
Student Name: _____

Teacher: _____ Date: _____

District: Miami-Dade County Public Schools

Assessment: 9_12 Mathematics Algebra II Benchmark 2

Description: Algebra 2 Winter Review

Form: 201

1. Karen is solving the quadratic equation shown below.

$$X^2 + 12X - 1 = 0$$

$$X^2 + 12X - 1 + 1 = 0 + 1$$

$$X^2 + 12X = 1$$

Which equation best represents the next step Karen would use to solve for x by completing the square?

- A. $x^2 + 12x + 6 = 1 + 6$
- B. $x^2 + 12x + 24 = 1 + 24$
- C. $x^2 + 12x + 36 = 1 + 36$
- D. $x^2 + 12x + 144 = 1 + 144$

2. Which binomial must be added to $(5r + 11)$ so that the sum of the two polynomials is $(7r - 3)$?

- A. $2r - 14$
- B. $2r + 8$
- C. $12r - 14$
- D. $12r + 8$

3. The volume of a sphere, S , is at least one-third the volume of a cone, C . The volume of the cone is no more than 150 cubic centimeters. Which system of inequalities below represents this problem?

A.
$$\begin{cases} S \geq \frac{1}{3}C \\ C \leq 150 \end{cases}$$

B.
$$\begin{cases} S \leq \frac{1}{3}C \\ C \geq 150 \end{cases}$$

C.
$$\begin{cases} S > \frac{1}{3}C \\ C < 150 \end{cases}$$

D.
$$\begin{cases} S < \frac{1}{3}C \\ C > 150 \end{cases}$$

4. Which equation represents a parabola with a focus located at $(0, 2)$ and a directrix located at $y = -2$?

A. $x^2 = -8y$

B. $x^2 = 8y$

C. $y^2 = -8x$

D. $y^2 = 8x$

5. Elise solved the quadratic equation $2x^2 + 9x + 4 = 0$ by completing the square. The first two steps of her solution are shown.

Step 1: $x^2 + \frac{9x}{2} + 2 = 0$

Step 2: $x^2 + \frac{9x}{2} = -2$

Step 3: _____

What should be Step 3 in solving the equation by completing the square?

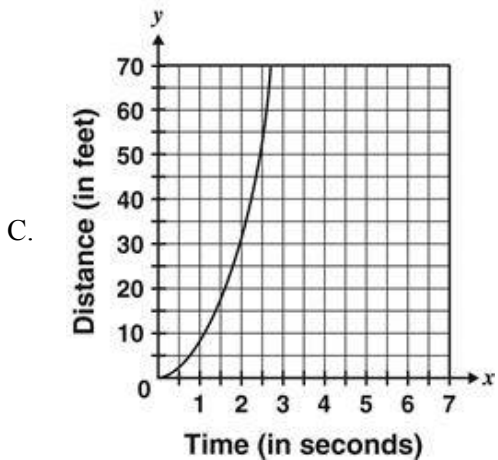
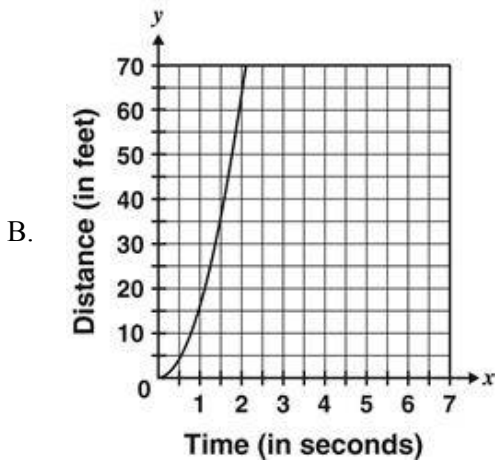
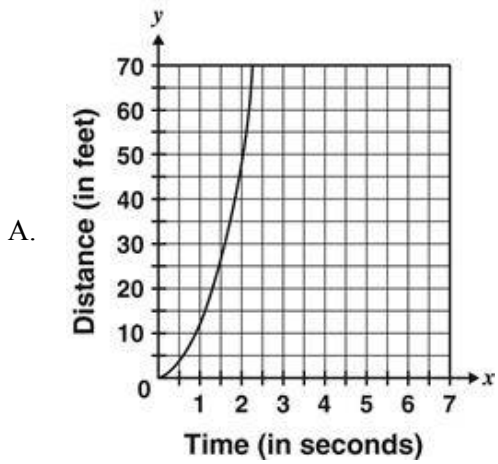
A. $x^2 + \frac{9x}{2} + \frac{9}{4} = -2 + \frac{9}{4}$

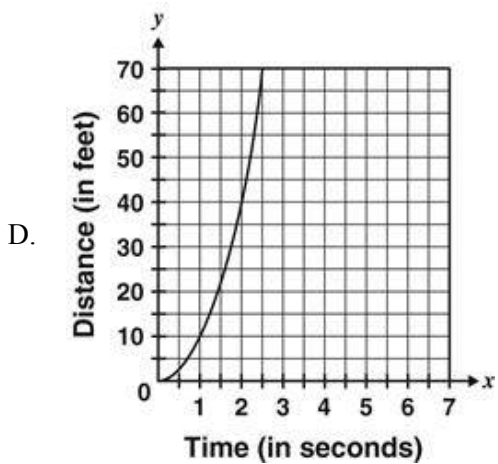
B. $x^2 + \frac{9x}{2} + \frac{81}{16} = -2 + \frac{81}{16}$

C. $x^2 + \frac{9x}{2} - \frac{9}{4} = -2 - \frac{9}{4}$

D. $x^2 + \frac{9x}{2} - \frac{81}{16} = -2 - \frac{81}{16}$

6. The equation $d = 16t^2$, where d represents distance in feet and t represents time in seconds, can be used to determine the distance that an object falls in a certain amount of time. Which graph represents an object falling a distance of 64 feet in 2 seconds?





7. Andre needs to buy hamburgers and hot dogs for a picnic. He has only \$23.00 to spend and must buy at least 78 hamburgers or hot dogs. A store charges 0.50 per hamburger and 0.25 per hot dog. Which of the following is a possible way Andre might buy the hamburgers and hot dogs?
- 40 hamburgers and 38 hot dogs
 - 16 hamburgers and 62 hot dogs
 - 14 hamburgers and 65 hot dogs
 - 12 hamburgers and 67 hot dogs
8. If the y -intercept of the equation $y = 3x - 2$ is changed to -5 , which statement best describes how the graph will be affected?
- The graph of the line will shift 3 units down.
 - The graph of the line will shift 7 units down.
 - The graph of the line will shift 2 units down.
 - The graph of the line will shift 5 units down and 1 unit to the right.
9. A-1 Electrical Company charges \$45 for a service call. After the first hour (h), there is a \$25 hourly charge. Materials (m) for the job are an additional cost. Which equation could be used to find the cost (C) to the customer?
- $C = 45 + 25h + m$
 - $C = 45 + 25(h + m)$
 - $C = 45 + 25(h - 1) + m$
 - $C = 45 + 25(h - 1)$

10. If Ryan and Natalie can plant a rosebush in 9.9 minutes and Natalie by herself can plant a rose bush in 22 minutes, about how many minutes will it take Ryan by himself to plant 3 rose bushes?

- A. 20.5
- B. 36.3
- C. 54.0
- D. 62.7

11. A projectile was projected into the air off a rooftop with an initial velocity at 32 feet per second.

The quadratic equation $h = -16t^2 + 32t + 240$ represents the height, h , of the projectile t seconds after it was projected into the air. According to the equation, how many seconds should it take for the projectile to hit the ground?

- A. 3
- B. 5
- C. 7.5
- D. 15

12. When factored completely, how is $7x^2 - 21xy - 28y^2$ written?

- A. $(x - y)(7x + 21y)$
- B. $7(x - y)(x + 4y)$
- C. $(7x - 7y)(x + 4y)$
- D. $7(x + y)(x - 4y)$

13. Which of the following complex numbers represents the solution to the quadratic equation $x^2 + 4x + 5 = 0$?

- A. $-2 \pm 2i$
- B. $-4 \pm 2i$
- C. $-2 \pm i$
- D. $-4 \pm i$

14. Sarah, Lacey, and Mark stuffed envelopes with invitations for parents to an open house.

- Sarah stuffed 10 more envelopes than Lacey.
- Mark stuffed 3 less than twice as many envelopes as Lacey.
- Altogether they stuffed 503 envelopes.

If x represents the number of envelopes that Lacey stuffed, which equation best represents this situation?

- A. $x + 10 + 2x - 3 = 503$
- B. $x + 10x + 3 - 2x = 503$
- C. $x + x + 10 + 2x - 3 = 503$
- D. $x + x + 10 + 3 - 2x = 503$

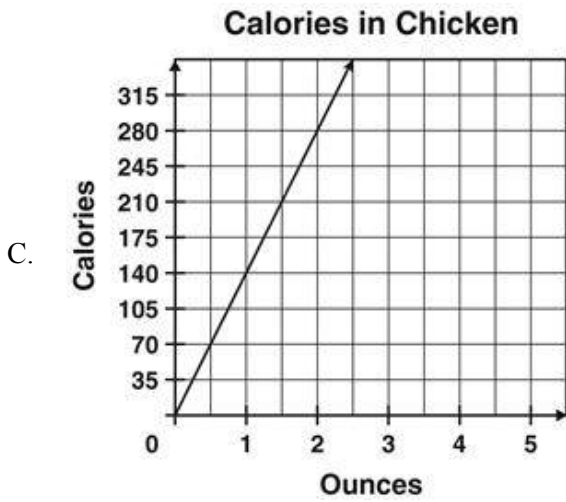
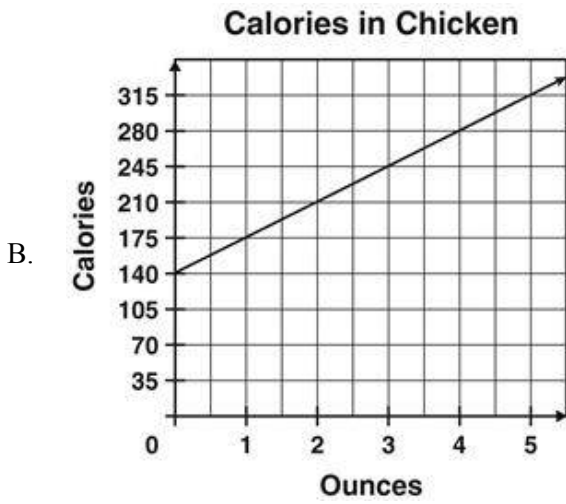
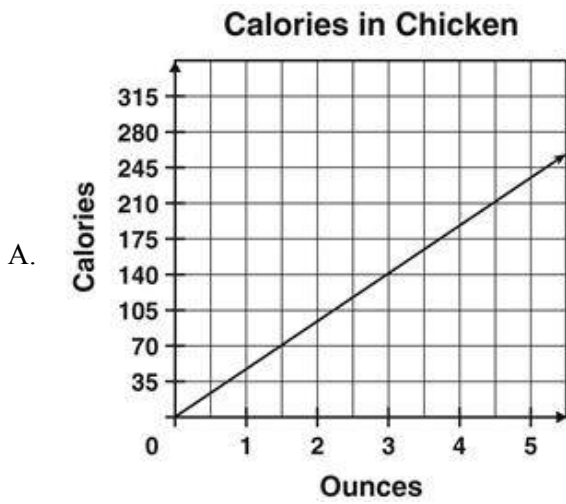
15. Which of the following expressions is equivalent to $5(x - 3)(2x + 1)$?

- A. $2x^2 - 5x - 3$
- B. $2x^2 + 5x - 3$
- C. $10x^2 - 5x - 3$
- D. $10x^2 - 25x - 15$

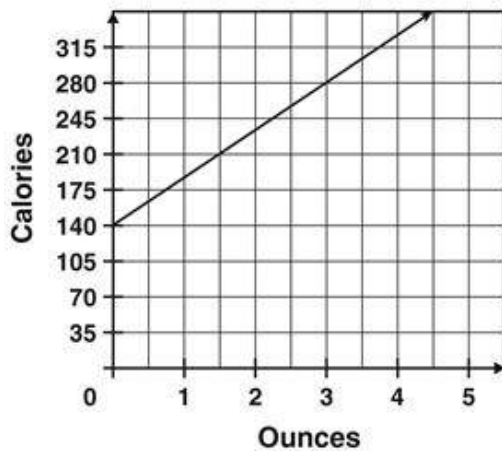
16. Rene graphed the equation $y - 2 = -\frac{1}{2}(x + 6)^2$ and wanted to move the figure 5 units up on the rectangular grid. Which change should be made to the equation to move all points of the parabola 5 units up?

- A. subtract 5 from -2
- B. subtract 5 from 6
- C. add 5 to -2
- D. add 5 to 6

17. A 3-ounce serving of roasted chicken without the skin contains 140 calories. Based on this information, which graph shows the relationship between the number of ounces of roasted chicken without the skin and the number of calories in the chicken?



Calories in Chicken



D.

18. Find all zeros of the function $f(x) = (x + 3)^2$?

- A. $(-3, 0)$
- B. $(0, -3)$
- C. $(0, 3)$
- D. $(3, 0)$

19. When Antonio first joined the swim team, he swam the race in 8 minutes. But now he can swim the race in $\frac{1}{3}$ that time. Henry swims the course in 4 minutes.

Let T be the difference between Henry's current swim time and Antonio's current swim time. Which equation below correctly solves for T , in seconds?

- A. $T = 240 - \frac{480}{3}$
- B. $T = 4.00 - \frac{480}{3}$
- C. $T = 800 - \frac{400}{3}$
- D. $T = 8.00 - \frac{4.00}{3}$

20. Jesse solved the system of equations in six steps as shown below.

$$y = -\frac{1}{2}x + 6$$

$$y = 2(x - 2)^2 - 2$$

Step 1: $2(x - 2)^2 - 2 = -0.5x + 6$

Step 2: $2(x^2 - 4x + 4) - 2 = -0.5x + 6$

Step 3: $2x^2 - 8x + 6 = -0.5x + 6$

Step 4: $2x^2 - 7.5x = 0$

Step 5: $2x^2 = 7.5x$

Step 6: $x = 3.75$

When Jesse compared his work to the graph of the system, he realized that he only found one solution. Which is the first step in Jesse's work that should be corrected to reveal the second solution?

- A. Step 2
- B. Step 3
- C. Step 4
- D. Step 5

21. For the satellite dish antenna shown below, the receiver is located at the focus of a parabolic cross section with its vertex being 3.6 feet directly below the focus.



Which equation represents the parabolic cross section of the dish?

- A. $x^2 = 4y$
- B. $x^2 = 12.96y$
- C. $x^2 = 14.4y$
- D. $x^2 = 16y$

22. Which statement describes the graph of $x = -2y^2 + 4$?

- A. y-intercept at (0, 4), downward curve
- B. y-intercept at (0, 4), upward curve
- C. x-intercept at (4, 0), left curve
- D. x-intercept at (-4, 0), right curve

23. Mr. Tenorio has a job that pays 45,500 per year with a guaranteed pay increase of 2,000 each year for 10 years. What is the formula for Mr. Tenorio's salary, S , if he has worked x years? ($0 \leq x \leq 10$)

- A. $S = 45,500x + 2000$
- B. $S = 45,500 + 2000x$
- C. $S = 45,500x + 2000(10)$
- D. $S = 45,500x + 2000(10)x$

24. Solve the equation $x^2 + 2x + 7 = 0$ for x over the set of complex numbers.

- A. $-1 \pm 2i\sqrt{6}$
- B. $-1 \pm i\sqrt{6}$
- C. $\pm i\sqrt{6}$
- D. $\pm 2i\sqrt{6}$

25. The cheerleaders made spirit buttons and sold them for homecoming. The table shows the amount of profit they made for different numbers of buttons sold.

Spirit Button Profits

Number Sold (x)	Total Profit (y)
50	\$0
100	\$45
150	\$90
200	\$135

Which equation represents this relationship?

- A. $y = 0.45x$
- B. $y = x - 65$
- C. $y = 0.9x - 45$

D. $y = 0.9x + 45$

26. What are the complex solutions for the quadratic equation, $y = 3x^2 + 2x + 1$?

A. $x = \frac{-1 \pm i\sqrt{2}}{3}$

B. $x = \frac{-1 \pm 4i}{3}$

C. $x = -3 \pm 3i\sqrt{2}$

D. $x = -1 \pm i\sqrt{2}$

27. Which equation describes the relationship between the values of x and y shown in the table below?

X	Y
0	-5
1	-4
2	-1
3	4

A. $y = x - 5$

B. $y = 2x - 5$

C. $y = 3x - 5$

D. $y = x^2 - 5$

28. Find the maximum value or minimum value for the function $f(x) = 0.15(x + 1)^2 - 3$.

A. 0.15

B. -3

C. 1

D. 3

29. Janine is considering two movie rental plans. Plan A can be modeled with the equation $C = 3m$, and Plan B can be modeled with the equation $C = 2m + 5$, where C represents the cost in dollars and m represents the number of movies rented each month. Which statement would justify selecting Plan B instead of selecting Plan A?

- A. Janine rents 5 to 10 movies each month.
- B. Janine rents exactly 5 movies each month.
- C. Janine rents exactly 3 movies each month.
- D. Janine rents from 1 to 5 movies each month.

30. A rectangle has a length of x inches and a width of 2 inches less than the length. If the dimensions were doubled, what would be the area of the new rectangle in terms of x ?

- A. $(2x - 4)\text{in.}^2$
- B. $(8x - 8)\text{in.}^2$
- C. $(2x^2 - 4x)\text{in.}^2$
- D. $(4x^2 - 8x)\text{in.}^2$