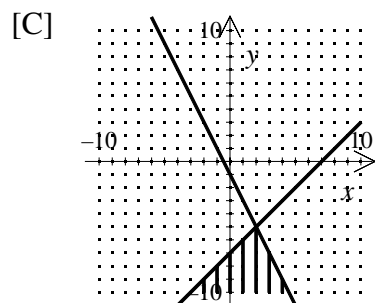
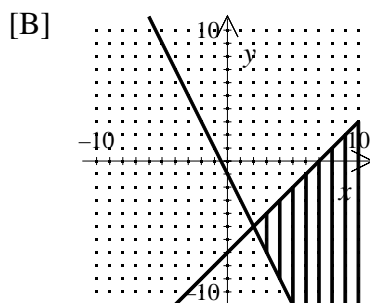
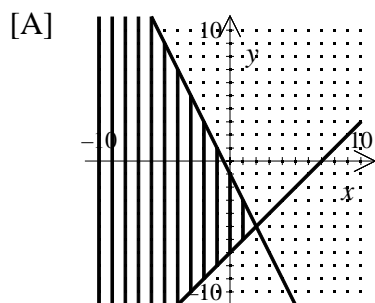
[A] 12%                      [B] 13%                      [C] 1.2%                      [D] 1.3%

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

29. Solve the system graphically:

$$y \leq -2x - 1$$

$$y \geq x - 7$$



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

30. Subtract:  $(-2x^2 - 5x - 6) - (-x^2 + 3x + 3)$

[A]  $-x^2 - 2x - 3$

[B]  $-x^2 - 8x - 3$

[C]  $-x^2 - 8x - 9$

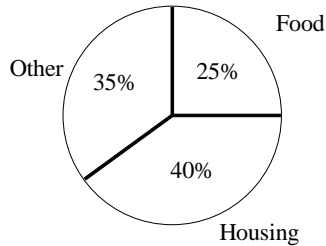
[D]  $-x^2 + 8x - 9$

[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 \$1800, how much is spent on housing?



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

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

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

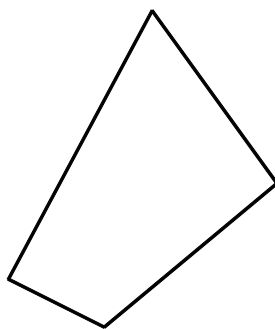
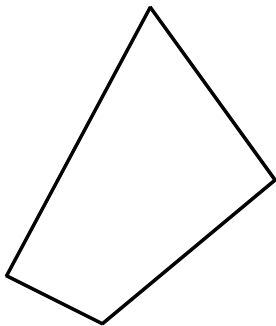
33. Luanda's test scores are 77, 83, 64, and 85. What score does she need on the last test in order to average 80 on her tests?

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

34. A coin is tossed and a die is rolled. What is the probability that the coin shows heads and the die shows a 3?

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

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



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

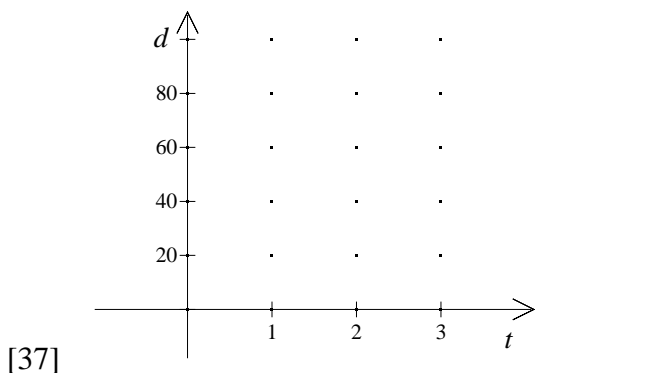
### Part III

**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. Kaye has \$1.50 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 85 feet, the function  $d = -16t^2 + 85$  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 5 feet greater than three times its width. Find the length and width of the rectangle if its area is 182 square feet.

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

39. At the local ballpark, the team charges \$8.25 for each ticket and expects to make \$1850.00 in concessions. The team must pay its players \$4150.00 and pay all other workers \$2450.00. Each fan gets a free bat that costs the team \$3.25 per bat. Write the income and expense equations and find how many tickets must be sold to break even.

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