

1. To which sets of numbers does $\frac{3}{5}$ belong?

- I. integers
- II. natural numbers
- III. rational numbers
- IV. real numbers
- V. whole numbers

- A. I, III, and IV only
- B. II and IV only
- C. III and IV only
- D. III, IV, and V only

2. Evaluate $-(3c - d)$ when $c = -1$ and $d = 5$.

- A. -8
- B. 2
- C. 3
- D. 8

3. Which is a simplified form of the expression $3(x + 2) - 5(2x - 4)$?

- A. $16x$
- B. $19x$
- C. $-7x - 2$
- D. $-7x + 26$

4. What is the value of x when

$$\frac{2}{3}x + \frac{1}{2} = \frac{5}{6}?$$

- A. $x = \frac{2}{9}$
- B. $x = \frac{1}{2}$
- C. $x = \frac{5}{7}$
- D. $x = \frac{3}{2}$

5. The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Which formula represents r in terms of V and h ?

- A. $r = \sqrt{\frac{3V}{\pi h}}$
- B. $r = \frac{3V}{\pi h}$
- C. $r = \sqrt{\frac{V}{3\pi h}}$
- D. $r = \frac{V}{3\pi h}$

6. Which represents y in terms of x for the equation $2x + 5y - 6x = 10x - 8 + y$?

- A. $y = \frac{1}{2}x - 2$
- B. $y = \frac{3}{2}x - 2$
- C. $y = \frac{7}{2}x - 2$
- D. $y = \frac{9}{2}x - 2$

7. What is the solution set of

$$|-4x - 8| = 20 ?$$

- A. $\{-3, 7\}$
- B. $\{-7, 3\}$
- C. $\{-7\}$
- D. $\{3\}$

8. Which expresses all of the solutions for the compound inequality below?

$$2 + 3x \leq 5 \text{ or } 3(x - 8) \geq 3$$

- A. $1 \leq x \leq 9$
- B. $x = 1$ or $x = 9$
- C. $x \leq 1$ or $x \geq 9$
- D. no solution

9. The cost for parts to repair a car is \$1,015. The cost for labor is \$70 per hour. Which of the following is a linear model for the total cost of repairing the car where n represents the number hours of labor?

- A. $C = 70n + 1015$
- B. $C = 70n - 1015$
- C. $C = 1015n + 70$
- D. $C = 1015n - 70$

10. Which relation is a function?

A.

Input	Output
2	3
2	4
4	5
5	4

B.

Input	Output
3	8
3	6
3	5
3	3

C.

Input	Output
4	1
7	2
9	3
9	4

D.

Input	Output
1	4
3	1
5	1
7	4

11. What is the domain of the following relation?

$$\{(5, -3), (-1, 7), (-4, 12)\}$$

- A. $\{-4, -1, 5\}$
- B. $\{-5, 1, 4\}$
- C. $\{-3, 7, 12\}$
- D. $\{-12, -7, 3\}$

12. Write an equation for the line that passes through $(1, 2)$ and is parallel to the line whose equation is $4x + y = 3$.

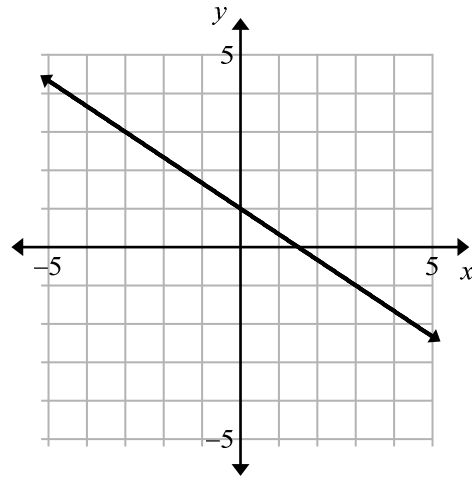
- A. $y = -4x + 9$
- B. $y = -4x + 6$
- C. $y = 3x - 1$
- D. $y = 4x - 2$

13. Which equation describes the pattern in the table?

x	1	2	3	4	5
y	-11	-14	-17	-20	-23

- A. $y = -8x + 3$
- B. $y = -8x - 3$
- C. $y = -3x + 8$
- D. $y = -3x - 8$

14. Use the graph below.



What is the slope of the line?

- A. $-\frac{3}{2}$
- B. $-\frac{2}{3}$
- C. $\frac{2}{3}$
- D. $\frac{3}{2}$

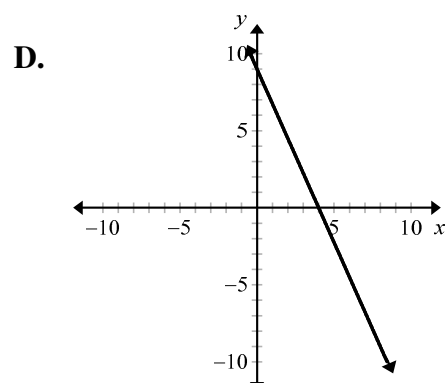
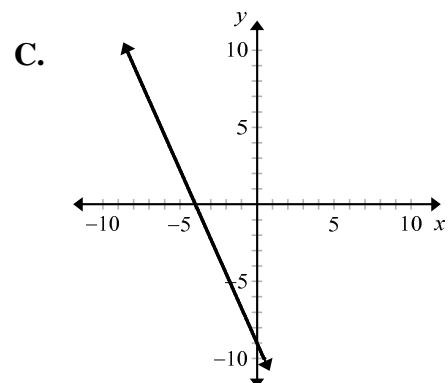
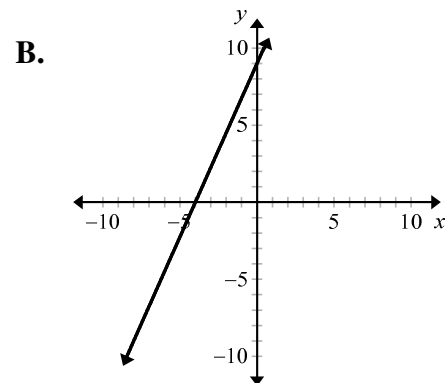
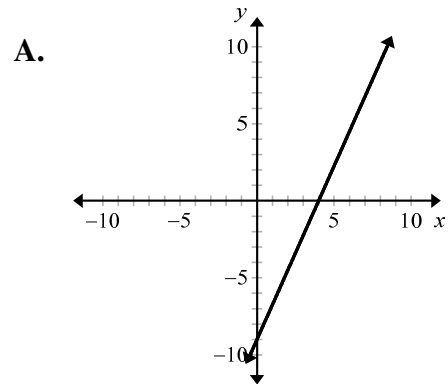
15. At 10:00 a.m., a thermometer reads 79°F . At 4:00 p.m., it reads 103°F . What is the average rate of change in the temperature?

- A. -24°F per hour
- B. -4°F per hour
- C. 4°F per hour
- D. 24°F per hour

16. Which line is perpendicular to the line $3x - y = 4$?

- A. $y = 3x + 2$
- B. $y = -3x + 2$
- C. $y = \frac{1}{3}x + 2$
- D. $y = -\frac{1}{3}x + 2$

17. Which graph represents the equation $-9x + 4y = 36$?

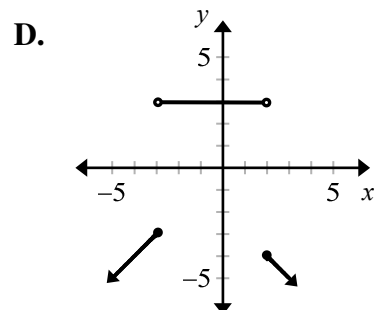
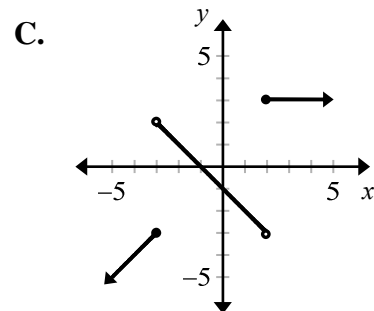
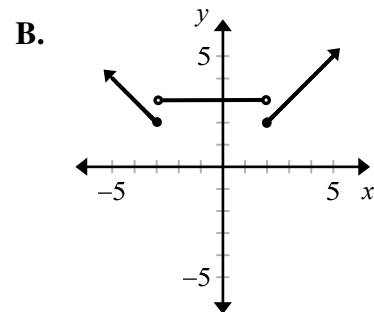
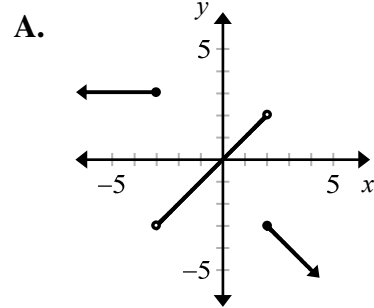


18. The value of y varies directly with x , and $y = 9$ when $x = 12$. What is the value of x when $y = 24$?

- A. 32
- B. 27
- C. 18
- D. 12

19. Which graph represents the piecewise function below?

$$f(x) = \begin{cases} x, & \text{if } x \geq 2 \\ 3, & \text{if } -3 < x < 2 \\ -x - 1, & \text{if } x \leq -3 \end{cases}$$



20. The equations for two lines are given below:

$$y = -7x + 9$$

$$y = 4x - 2$$

What is the x -coordinate of the point of intersection of the two lines?

- A. 2
- B. 1
- C. -1
- D. -2

21. What is the x -coordinate of the solution of the system of equations?

$$4x + 2y = 10$$

$$5x - 3y = 18$$

- A. 3
- B. 1
- C. -1
- D. -3

22. What is the x -coordinate of the solution of the system of equations?

$$2x + y - z = 5$$

$$x + 3z = 14$$

$$-2x - 3y + 2z = 2$$

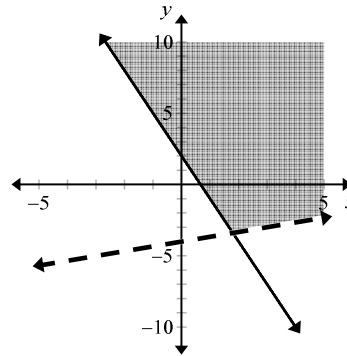
- A. -1
- B. 3
- C. 4
- D. 5

23. Which graph shows the solution to the system of inequalities below?

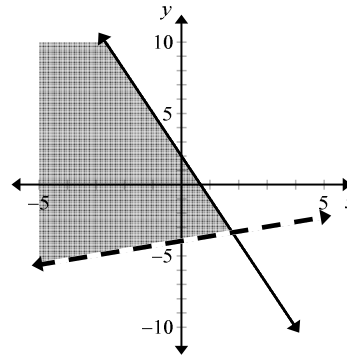
$$x - 3y > 12$$

$$3x + y \geq 2$$

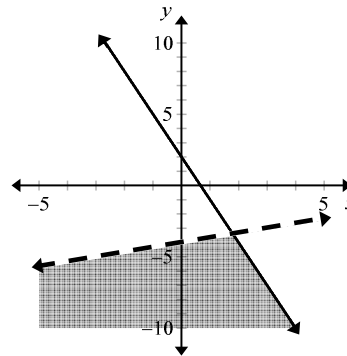
A.



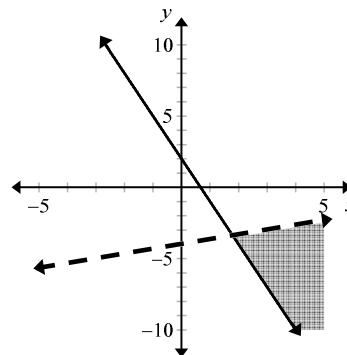
B.



C.



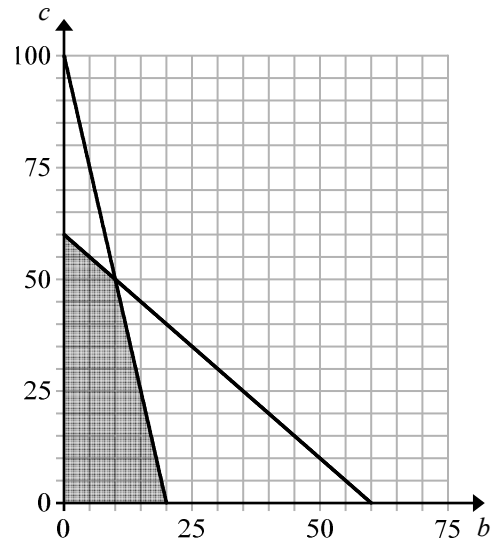
D.



24. A coin bank contains only dimes and nickels. The bank contains 46 coins. When 5 dimes and 2 nickels are removed, the total value of the coins remaining in the bank is \$3.40. How many nickels did the coin bank start with?

- A. 12
- B. 22
- C. 24
- D. 34

25. The area of a parking lot is 600 square meters. A car requires 6 square meters and a bus requires 30 square meters of space. The lot can handle a maximum of 60 vehicles. Let b represent the number of buses and c represent the number of cars. The diagram below represents the feasible region based on the constraints of the number of vehicles that can be parked in the lot.



To park in the lot, a bus costs \$8 and a car costs \$3. How many of each type of vehicle can be parked in the lot to maximize the amount of money collected?

- A. 0 buses and 60 cars
- B. 10 buses and 50 cars
- C. 20 buses and 0 cars
- D. 30 buses and 30 cars

26. The tables show the number of students in band and choir by grade and gender.

Students in Band			Students in Choir		
Grade	Girls	Boys	Grade	Girls	Boys
10	23	27	10	26	20
11	18	20	11	20	16
12	13	17	12	12	15

Which could be used to find the total number of girls and boys in the band and choir by grade level?

- A. $\begin{bmatrix} 23 & 27 \\ 18 & 20 \\ 13 & 17 \end{bmatrix} + \begin{bmatrix} 26 & 20 \\ 20 & 16 \\ 12 & 15 \end{bmatrix}$
- B. $\begin{bmatrix} 23 & 27 \\ 18 & 20 \\ 13 & 17 \end{bmatrix} \begin{bmatrix} 26 & 20 & 12 \\ 20 & 16 & 15 \end{bmatrix}$
- C. $\begin{bmatrix} 23 & 26 \\ 18 & 20 \\ 13 & 12 \end{bmatrix} + \begin{bmatrix} 20 & 27 \\ 16 & 20 \\ 15 & 17 \end{bmatrix}$
- D. $\begin{bmatrix} 23 & 26 \\ 18 & 20 \\ 13 & 12 \end{bmatrix} \begin{bmatrix} 27 & 20 & 17 \\ 20 & 16 & 15 \end{bmatrix}$
27. Find the values of x and y that make the equation true.

$$\begin{bmatrix} 2x & -2 \\ -3 & 6 \end{bmatrix} + \begin{bmatrix} -4 & 8 \\ -10 & -7 \end{bmatrix} = \begin{bmatrix} -16 & 6 \\ y & -1 \end{bmatrix}$$

- A. $x = -8, y = -3$
- B. $x = -7, y = 3$
- C. $x = -6, y = -13$
- D. $x = -1, y = -1$

28. If $A = \begin{bmatrix} 6 & -2 \\ 1 & 4 \\ 0 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} -4 & -2 & 5 \\ 4 & -6 & -1 \end{bmatrix}$, which is the product AB ?

- A. $\begin{bmatrix} -26 & 25 \\ 18 & -37 \end{bmatrix}$
- B. $\begin{bmatrix} -22 & -9 \\ 30 & 21 \end{bmatrix}$
- C. $\begin{bmatrix} -16 & -24 & 28 \\ -20 & 22 & 20 \\ -20 & 30 & 5 \end{bmatrix}$
- D. $\begin{bmatrix} -32 & 0 & 32 \\ 12 & -26 & 1 \\ 20 & -30 & -5 \end{bmatrix}$

29. What is the determinant of $\begin{bmatrix} 2 & 1 \\ -3 & -2 \end{bmatrix}$?
- A. -7
- B. -2
- C. -1
- D. 1

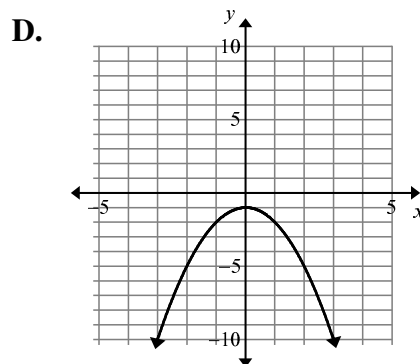
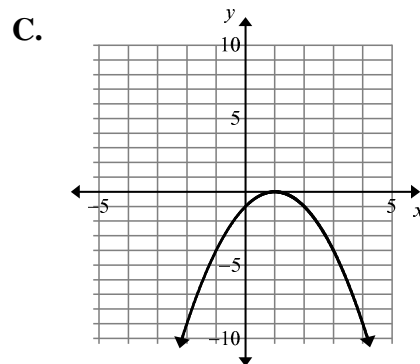
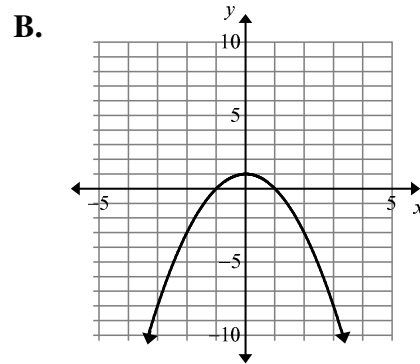
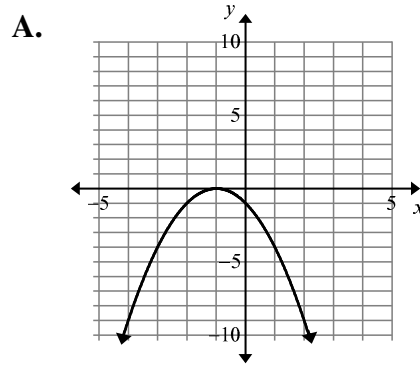
30. The flower shop in a grocery store sells flowers individually. The relationship between r , the cost of one rose, and c , the cost of one carnation, is represented by the matrix equation below.

$$\begin{bmatrix} 3 & 2 \\ 2 & 5 \end{bmatrix} \begin{bmatrix} r \\ c \end{bmatrix} = \begin{bmatrix} 8 \\ 9 \end{bmatrix}$$

What is the cost of buying one rose?

- A. \$0.82
- B. \$1.00
- C. \$1.55
- D. \$2.00

31. Which graph represents $f(x) = -x^2 + 2x - 1$?



32. What are the solutions of the quadratic equation $9x^2 - 6x - 8 = 0$?

- A. $x = -\frac{2}{9}, x = 4$
- B. $x = -\frac{2}{3}, x = \frac{4}{3}$
- C. $x = -\frac{4}{3}, x = \frac{2}{3}$
- D. $x = -4, x = \frac{2}{9}$

33. What is the solution set for the quadratic equation $x^2 + 6x - 3 = 0$?

- A. $\{-3 - 2\sqrt{3}, -3 + 2\sqrt{3}\}$
- B. $\{-3 - \sqrt{6}, -3 + \sqrt{6}\}$
- C. $\{3 - 2\sqrt{3}, 3 + 2\sqrt{3}\}$
- D. $\{3 - \sqrt{6}, 3 + \sqrt{6}\}$

34. Which is one of the appropriate steps in finding solutions for $x^2 + 4x - 3 = 0$ when completing the square?

- A. $(x+4)^2 = 3$
- B. $(x+2)^2 = 3$
- C. $(x+4)^2 = 7$
- D. $(x+2)^2 = 7$

35. What are the solutions of $(x + 3)^2 = 25$?

- A. $\{-8, 2\}$
- B. $\{-5, 5\}$
- C. $\{-4, 4\}$
- D. $\{-2, 8\}$

36. How many real and imaginary solutions are there for the equation $7x^2 - x + 10 = 0$?

- A. no real solutions, 2 imaginary solutions
- B. 1 real solution, no imaginary solutions
- C. 1 real solution, 1 imaginary solution
- D. 2 real solutions, no imaginary solutions

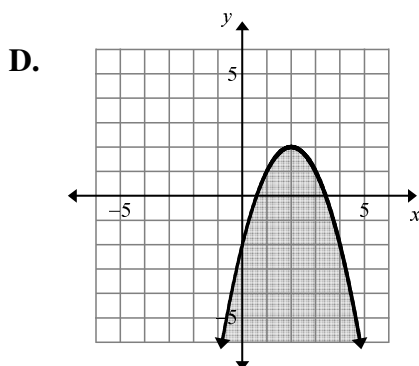
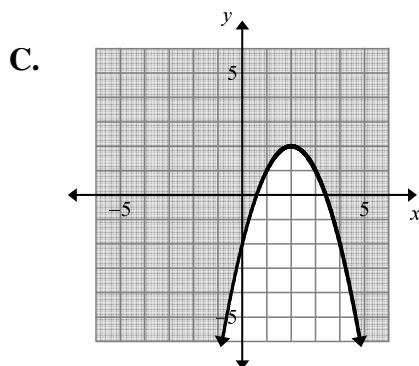
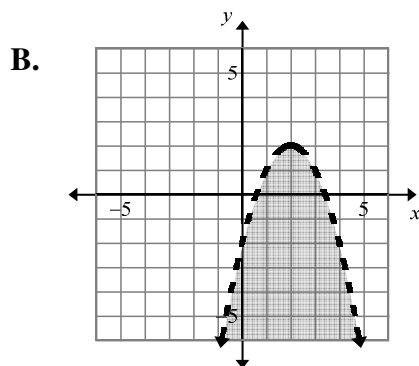
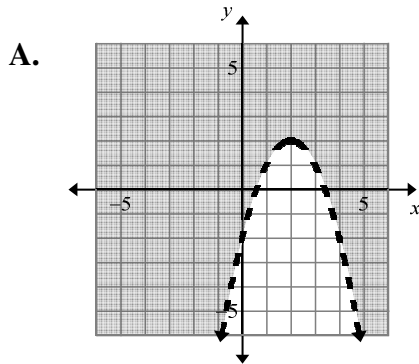
37. What are the solutions of $x^2 - 6x + 10 = 0$?

- A. $x = 2$ or $x = 4$
- B. $x = -10$ or $x = -4$
- C. $x = 3 + i$ or $x = 3 - i$
- D. $x = -3 + i$ or $x = -3 - i$

38. Which is the product $(8+i)(6+2i)$ in standard form?

- A. $50 + 22i$
- B. $48 + 24i$
- C. $46 + 22i$
- D. $48 + 20i$

39. Which of the following graphs represents the quadratic inequality $y \leq -x^2 + 4x - 2$?



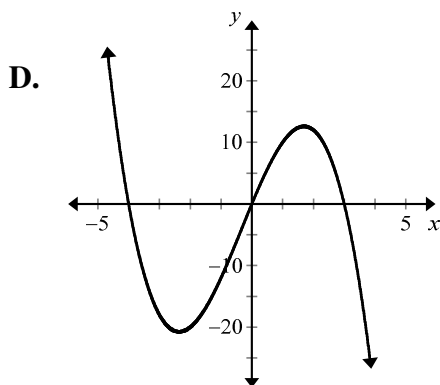
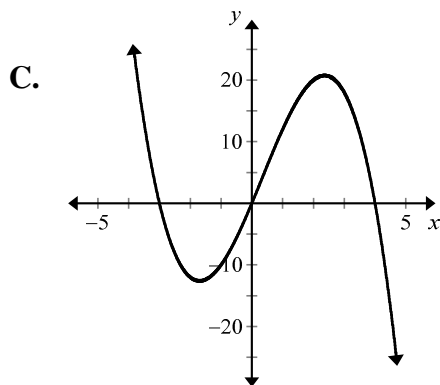
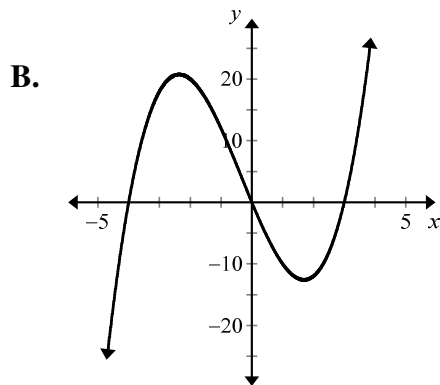
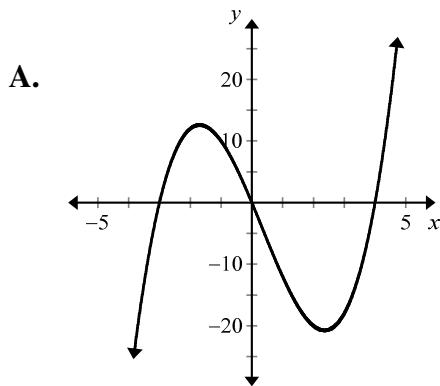
40. Use the formula below, where h is the height (in feet) of a falling object after t seconds and h_0 is the object's initial height (in feet).

$$h = -16t^2 + h_0$$

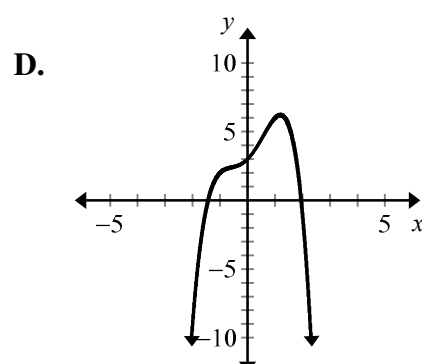
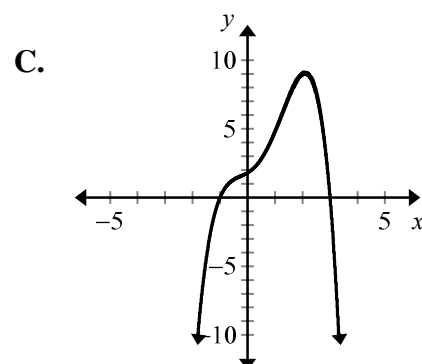
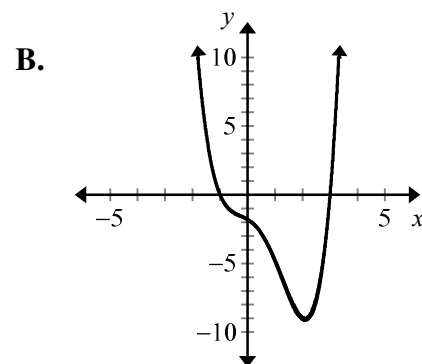
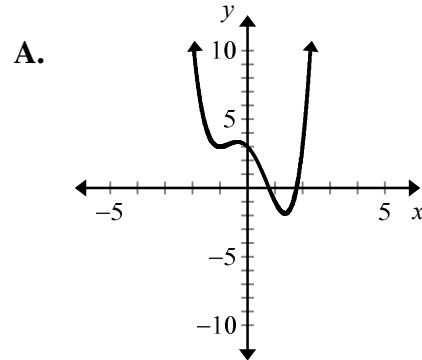
A coyote is standing on a cliff 64 feet above a roadrunner on the ground. The coyote drops a boulder from the cliff. How much time does the roadrunner have before the boulder hits the ground?

- A. $\frac{1}{4}$ second
 B. $\frac{1}{2}$ second
 C. 2 seconds
 D. 4 seconds

41. Which graph represents the polynomial function $f(x) = x(x+3)(x-4)$?



42. Which best represents the graph of the polynomial function $y = -x^4 + 2x^2 + 2x + 3$?



43. Which polynomial represents the product of $(x + 2)(x^3 - 8)$?

- A. $x^4 + 2x^3 - 8x - 16$
- B. $x^4 + 2x^3 + 8x + 16$
- C. $x^4 - 16$
- D. $x^4 + 16$

44. Which of the following represents the solution set of the polynomial equation $x^4 - 7x^2 + 12 = 0$?

- A. $\{-2, 2, -i\sqrt{3}, i\sqrt{3}\}$
- B. $\{-2, -\sqrt{3}, \sqrt{3}, 2\}$
- C. $\{-2i, -i\sqrt{3}, i\sqrt{3}, 2i\}$
- D. $\{-\sqrt{3}, \sqrt{3}, -2i, 2i\}$

45. What is the factored form of the polynomial $x^3 - 27$?

- A. $(x + 3)(x^2 - 3x + 9)$
- B. $(x + 3)(x^2 - 3x - 9)$
- C. $(x - 3)(x^2 - 3x - 9)$
- D. $(x - 3)(x^2 + 3x + 9)$

46. What is the set of all real zeros of the polynomial function?

$$f(x) = x^3 + 3x^2 + 4x + 12$$

- A. $\{-3\}$
- B. $\{-3, 2\}$
- C. $\{-3, -2, 2\}$
- D. $\{-3, -2, 1, 2\}$

47. According to the *Fundamental Theorem of Algebra*, how many complex zeros does the polynomial

$$f(x) = -5x^4 + 2x^3 + x - 1$$

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

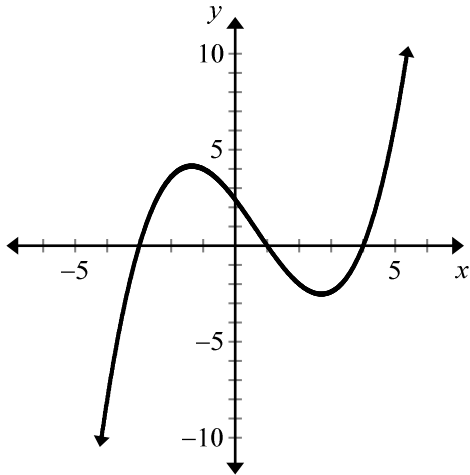
48. What is $x^3 - 3x^2 - 9x + 2$ divided by $x + 2$?

- A. $x^2 - x - 11$
- B. $x^2 - 2x - 11$
- C. $x^2 - 5x + 1$
- D. $x^2 - 4x + 5$

49. Which describes the end behavior of the graph of $f(x) = x^4 - 5x + 2$ as $x \rightarrow -\infty$?

- A. $f(x) \rightarrow -\infty$
- B. $f(x) \rightarrow +\infty$
- C. $f(x) \rightarrow 0$
- D. $f(x) \rightarrow 2$

50. Use the graph of a polynomial function below.

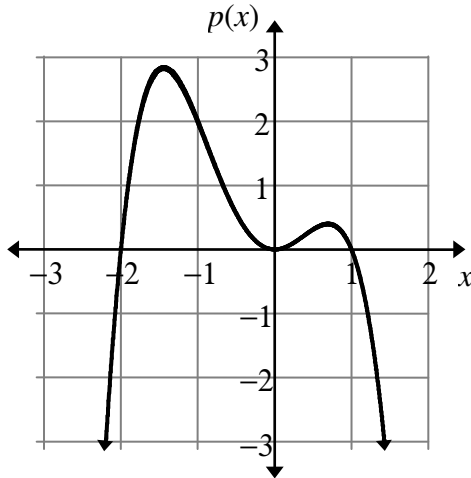


What are the zeros of the polynomial?

- A. {2}
- B. {-2}
- C. {-3, 1, 4}
- D. {3, -1, -4}

**Algebra II 2008–2009 Semester 1 Assessment — Released
Free Response**

1. The graph of the polynomial function $p(x)$ is shown. The domain of $p(x)$ is the set of real numbers. The graph is tangent (touches in exactly one point) to the x -axis at $(0,0)$. All zeros of $p(x)$ can be observed on the graph.



- A. Could $p(x)$ be a third-degree polynomial? Explain.
- B. Is the leading coefficient of $p(x)$ positive or negative? Explain.
- C. Find a possible equation for $p(x)$. Write the equation in standard form.

**Algebra II 2008–2009 Semester 1 Assessment — Released
Free Response**

2. Let $f(x) = ax^2 + bx + c$. The axis of symmetry is at $x = 2$ and $f(-1) = 0$.

A. What are the values of k when $f(k) = 0$?

B. The y intercept of $f(x)$ is -15 . Find the values of a , b , and c .

C. What are the domain and range of $f(x)$?

3. A hardware store chain displays prices in a 1×3 matrix and daily sales at its three stores in a 3×3 matrix as shown below:

Prices			Number of Items Sold		
Hammers	Flashlights	Lanterns	Store A	Store B	Store C
[\$3	\$5	\$7]]
Hammers	Flashlights	Lanterns	10	8	5
Flashlights	Lanterns	Hammers	4	15	7
Lanterns	Hammers	Flashlights	3	2	6

A. Find the product of the two matrices. Explain what the product represents.

B. How would you find the total gross revenue from all three stores?

