

## Algebra II Practice Test

Objective: 1.1a

1. Which is equivalent to  $49^{\frac{3}{2}}$ ?
  - A 21
  - B 98
  - C 294
  - D 343
2. Which expression is another way to write  $\sqrt[3]{125x^4}$ ?
  - A  $5x^{\frac{3}{4}}$
  - B  $5x^{\frac{4}{3}}$
  - C  $25x^{\frac{3}{4}}$
  - D  $25x^{\frac{4}{3}}$
3. If  $x$  and  $y$  are real numbers, what is the simplified radical form of  $(x^2y^5)^{\frac{1}{5}}$ ?
  - A  $y\sqrt[5]{x^2}$
  - B  $y\sqrt{x^5}$
  - C  $|y|\sqrt[5]{x^2}$
  - D  $|y|\sqrt{x^5}$

Objective 1.1b

4. What is the simplified expression of  $\sqrt{\frac{36x^8}{4x^6}}$ ?
  - A  $3x$
  - B  $9x$
  - C  $3x^2$
  - D  $9x^2$
5. What is the simplified form of  $(2\sqrt{5}+3)(\sqrt{5}-1)$ ?
  - A  $\sqrt{5}-3$
  - B  $\sqrt{5}+7$
  - C  $2\sqrt{5}-3$
  - D  $2\sqrt{5}+7$

6. What is the sum of  $\frac{1}{3\sqrt{25}}$  and  $\frac{1}{2\sqrt[3]{27}}$ ?

- A  $\frac{2}{21}$
- B  $\frac{7}{30}$
- C  $\frac{2}{33}$
- D  $\frac{11}{90}$

7. The area of a square is  $2\sqrt{2}+3$ . What is the length of a side of the square?

- A  $\sqrt{2}-1$
- B  $\sqrt{2}+1$
- C  $2\sqrt{2}-1$
- D  $2\sqrt{2}+1$

Objective 1.2a

8. Which expression represents the quotient?  $\frac{8x^6z^4 + 4x^4z^2}{4x^2z}$

- A  $2x^4z^3 + x^2z$
- B  $2x^3z^4 + x^2z^2$
- C  $4x^4z^3 + 3x^2z$
- D  $4x^3z^4 + 3x^2z^2$

9. Which expression represents the quotient?  $\frac{4x^2y}{8xy^2} \div \frac{12xy^2}{8x^6y^3}$

- A  $\frac{x^5}{3}$
- B  $\frac{3}{x^5}$
- C  $\frac{x^6}{3}$
- D  $\frac{3}{x^6}$

10. Which expression represents the quotient?  $(y^2 - 4y - 32) \div (y + 4)$

- A  $y-8$
- B  $y+8$
- C  $y-4$
- D  $y+4$

11. A rectangular prism has a volume of  $8x^3 + 14x^2 + x - 2$  and a height of  $2x + 1$ . Which expression represents the area of the base of the prism?
- A  $4x^2 + 5x - 2$
  - B  $4x^2 + 5x + 2$
  - C  $4x^2 + 9x + 4$
  - D  $4x^2 + 9x + 5$

objective 1.2b

12. What is the completely simplified equivalent of  $\frac{x^2 + x - 12}{x^2 - 6x + 9}$ ?

- A  $\frac{x-3}{x+4}$
- B  $\frac{x+4}{x-3}$
- C  $2x^2 + 5x - 3$
- D  $2x^2 + 7x + 21$

13. Which expression represents the result of this subtraction  $\frac{3x-1}{x+2} - \frac{x-2}{x-1}$ ?

- A  $\frac{2x+1}{3}$
- B  $\frac{2x+1}{x^2+x-2}$
- C  $\frac{3x^2-4x+5}{3}$
- D  $\frac{2x^2-4x+5}{x^2+x-2}$

14. What is the simplified equivalent of  $2 - x - \frac{1}{3-x}$ ?

- A  $\frac{1}{3-2x}$
- B  $\frac{x^2-x+3}{3-x}$
- C  $\frac{x^2-5x+5}{3-x}$
- D  $\frac{x^2-5x+7}{3-x}$

objective 1.3b

15. Which expression is equivalent to  $(4i)^3$ ?

- A  $-12i$
- B  $12i$
- C  $-64i$
- D  $64i$

16. A circuit has a current of  $(8 + 7i)$  amps, and another circuit has a current of  $(5 - 3i)$  amps. What is the difference between the currents of the two circuits?

- A  $(3 - 4i)$  amps
- B  $(3 + 4i)$  amps
- C  $(3 - 10i)$  amps
- D  $(3 + 10i)$  amps

17. Which expression is equivalent to  $\sqrt{-6}(\sqrt{-4} - \sqrt{3})$ ?

- A  $2\sqrt{6} + 3\sqrt{2}$
- B  $-24 - 6i\sqrt{3}$
- C  $2\sqrt{6} - 3i\sqrt{2}$
- D  $-2\sqrt{6} - 3i\sqrt{2}$

18. What is the product of  $(2 + 3i)$  and  $(5 - 4i)$ ?

- A  $-2 - 23i$
- B  $-2 + 7i$
- C  $22 - 23i$
- D  $22 + 7i$

19. What is the completely simplified equivalent of  $\frac{2}{5+i}$ ?

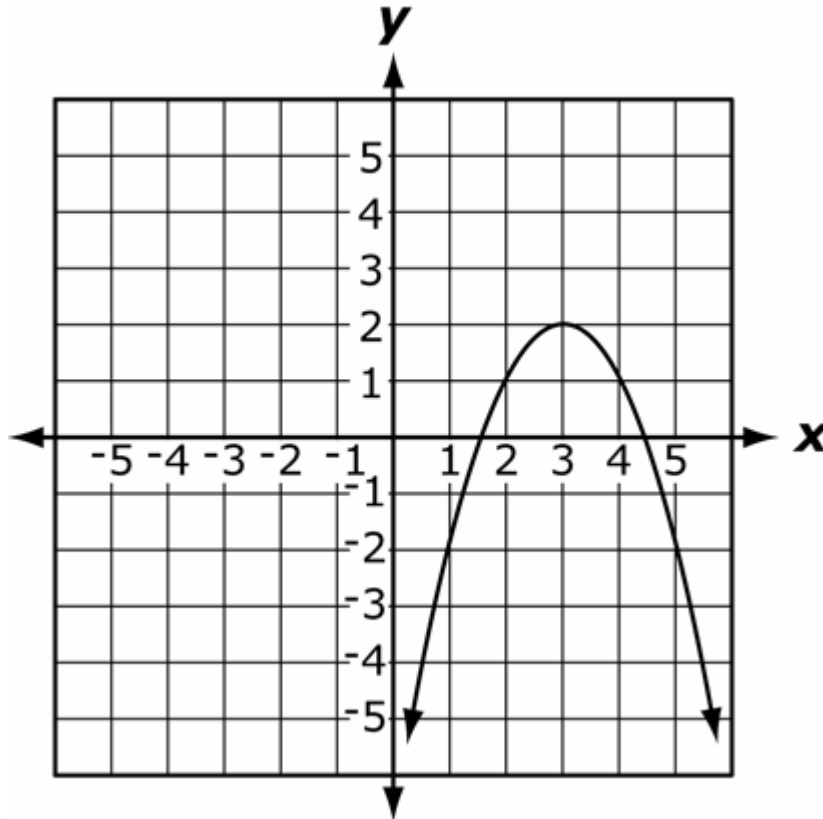
- A  $\frac{5-i}{12}$
- B  $\frac{5+i}{12}$
- C  $\frac{5-i}{13}$
- D  $\frac{5+i}{13}$

objective 2.1a

20. What is the parent graph of the following function and what transformations have taken place on it:  $y = (x-3)^2$ ?

- A The parent graph is  $y = x^2$ , which is shifted 3 units up.
- B The parent graph is  $y = x^2$ , which is shifted 3 units down.
- C The parent graph is  $y = x^2$ , which is shifted 3 units to the left.
- D The parent graph is  $y = x^2$ , which is shifted 3 units to the right.

21. What is the parent function of this graph?



- A  $f(x) = x^2$
- B  $f(x) = x^4$
- C  $f(x) = -x^2$
- D  $f(x) = -x^4$

objective 2.1b

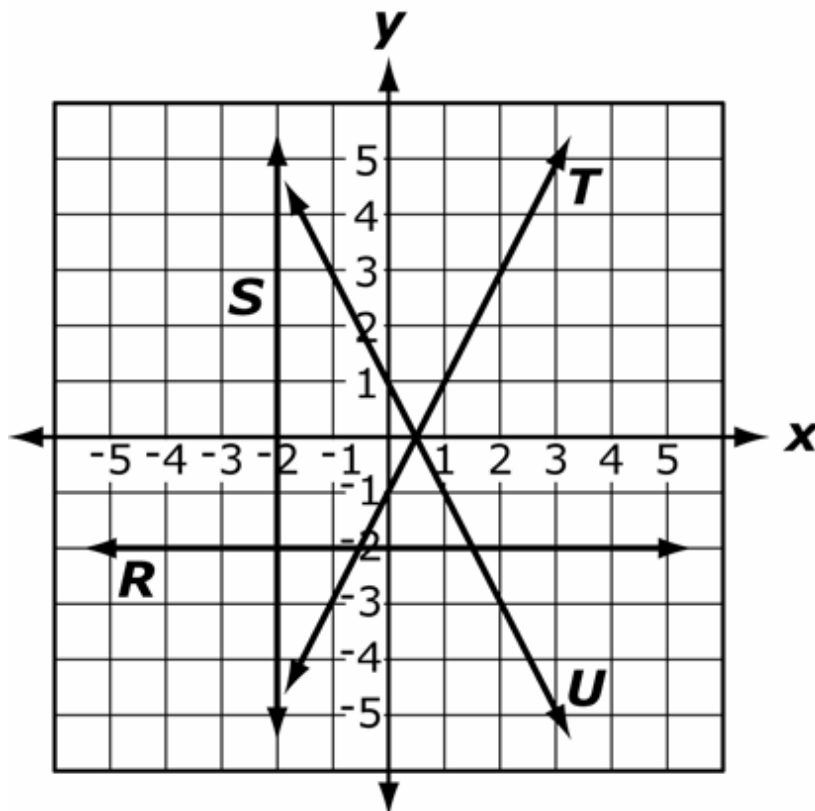
22. If  $f(x) = 3x^2 - 2$  and  $g(x) = 4x + 2$ , what is the value of  $(f + g)(-1)$ ?

- A -7
- B -1
- C 1
- D 7

23. If  $f(x) = x^2 - 1$  and  $g(x) = x - 1$ , what is the value of  $\left(\frac{f}{g}\right)(x)$ ?

- A  $x - 1$
- B  $x + 1$
- C  $\frac{1}{x - 1}$
- D  $\frac{1}{x + 1}$

24.



If  $f(x) = x - \frac{1}{2}$  and  $g(x) = -2$ , which graph corresponds to the function of  $(fg)(x)$ ?

- A line R
- B line S
- C line T
- D line U

Objective 2.1c

25. If  $f(x) = 2x + 7$  and  $g(x) = 3x^2 - 1$ , what expression represents  $(f(g(x)))$ ?

- A  $6x^2 + 5$
- B  $6x^2 + 12$
- C  $3x^2 - 2x - 8$
- D  $3x^2 + 2x + 6$

26. If  $(f \circ g)(x) = 2x - 1$ , how might  $f(x)$  and  $g(x)$  be defined?

- A  $f(x) = (x - 1)$  and  $g(x) = (2x - 1)$
- B  $f(x) = (x - 1)$  and  $g(x) = (2x + 1)$
- C  $f(x) = (2x - 1)$  and  $g(x) = (x - 1)$
- D  $f(x) = (2x + 1)$  and  $g(x) = (x - 1)$

Objective 2.1d

27. Which statement is true for the function  $f(x) = \frac{1}{x+4}$  ?

- A 4 is not in the range of the function.
- B 4 is not in the domain of the function.
- C -4 is not in the range of the function.
- D -4 is not in the domain of the function.

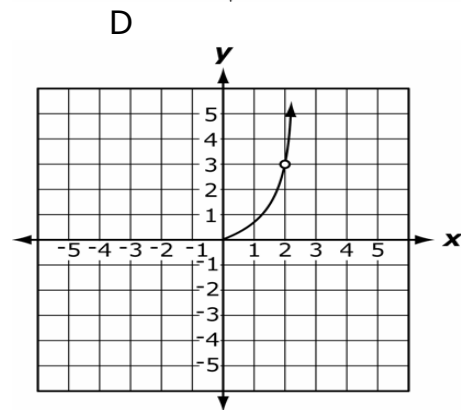
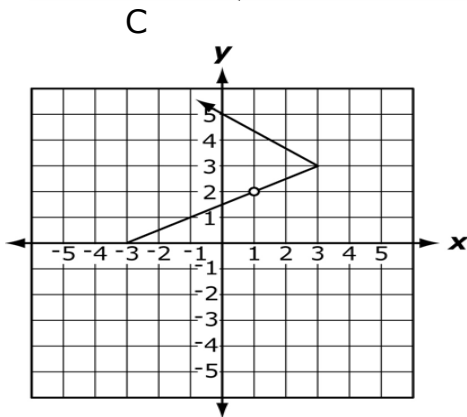
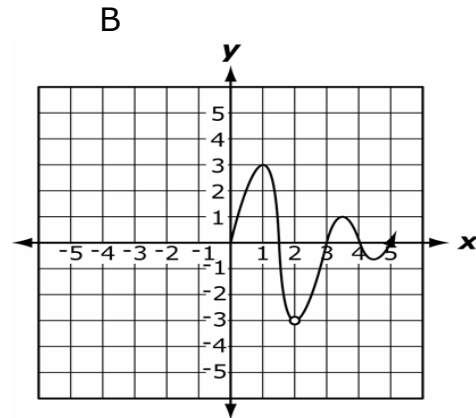
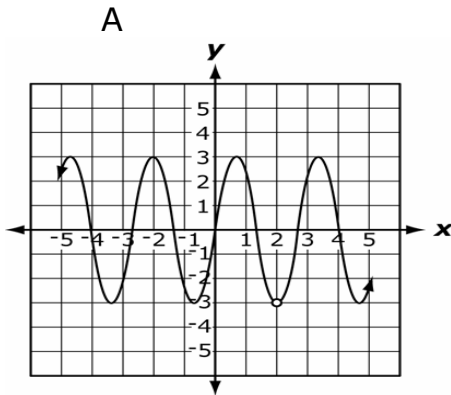
28. What is the domain of the function  $f(x) = \frac{x+5}{x^2+2x-8}$  ?

- A  $\{x : x \neq 0\}$
- B  $\{x : x \neq -5\}$
- C  $\{x : x \neq -2, 4\}$
- D  $\{x : x \neq 2, -4\}$

29. Which intervals correctly define the domain of  $f(x) = \frac{1}{x+4} - 2$  ?

- A  $(-\infty, 4)$  and  $(4, \infty)$
- B  $(-\infty, -4)$  and  $(4, \infty)$
- C  $(-\infty, -4)$  and  $(-4, \infty)$
- D  $(-\infty, -4)$  and  $(-2, \infty)$

30. Domain:  $\{x|x \geq 0, x \neq 2\}$  Range:  $\{y|-3 < y \leq 3\}$  Which graph corresponds to the given constraints?



31. Which function has the fewest domain restrictions for real numbers?

A  $f(x) = \frac{1}{x-1}$

B  $f(x) = \frac{1}{x+1}$

C  $f(x) = \frac{1}{x^2-1}$

D  $f(x) = \frac{1}{x^2+1}$

Objective 2.1e

32. What is the inverse of  $f(x) = x+1$ ?

A  $f^{-1}(x) = -x-1$

B  $f^{-1}(x) = x-1$

C  $f^{-1}(x) = \frac{-1}{1-x}$

D  $f^{-1}(x) = \frac{1}{1+x}$



33. What is the inverse of the function  $f(x) = (x+4)^2$ ?

A  $f^{-1}(x) = \sqrt{x} - 4$

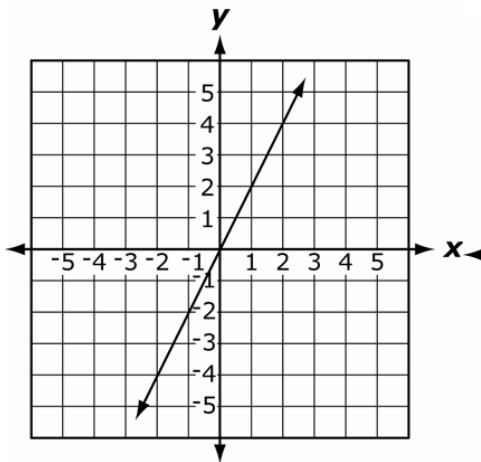
B  $f^{-1}(x) = \frac{1}{(x+4)^2}$

C  $f^{-1}(x) = \pm\sqrt{x} - 4$

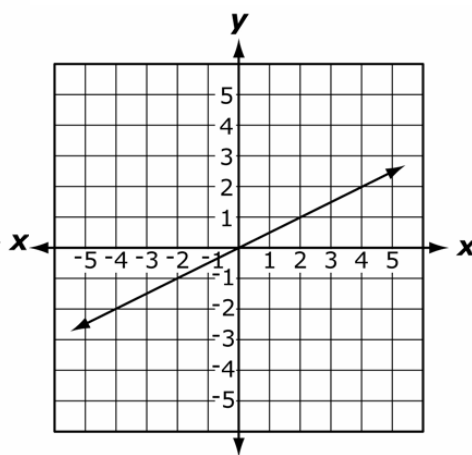
D  $f^{-1}(x) = (x-4)^2$

34. Which graph represents the inverse of  $f(x) = 2x$ ?

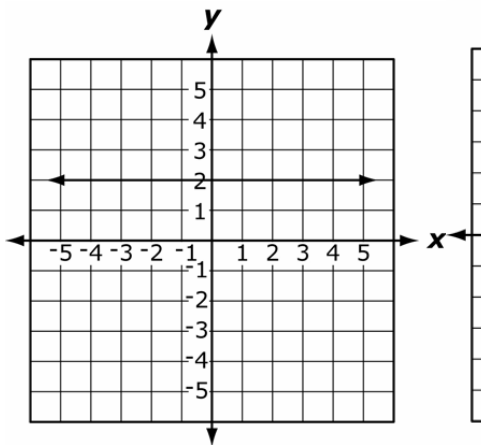
A



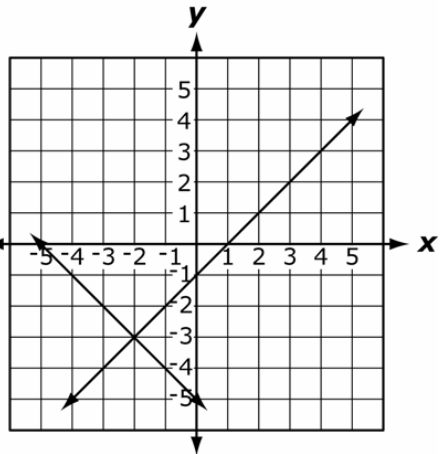
B



C



D



35. Which statement about graphs and their inverse is true?

A They are symmetric about  $y = x$ .

B They are symmetric about the origin.

C They are symmetric about the x-axis.

D They are symmetric about the y-axis.

Objective 2.2a

36. Profits,  $P$ , are equal to sales,  $S$ , minus expenses,  $E$ . If expenses are equal to travel,  $T$ , plus materials,  $M$ , which system of equations models this situation?

A  $P = S - E$   
 $E = T + M$

B  $P = S + E$   
 $E = T + M$

C  $P = S - E$   
 $E = T - M$

D  $P = S + E$   
 $E = T - M$

37. Tyrone wants to spend at most \$10,000 on two televisions,  $R$  and  $S$ . Each television must cost at least \$3,000, and television  $R$  must cost at least twice as much as television  $S$ . Which system of inequalities models the amount of money spent on each television?

A  $R + S \geq 10,000$   
 $R \geq 2S$   
 $R \geq 3,000$   
 $S \geq 3,000$

B  $R + S \leq 10,000$   
 $S \geq 2R$   
 $R \geq 3,000$   
 $S \geq 3,000$

C  $R + S \leq 10,000$   
 $R \geq 2S$   
 $R \geq 3,000$   
 $S \geq 3,000$

D  $R + S \geq 10,000$   
 $S \geq 2R$   
 $R \geq 3,000$   
 $S \geq 3,000$

38. Meredith invests \$50,000 in her new business. It costs the company \$10 to produce each unit, which is sold for \$15. Let  $C$  represent the cost and  $R$  represent the revenue for  $x$  units. Which statement is true about the graphs of the equations  $C = 50,000 + 10x$  and  $R = 15x$ ?

A Both slopes are positive.

B Both slopes are negative.

C One slope is positive, and the other is zero.

D one slope is negative, and the other is positive.

Objective 2.2b

39. Which quadrants contain the solutions to this system of inequalities?

$$\begin{cases} y - 2x \leq -3 \\ 3y + x \geq -4 \end{cases}$$

A quadrants I and IV

B quadrants II and III

C quadrants III and IV

D quadrants II, III, and IV

40. What is the solution to this system of equations?  $\begin{cases} 3x - y + 5 = 0 \\ 2x + 3y - 4 = 0 \end{cases}$

A  $x = -1, y = -2$

B  $x = -1, y = 2$

C  $x = 2, y = -1$

D  $x = 2, y = 1$

41. The corners of a triangle are  $(2,1)$ ,  $(4,4)$ , and  $(6,2)$ . Which system of inequalities describes the interior of the triangle?

A  $\begin{cases} 4y > x + 2 \\ 3y < 2x - 1 \\ y < 8 - x \end{cases}$

B  $\begin{cases} 4y > x + 2 \\ 2y < 3x - 4 \\ y < 8 - x \end{cases}$

C  $\begin{cases} 2y > x \\ 2y < 3x - 4 \\ y < 8 - x \end{cases}$

D  $\begin{cases} 2y > x \\ 3y < 2x - 1 \\ y < 8 - x \end{cases}$

Objective 2.2c

42. What is the solution set of this system of equations?

$$\begin{cases} x^2 + y - 1 = 0 \\ x - y + 1 = 0 \end{cases}$$

A  $\{(-1, -1), (-1, 0)\}$

B  $\{(-1, 0), (-1, 1)\}$

C  $\{(-1, 0), (0, 1)\}$

D  $\{(1, 0), (1, 1)\}$

43. What is the solution set of this system of equations?

$$\begin{cases} y - x = 3 \\ x^2 - 7y + 31 = 0 \end{cases}$$

A  $\{(2, 5), (5, 2)\}$

B  $\{(2, 5), (5, 8)\}$

C  $\{(5, 8), (8, 5)\}$

D  $\{(8, 5), (8, 8)\}$

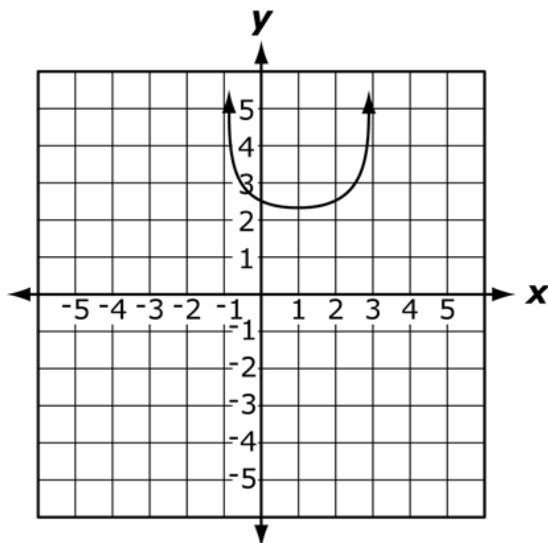
44. What is the solution set of this system of equations?

$$\begin{cases} x^2 - y = -3 \\ 2x^2 - y = -2 \end{cases}$$

- A  $\{(-1, -4), (-1, 4)\}$
- B  $\{(-1, -4), (1, 4)\}$
- C  $\{(-1, 4), (1, -4)\}$
- D  $\{(-1, 4), (1, 4)\}$

Objective 2.3a

45. How many real roots does the function given by the graph have?



- A 0 real roots
- B 1 real root
- C 2 real roots
- D 4 real roots

46. What number is added to both sides of the equation  $x^2 - 8x + 3 = 0$  to solve it by completing the square?

- A -16
- B 16
- C -64
- D 64

47. What is the solution of  $x^2 + 5x - 3 = 0$ ?

- A  $\frac{-5 \pm \sqrt{13}}{2}$
- B  $\frac{-5 \pm \sqrt{37}}{2}$
- C  $\frac{5 \pm \sqrt{13}}{2}$
- D  $\frac{5 \pm \sqrt{37}}{2}$

Objective 2.3b

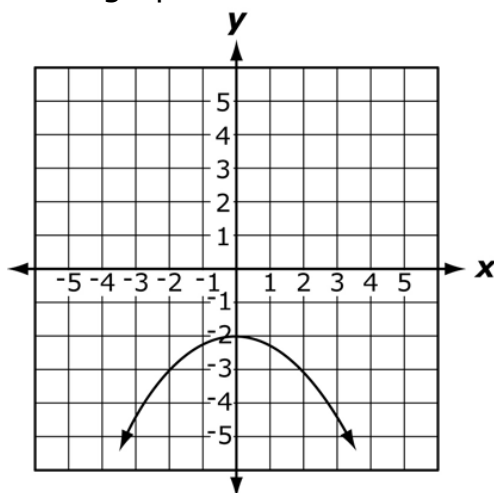
48. What is the y-intercept of  $f(x) = 3x^2 - 2x + 1$ ?

- A (0, -1)
- B (0, 1)
- C (-1, 0)
- D (1, 0)

49. What are the coordinates at the minimum point of  $f(x) = x^2 - 4x + 3$ ?

- A (-1, -2)
- B (-1, 2)
- C (2, -1)
- D (2, 1)

50. Which function represents this graph?



- A  $f(x) = \frac{-1}{4}x^2 - 2$
- B  $f(x) = \frac{1}{4}x^2 - 2$
- C  $f(x) = -4x^2 - 2$
- D  $f(x) = 4x^2 - 2$

51. Which statement best describes these two functions?

$$f(x) = x^2 - x + 6$$

$$g(x) = -3x^2 + 3x + 5$$

- A They have no common points.
- B They have the same x-intercepts.
- C The maximum of  $f(x)$  is the same as the minimum of  $g(x)$ .
- D The maximum of  $g(x)$  is the same as the minimum of  $f(x)$ .

52. Which statement best describes these two functions?

$$f(x) = x^2 - x + 4$$

$$g(x) = -3x^2 + 3x + 7$$

- A The maximum of  $f(x)$  is less than the minimum of  $g(x)$ .
- B The minimum of  $f(x)$  is less than the maximum of  $g(x)$ .
- C The maximum of  $f(x)$  is greater than the minimum of  $g(x)$ .
- D The minimum of  $f(x)$  is greater than the maximum of  $g(x)$ .

Objective 2.3c

53. The length of a rectangular swimming pool is 20 feet greater than the width. The surface area of the pool is 1,500 square feet. What are the length and width of the pool?

- A length = 20 ft, width = 20 ft
- B length = 50 ft, width = 30 ft
- C length = 60 ft, width = 40 ft
- D length = 150 ft, width = 10 ft

54. The profit,  $P$ , (in dollars) for Ace Car Rental is given by  $P = 100x - 0.1x^2$ , where  $x$  is the number of cars rented. How many cars have to be rented for the company to maximize profits?

- A 500 cars
- B 1,000 cars
- C 12,500 cars
- D 25,000 cars

55. The revenue,  $R$ , at a bowling alley is given by the equation  $R = \frac{-1}{800}(x^2 - 2,400x)$ , where  $x$  is the number of frames bowled.

What is the maximum amount of revenue the bowling alley can generate?

- A \$800
- B \$1,200
- C \$1,800
- D \$2,400

Objective 2.4

56. Which best describes the graph of  $\frac{x^2}{50} + \frac{y^2}{25} = 1$ ?

- A circle
- B ellipse
- C parabola
- D hyperbola

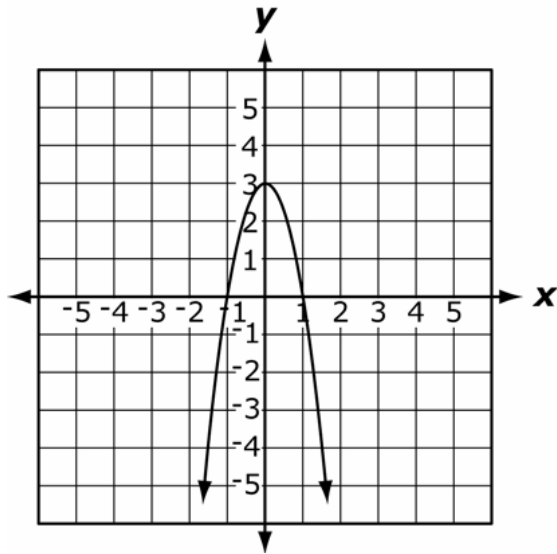
57. What is the equation of a circle with center  $(-4, 2)$  and diameter 6?

- A  $(x-4)^2 + (y+2)^2 = 6$
- B  $(x+4)^2 + (y-2)^2 = 6$
- C  $(x-4)^2 + (y+2)^2 = 9$
- D  $(x+4)^2 + (y-2)^2 = 9$

58. Which statement describes the equation  $y = -x^2 + 6x - 8$ ?

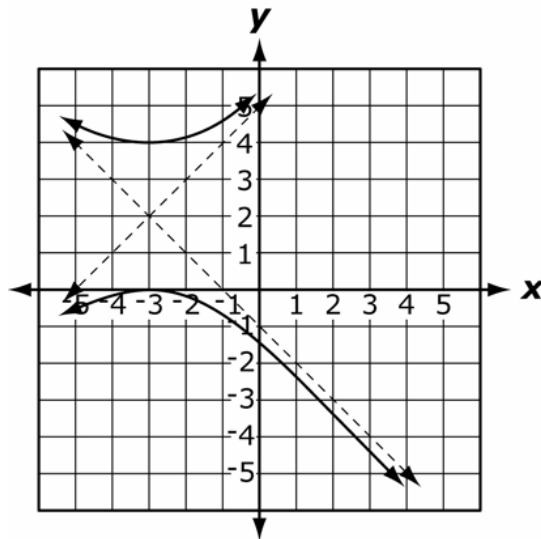
- A It is a vertical parabola.
- B It is a vertical hyperbola.
- C It is a horizontal parabola.
- D It is a horizontal hyperbola.

59. What is the equation of the given parabola?



- A  $y = -x^2 + 3$
- B  $y = -3x^2 + 3$
- C  $y = -x^2 - 2x + 3$
- D  $y = 3x^2 - 6x + 3$

60. What is the equation of the graphed Hyperbola?



- A  $\frac{(x+3)^2}{4} - \frac{(y-2)^2}{4} = 1$
- B  $\frac{(y+2)^2}{4} - \frac{(x-3)^2}{4} = 1$
- C  $\frac{(y-2)^2}{2} - \frac{(x+3)^2}{2} = 1$
- D  $\frac{(y-2)^2}{4} - \frac{(x+3)^2}{4} = 1$

61. What is the vertex of the parabola  $y = (x-1)^2 - 9$ ?

- A (-1, -9)
- B (1, -9)
- C (-9, -1)
- D (-9, 1)

62. What is the equation of the ellipse whose center is at the origin, major axis has length of 10 units along the x-axis, and minor axis has length of 6 units?

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

- A  $\frac{x^2}{25} + \frac{y^2}{9} = 1$
- B  $\frac{x^2}{9} + \frac{y^2}{25} = 1$
- C  $\frac{x^2}{20} + \frac{y^2}{12} = 1$
- D  $\frac{x^2}{100} + \frac{y^2}{36} = 1$



Objective 2.5a

63. Which function is best represented by the data in this table?

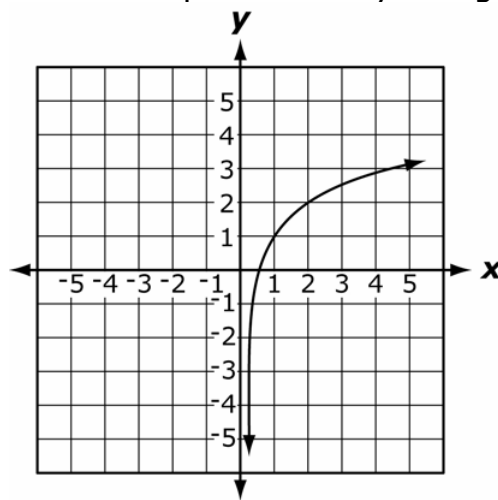
X	0	1	2	3	4
Y	1	3	9	27	81

- A  $f(x) = x^3$
- B  $f(x) = 3^x$
- C  $f(x) = 3x$
- D  $f(x) = 3x^2$

64. What are the horizontal asymptote and y-intercept for the graph of this function  $f(x) = 2^{-x} + 7$ ?

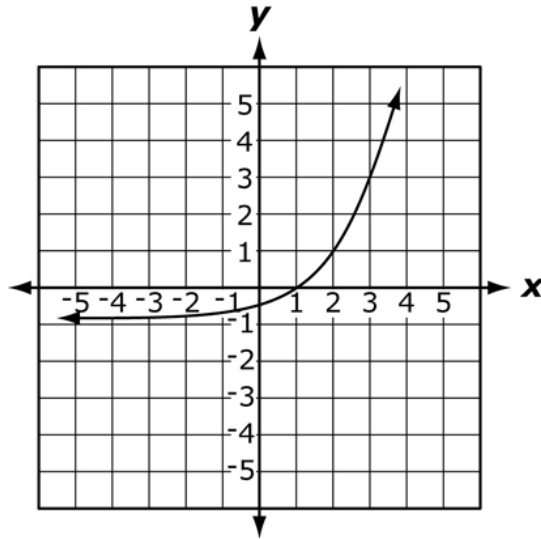
- A Asymptote:  $y=7$ , Intercept:  $(0, 7)$
- B Asymptote:  $y=-7$ , Intercept:  $(0, 7)$
- C Asymptote:  $y=7$ , Intercept:  $(0, 8)$
- D Asymptote:  $y=-7$ , Intercept:  $(0, 8)$

65. Which function is best represented by this graph?



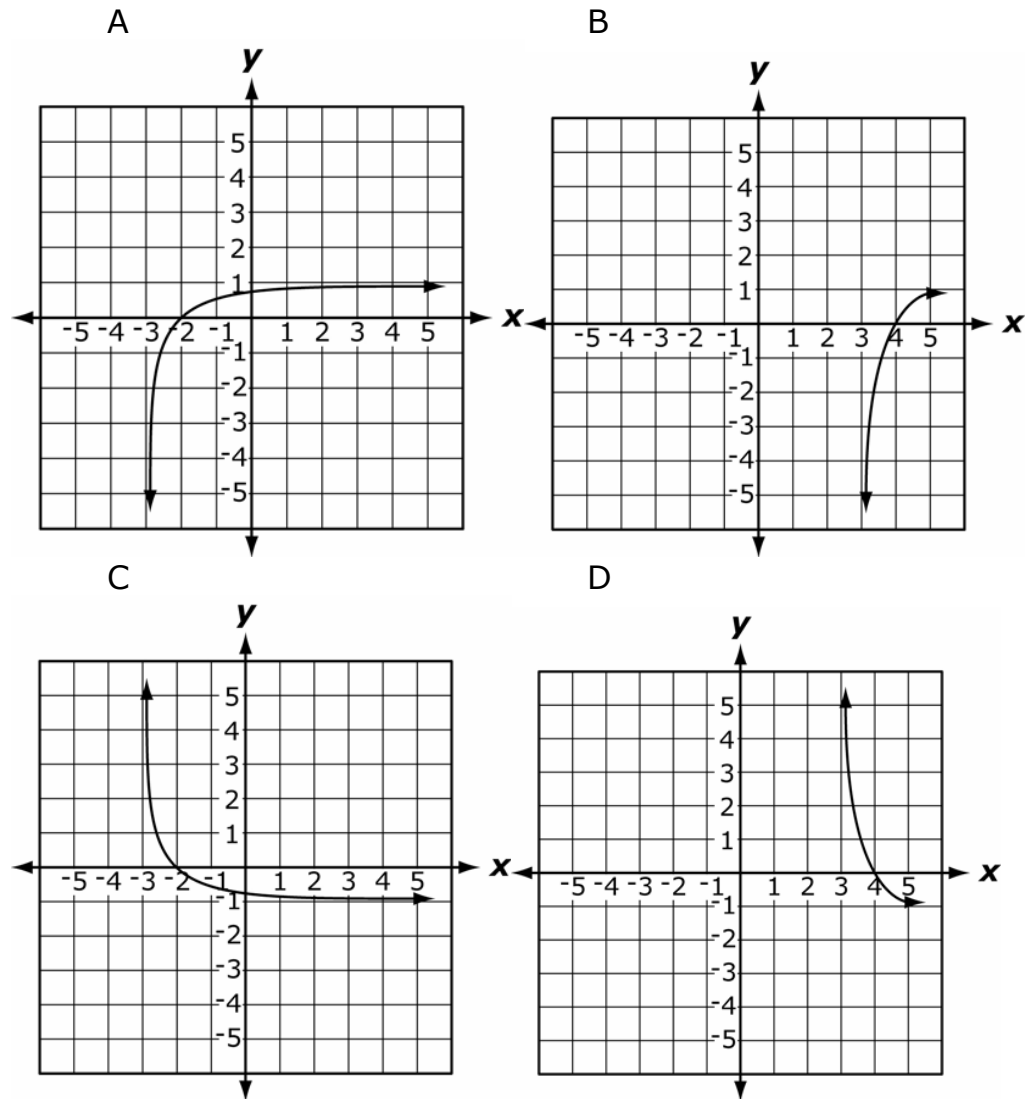
- A  $f(x) = \log_2 x + 1$
- B  $f(x) = \log_2 x - 1$
- C  $f(x) = \log_2(x + 1)$
- D  $f(x) = \log_2(x - 1)$

66. Which function is best represented by this graph?



- A  $f(x) = 2^{x-1} - 1$
- B  $f(x) = 2^{x+1} - 1$
- C  $f(x) = 2^x - \frac{1}{2}$
- D  $f(x) = 2^{x-1}$

67. Which graph represents the function  $f(x) = \log(x+3)$ ?



objective 2.5b

68. Which function is the inverse of  $f(x) = \log x$ ?

- A  $f(x) = e^x$
- B  $f(x) = 2^x$
- C  $f(x) = 10^x$
- D  $f(x) = \frac{1}{\log x}$

69. If  $3^{\log_3 7} = x$ , what is the value of  $x$ ?

- A 7
- B  $3^7$
- C  $\sqrt[3]{7}$
- D  $\sqrt[7]{3}$

70. Which equation represents the solution for  $x$  in the formula  $6^x = 21$ ?

A  $x = \frac{\log 6}{\log 21}$

B  $x = \frac{\log 21}{\log 6}$

C  $x = \log 21 - \log 6$

D  $x = \log 21 + \log 6$

71. What is the value of  $\log \sqrt{10}$ ?

A 0

B  $\frac{1}{2}$

C 1

D 10

72. If  $\log_{2x} 80 = 2$ , what is the value of  $x$ ?

A 20

B  $2\sqrt{5}$

C  $5\sqrt{2}$

D  $2\sqrt{10}$

73. If  $4 \left( \log_3 \frac{1}{27} \right) = x$ , what is the value of  $x$ ?

A  $\frac{4}{3}$

B  $-\frac{4}{3}$

C 12

D -12

Objective: 2.5c

74. If the loudness of fizz in a can of soda pop is represented

by  $F = 4 \log \left( \frac{x}{10^{-5}} \right)$ , where  $x$  is represented by the intensity of sound, how

loud is the fizz if  $x = 10^{-3}$ ?

A 4 decibels

B 8 decibels

C 16 decibels

D 32 decibels

75. The formula,  $r = 2^{\frac{1}{x}} - 1$ , gives the annual interest rate,  $r$ , required for your money to double in  $x$  years. If it takes 18 years for your money to double, what was the approximate annual interest rate?
- A 2%  
 B 4%  
 C 8%  
 D 18%
76. The population,  $P$ , of prairie dogs increases according to the equation  $P = 2,250e^{rt}$ , where  $t$  is the number of years, and  $r$  is the rate of growth. Which equation solves for  $r$ ?

A  $r = \frac{\ln\left(\frac{P}{2,250}\right)}{t}$

B  $r = \frac{t}{\ln\left(\frac{P}{2,250}\right)}$

C  $r = \frac{\ln\left(\frac{2,250}{P}\right)}{t}$

D  $r = \frac{t}{\ln\left(\frac{2,250}{P}\right)}$

77. The mass of a radioactive sample is given by  $M(t) = M_0 10^{-kt}$ , where  $t$  is the time in years,  $M_0$  is the initial mass, and  $k$  is a constant. If 400 grams of this material decays to 40 grams in 10 years, what is the value of  $k$ ?
- A 1  
 B -1  
 C 0.1  
 D -0.1

Objective 2.6a

78. Which equation has -1 and 3 as solutions?
- A  $x^2 - 2x - 3 = 0$   
 B  $x^2 - 2x + 3 = 0$   
 C  $x^2 + 2x - 3 = 0$   
 D  $x^2 + 2x + 3 = 0$

79. Which of these is a root of  $f(x) = x^3 - 3x^2 - 4x + 12$ ?

- A -3
- B 3
- C 4
- D 12

80. Given that  $(2x-1)$  and  $(x+3)$  are factors of the polynomial,  $2x^3 + 13x^2 + 17x - 12$ , what is the third factor?

- A  $x-4$
- B  $x+4$
- C  $3-x$
- D  $3+x$

81. What is the solution set of  $10x^2 - x - 3 = 0$ ?

- A  $\left\{\frac{-1}{2}, \frac{3}{5}\right\}$
- B  $\left\{\frac{-3}{5}, \frac{1}{2}\right\}$
- C  $\left\{\frac{-3}{2}, \frac{1}{5}\right\}$
- D  $\left\{\frac{-1}{5}, \frac{3}{2}\right\}$

82. A rectangular prism has a volume of 120 cubic inches. The length of the prism is 5 inches, the width is  $(x-2)$  inches, and the height is  $(x+3)$  inches. What are the width and height of the prism?

- A width: 3 in., height: 8 in.
- B width: 4 in., height: 6 in.
- C width: 6 in., height: 4 in.
- D width: 8 in., height: 3 in.

83. What is  $(3x^5 - 15x^4 + 4x^3 + 11x^2 - 9x + 2)$  divided by  $(x^2 - 5x + 2)$ ?

- A  $(3x^3 - 2x + 1)$
- B  $(3x^3 - 2x^2 + 7)$
- C  $(3x^3 - 2x^2 + 7x + 26)$
- D  $(3x^3 - 30x^2 + 160x - 849)$

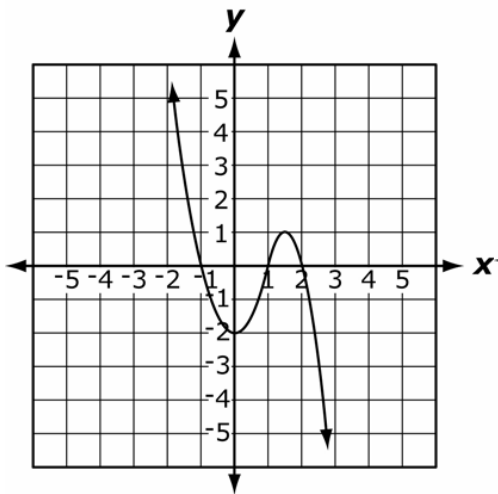
Objective 2.6b

84. In which direction does the graph of the parabola  $x = -y^2$  open?

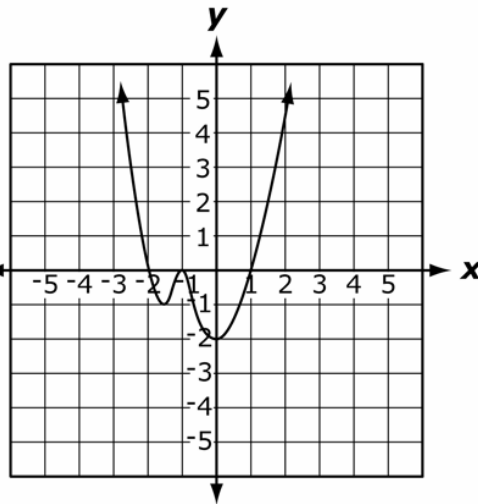
- A up
- B left
- C right
- D down

85. What is the graph of the polynomial  $y = x^3 + 2x^2 - x - 2$ ?

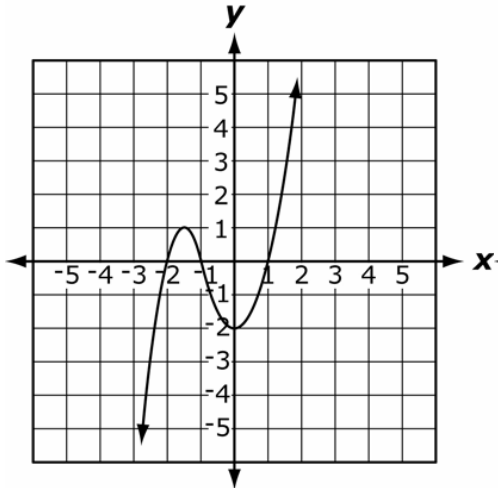
A



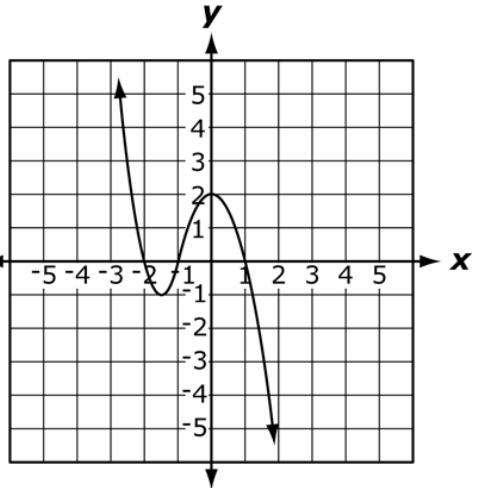
B



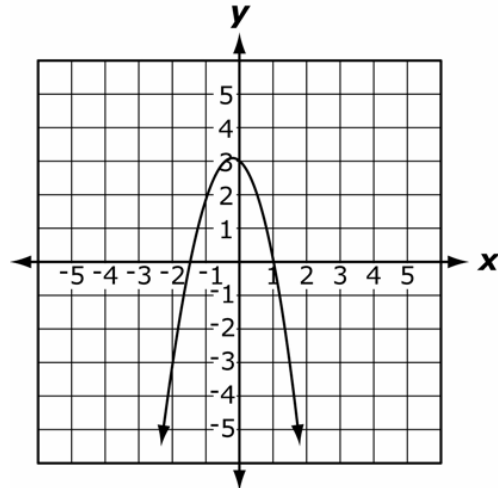
C



D



86. Which function is represented by this graph?



- A  $f(x) = 2x^2 - x + 3$
- B  $f(x) = -2x^2 - x + 3$
- C  $f(x) = 2x^2 - 3x + 1$
- D  $f(x) = -2x^2 - 3x + 1$

87. Which statement describes the characteristics of the graph of  $f(x) = -5x^4 + 3x^2 + x - 2$ ?

- A The graph primarily increases in the third quadrant and increases in the first quadrant.
- B The graph primarily decreases in the second quadrant and increases in the first quadrant.
- C The graph primarily increases in the third quadrant and decreases in the fourth quadrant.
- D The graph primarily decreases in the second quadrant and decreases in the fourth quadrant.

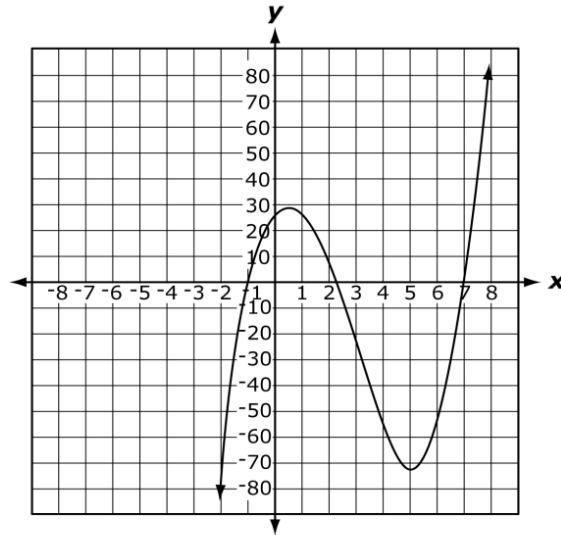
Objective 2.6c

88. What is the y-intercept of the graph of  $y = -4x^2 + 2x - 3$ ?

- A -3
- B 3
- C -4
- D 4

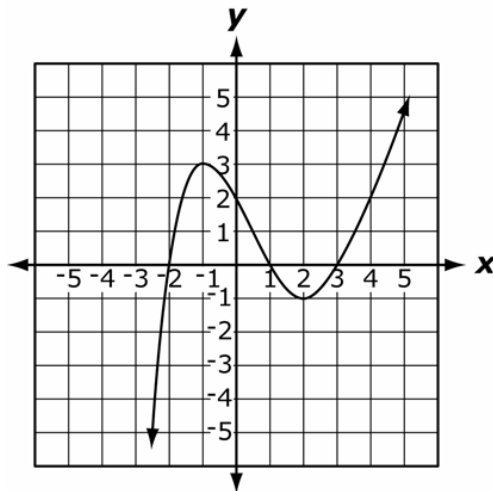


89. What are the x- and y-intercepts of this graphed function?



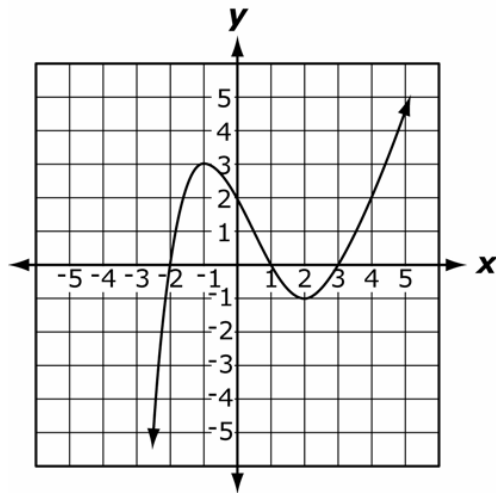
- A x-intercepts:  $(-1, 0)$ ,  $(2.3, 0)$ ,  $(7, 0)$ ; y-intercepts:  $(0, 28)$
- B x-intercepts:  $(-0, 28)$ ; y-intercepts:  $(-1, 0)$ ,  $(2.3, 0)$ ,  $(7, 0)$
- C x-intercepts:  $(1, 0)$ ,  $(-2.3, 0)$ ,  $(-7, 0)$ ; y-intercepts:  $(0, 28)$
- D x-intercepts:  $(0, 28)$ ; y-intercepts:  $(1, 0)$ ,  $(-2.3, 0)$ ,  $(-7, 0)$

90. What is the set of x-intercepts of this graphed function?



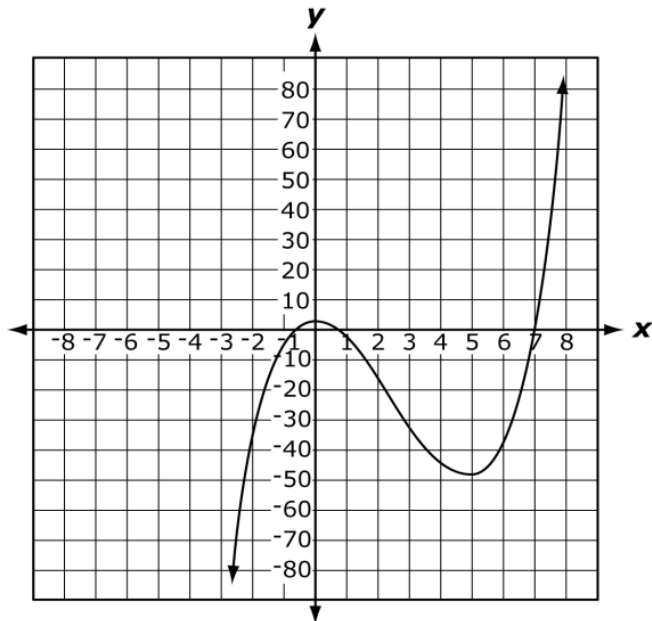
- A  $\{2\}$
- B  $\{-1, 2\}$
- C  $\{-1, 3\}$
- D  $\{-2, 1, 3\}$

91. What is the set of approximate y-values of the relative minimum and maximum of this graphed function?



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

92. What are the properties of the point (0, 3) in this graphed function?



- A It is a relative minimum and an x-intercept.
- B It is a relative maximum and an x-intercept.
- C It is a relative minimum and an y-intercept.
- D It is a relative maximum and an y-intercept.

Objective 2.6

93. The intensity,  $L$ , of light varies inversely with the square of the distance,  $r$ , from the source of the light. Given that  $k$  is the constant of proportionality, which equation describes this relationship?

A  $L = 2kr$

B  $L = \frac{k}{r^2}$

C  $L = k\sqrt{r}$

D  $L = kr^2$

94. A company is selling an item and determines that the profit from selling the item for a price of  $x$  dollars is given by the function below.

$$P(x) = \frac{-1}{4}(x-16)^2 + 4$$

Which price will maximize the profit?

A \$4

B \$12

C \$16

D \$20

95. The path of a kicked soccer ball can be modeled by the function  $f(x) = 26 + 2x - x^2$ , where  $x$  is the horizontal distance (in meters) and  $f(x)$  is the height (in meters). If the height is 2 meters, what is the horizontal distance?

A 4 meters

B 6 meters

C 12 meters

D 24 meters

96. A landscape designer has to construct a rectangular flower bed with a perimeter of 100 feet and the maximum possible area. What is the area of the flower bed?

A 25 sq. ft

B 100 sq. ft

C 625 sq. ft

D 2,500 sq. ft

Objective 2.7a

97. What is the value of  $x$  in this rational equation  $\frac{2}{x-1} = \frac{3}{x+1}$ ?

A 2

B 3

C 4

D 5

98. What is the solution set of this rational equation  $\frac{5}{2x-2} - \frac{9}{2x} = \frac{-1}{4}$ ?

- A {6}
- B {-3}
- C {3, 6}
- D {-3, -6}

99. What is the value of  $x$  in this rational equation  $2x = \frac{4x+5}{3}$ ?

- A -4
- B -1
- C  $\frac{1}{2}$
- D  $\frac{5}{2}$

100. What is the solution set of this rational equation  $\frac{-3}{x^2} + \frac{1}{2} = \frac{1}{2x}$ ?

- A {-3, -2}
- B {-3, 2}
- C {-2, 3}
- D {2, 3}

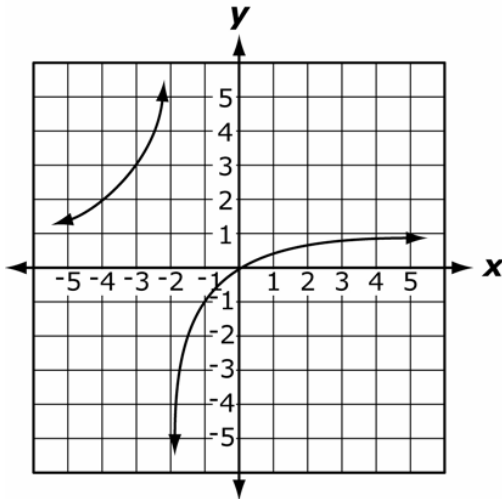
Objective 2.7b

101. What is the vertical asymptote of the graph of  $f(x) = \frac{1}{x+4}$ ?

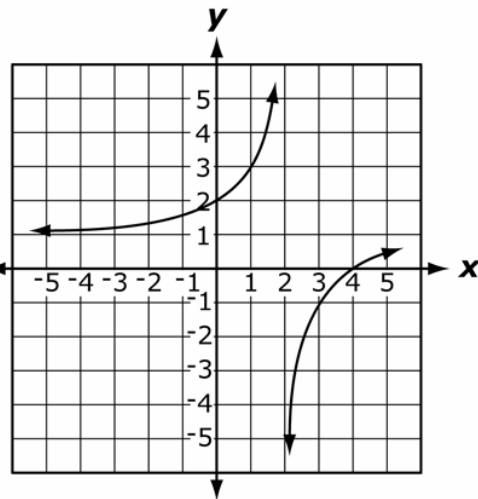
- A  $x = -4$
- B  $x = -1$
- C  $x = 1$
- D  $x = 4$

102. What is the graph of the function  $f(x) = \frac{x}{x-2}$ ?

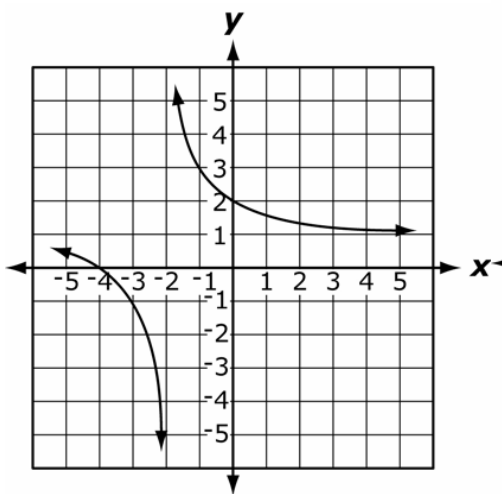
A



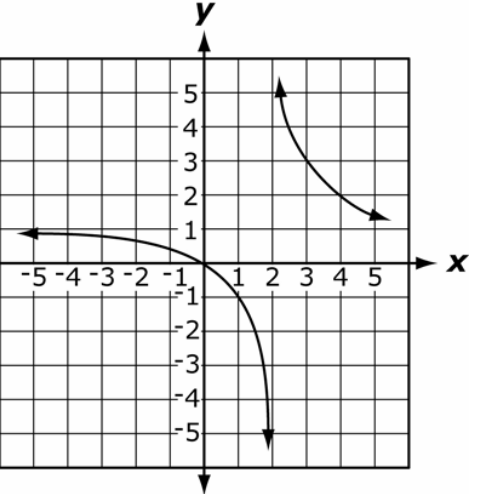
B



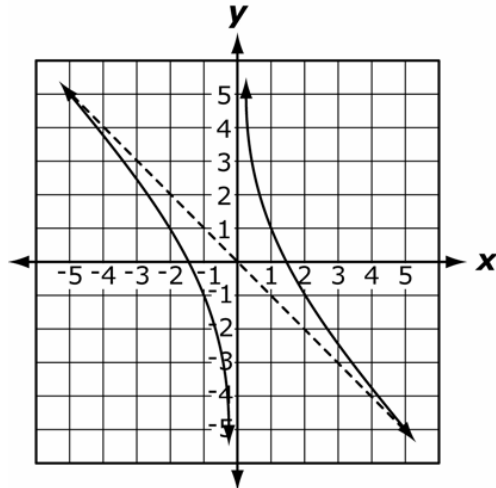
C



D



103. Which function is represented by this graph?



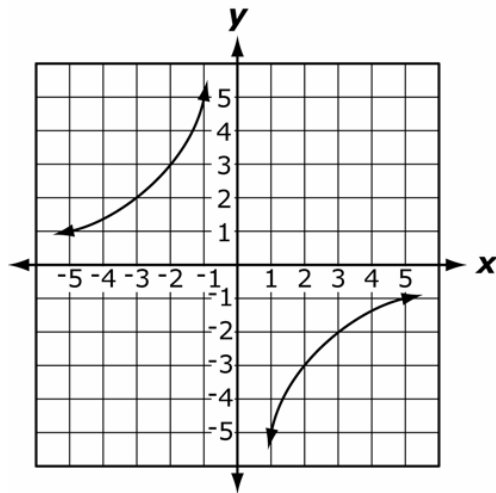
- A  $f(x) = \frac{-2+x^2}{x}$
- B  $f(x) = \frac{-2-x^2}{x}$
- C  $f(x) = \frac{2-x^2}{x}$
- D  $f(x) = \frac{2+x^2}{x}$

104. How many vertical asymptotes does the graph of  $y = \frac{x-2}{x^2+4}$  have?

- A 0 vertical asymptotes
- B 1 vertical asymptote
- C 2 vertical asymptotes
- D 4 vertical asymptotes

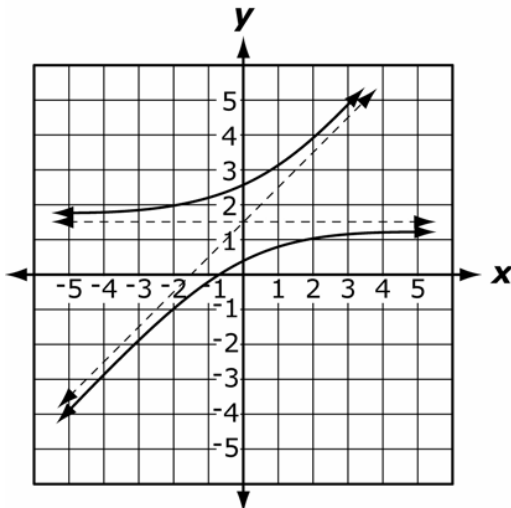
Objective 2.7c

105. What is the horizontal asymptote of this graph?



- A  $x = 0$
- B  $y = 0$
- C  $x = 2.5$
- D  $y = 2.5$

106. Which statement correctly describes the asymptotes of the graph of this rational function?



- A The vertical asymptote is  $x = \frac{3}{2}$ , and there is a negative slant asymptote.
- B The vertical asymptote is  $y = \frac{3}{2}$ , and there is a negative slant asymptote.
- C The horizontal asymptote is  $x = \frac{3}{2}$ , and there is a positive slant asymptote.
- D The horizontal asymptote is  $y = \frac{3}{2}$ , and there is a positive slant asymptote.

107. How many x-intercepts does the graph of  $y = \frac{x+1}{x^2-1}$  have?
- A 0
  - B 1
  - C 2
  - D 4

108. What are the vertical and horizontal asymptotes of  $f(x) = \frac{x^2-9}{16-x^2}$ ?
- A  $x = \pm 4$ , and  $y = -1$
  - B  $y = \pm 4$ , and  $x = -1$
  - C  $x = \pm 4$ , and  $y = 1$
  - D  $y = \pm 4$ , and  $x = 1$

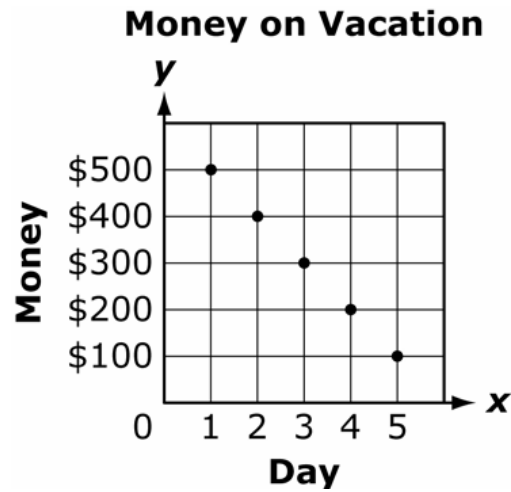
Objective 2.7d

109. If the surface area of a closed cylinder is 25 square inches, which equation represents the height of the cylinder in terms of  $r$ ?  
( $SA = 2\pi rh + 2\pi r^2$ )
- A  $h = \frac{25 + 2\pi r^2}{2\pi r}$
  - B  $h = \frac{25 - 2\pi r^2}{2\pi r}$
  - C  $h = 25 + r$
  - D  $h = 25 - r$
110. A homeowner stocked his pond with fish. The number of fish,  $F$ , increases according to the equation,  $F = \frac{19(3+2t)}{1+0.05t}$ , where  $t$  is the time in years. What is the approximate number of fish after 10 years?
- A 49 fish
  - B 69 fish
  - C 138 fish
  - D 291 fish
111. The cost,  $C$ , in thousands of dollars, to remove  $x$  percent of the trash left by a tornado is modeled by the equation  $C = \frac{450x}{225-x}$ . Approximately what percent of trash will be removed if 100 thousand dollars are spent?
- A 41%
  - B 50%
  - C 59%
  - D 64%



Objective 3.1a

112. Nancy made a scatter plot of how much money she had left at the end of each day of her vacation.



Which table best represents the data in her scatter plot?

A

Day	1	2	3	4	5
Money	\$100	\$100	\$100	\$100	\$100

B

Day	1	2	3	4	5
Money	\$100	\$200	\$300	\$400	\$500

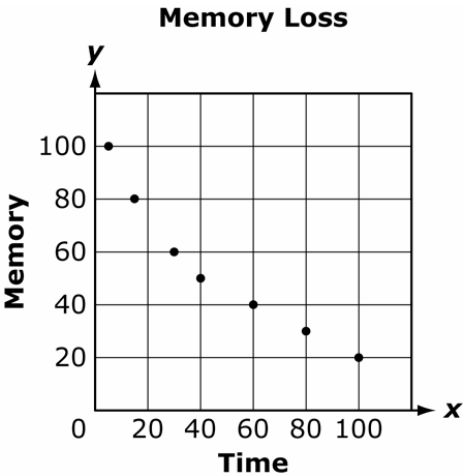
C

Day	1	2	3	4	5
Money	\$500	\$200	\$300	\$400	\$100

D

Day	1	2	3	4	5
Money	\$500	\$400	\$300	\$200	\$100

113. Which set of data best represents the data on the scatter plot?



- A
 

Time	10	30	60	80	100
Memory	95	60	40	30	20
  
- B
 

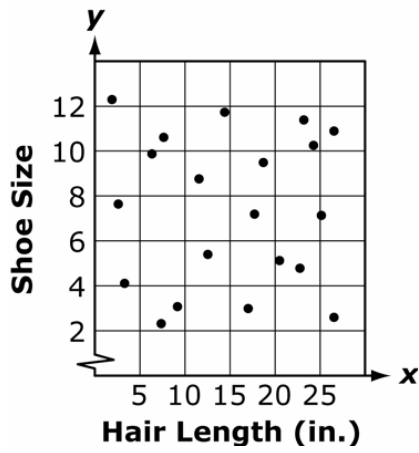
Time	10	30	60	80	100
Memory	20	30	40	60	95
  
- C
 

Time	10	30	60	80	100
Memory	100	80	60	40	20
  
- D
 

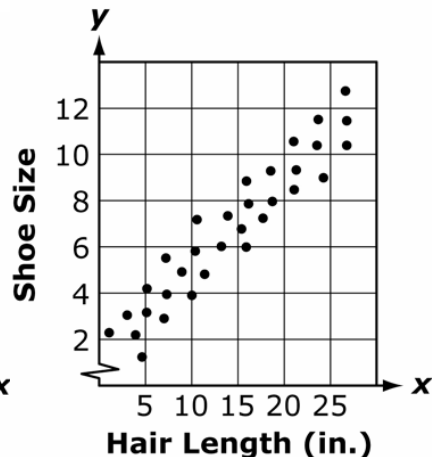
Time	10	30	60	80	100
Memory	85	60	50	40	20

114. Which scatter plot best represents the lack of correlation between shoe size and hair length?

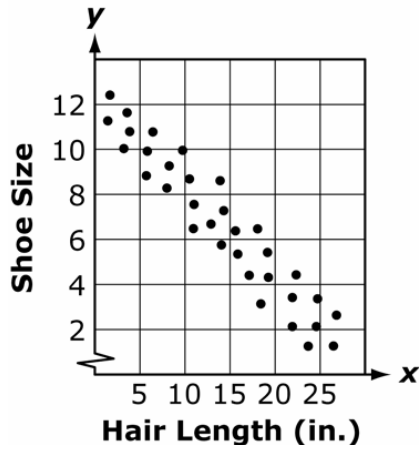
A



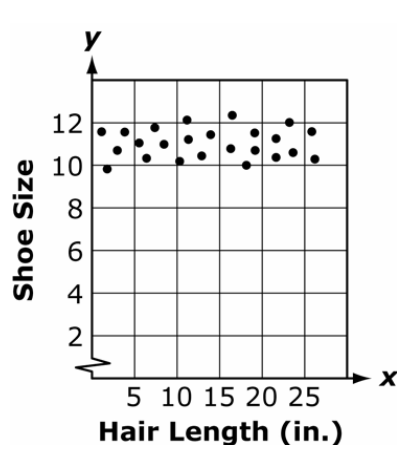
B



C

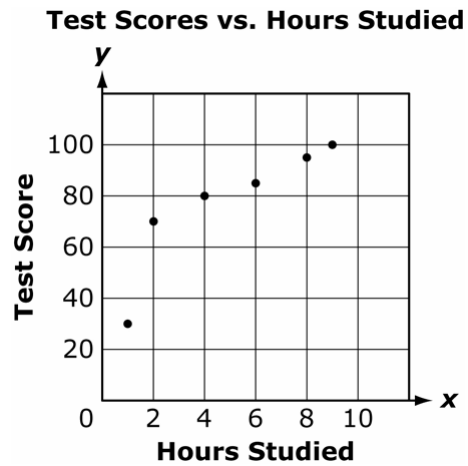


D



objective 3.1b

115. The test scores and hours studied of 6 students were put into a scatter plot.



If another student studies 2 hours, what is the most likely test score based on this data?

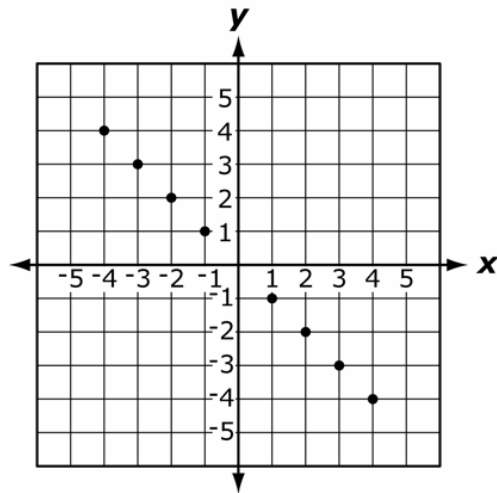
- A 20
- B 60
- C 70
- D 80

116. Which of these observations would be consistent with an exponential model of population growth?

- A The population started out large, decreased in size, then became large again.
- B The population is observed to increase at a faster rate as time passes.
- C The population is observed to increase steadily over time.
- D The population grew very quickly but then declined.

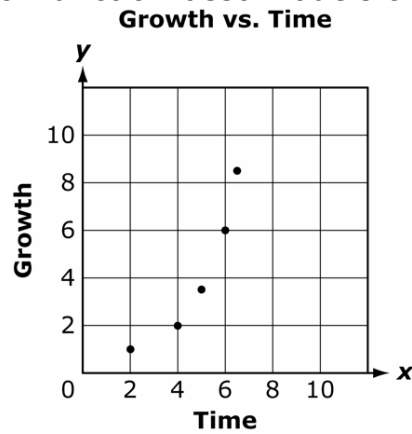
Objective 3.1c

117. Which equation most closely models the data in the scatter plot?



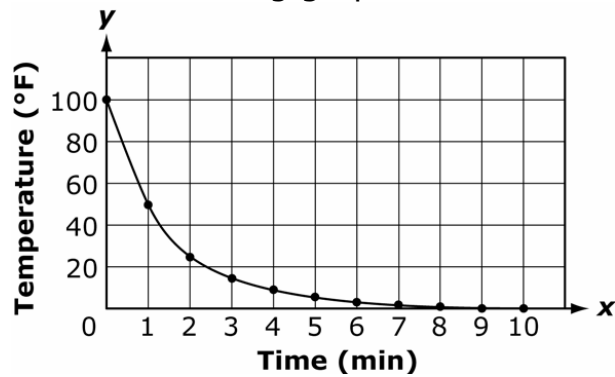
- A  $y = x$
- B  $y = -x$
- C  $y = 2x$
- D  $y = -2x$

118. Which type of function best models the data in this scatter plot?



- A exponential
- B logarithmic
- C quadratic
- D linear

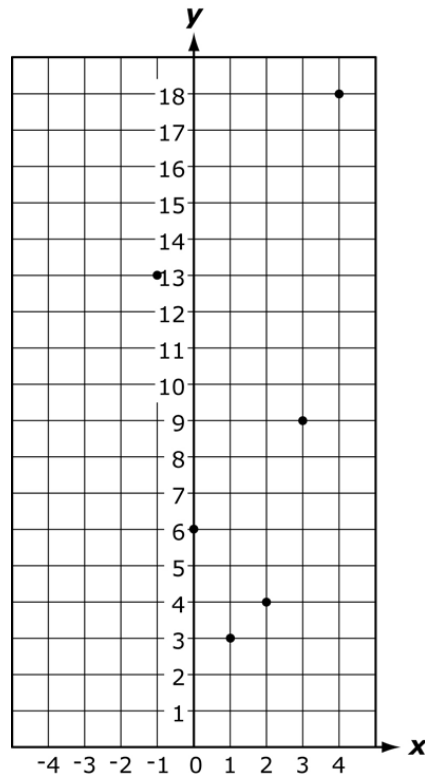
119. Students in a science classroom perform an experiment to find the rate at which a hot liquid cools in a freezer. They plot the temperature over time and obtain the following graph.



Which type of function best models the data in this scatter plot?

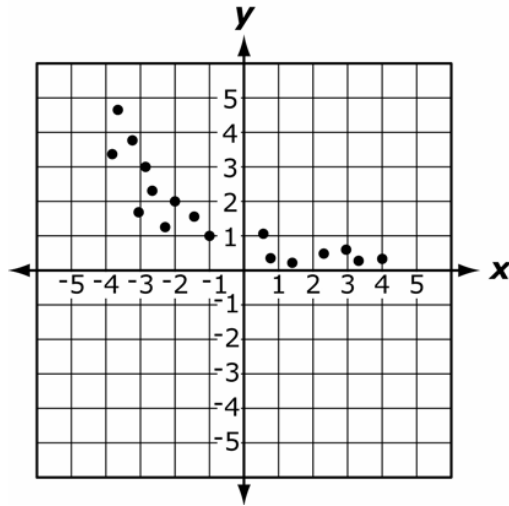
- A exponential
- B logarithmic
- C quadratic
- D linear

120. Which equation most closely models the data in the scatter plot?



- A  $y = x^2 - 4x + 6$
- B  $y = -x^2 - 2x + 6$
- C  $y = -2x^2 - x + 6$
- D  $y = 2x^2 - 5x + 6$

121. Which equation best models the data in this scatter plot?



- A  $y = 5 \cdot 3^x$
- B  $y = 0.5 \cdot 3^x$
- C  $y = 5 \cdot 0.5^x$
- D  $y = 0.5 \cdot 5^x$

Objective 3.3

122. What is the 12<sup>th</sup> term in the sequence  $\{1, 3, 5, 7, \dots\}$ ?

Arithmetic Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 + (n-1)d$$

$$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$$

Geometric Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 r^{(n-1)}$$

$$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$$

- A 22
- B 23
- C 24
- D 25

123. What is the sum of the first 6 terms of the series  $2+10+50+\dots$ ?

Arithmetic Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 + (n-1)d$$

$$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$$

Geometric Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 r^{(n-1)}$$

$$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$$

- A 3,906
- B 7,812
- C 15,624
- D 31,248

124. A child puts \$1.00 into a piggy bank. One week later, he puts \$1.25 in the bank. Two weeks later, he puts \$1.50 in the bank, and so on. How much money does he put in the bank on the 25<sup>th</sup> week?

Arithmetic Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 + (n-1)d$$

$$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$$

Geometric Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 r^{(n-1)}$$

$$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$$

- A \$ 6.25
- B \$7.00
- C \$93.00
- D \$100.00



125. What is the value of  $x$  in the geometric sequence  $\left\{x, -\frac{1}{2}, \frac{1}{8}, \frac{-1}{32}, \dots\right\}$ ?

**Arithmetic Sequences & Series**  
 $n^{\text{th}} \text{ term: } a_n = a_1 + (n-1)d$   
 Sum:  $s_n = \frac{n}{2}(a_1 + a_n)$

**Geometric Sequences & Series**  
 $n^{\text{th}} \text{ term: } a_n = a_1 r^{(n-1)}$   
 Sum:  $s_n = \frac{a_1(1-r^n)}{(1-r)}$

- A -4
- B -2
- C 2
- D  $\frac{9}{2}$

126. Which formula could be used to find the sum of an arithmetic series if the last term is unknown?

**Arithmetic Sequences & Series**  
 $n^{\text{th}} \text{ term: } a_n = a_1 + (n-1)d$   
 Sum:  $s_n = \frac{n}{2}(a_1 + a_n)$

**Geometric Sequences & Series**  
 $n^{\text{th}} \text{ term: } a_n = a_1 r^{(n-1)}$   
 Sum:  $s_n = \frac{a_1(1-r^n)}{(1-r)}$

- A  $s_n = \frac{n}{2}(2a_1 + (n-1)d)$
- B  $s_n = \frac{n}{2}(2a_1 + (n+1)d)$
- C  $s_n = n(2a_1 + (n-1)d)$
- D  $s_n = n(2a_1 + (n+1)d)$

127. In an arithmetic sequence beginning with 36 and ending with 405, how many integers are divisible by 9?

Arithmetic Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 + (n-1)d$$

$$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$$

Geometric Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 r^{(n-1)}$$

$$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$$

- A 41 integers  
B 42 integers  
C 44 integers  
D 45 integers
128. How many terms are there in a geometric series if the first term is 3, the common ratio is 4, and the sum of the series is 1,023?

Arithmetic Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 + (n-1)d$$

$$\text{Sum: } s_n = \frac{n}{2}(a_1 + a_n)$$

Geometric Sequences & Series

$$n^{\text{th}} \text{ term: } a_n = a_1 r^{(n-1)}$$

$$\text{Sum: } s_n = \frac{a_1(1-r^n)}{(1-r)}$$

- A 4 terms  
B 5 terms  
C 6 terms  
D 23 terms

## Answers

- |       |       |        |
|-------|-------|--------|
| 1. D  | 45. A | 89. A  |
| 2. B  | 46. B | 90. D  |
| 3. A  | 47. B | 91. C  |
| 4. A  | 48. B | 92. D  |
| 5. B  | 49. C | 93. B  |
| 6. B  | 50. A | 94. C  |
| 7. B  | 51. D | 95. B  |
| 8. A  | 52. B | 96. C  |
| 9. C  | 53. B | 97. D  |
| 10. A | 54. A | 98. C  |
| 11. A | 55. C | 99. D  |
| 12. B | 56. B | 100. C |
| 13. D | 57. D | 101. A |
| 14. C | 58. A | 102. D |
| 15. C | 59. B | 103. C |
| 16. D | 60. D | 104. A |
| 17. D | 61. B | 105. B |
| 18. D | 62. A | 106. D |
| 19. C | 63. B | 107. A |
| 20. D | 64. C | 108. A |
| 21. A | 65. A | 109. B |
| 22. B | 66. A | 110. D |
| 23. B | 67. A | 111. A |
| 24. D | 68. C | 112. D |
| 25. A | 69. A | 113. A |
| 26. D | 70. B | 114. A |
| 27. D | 71. B | 115. C |
| 28. D | 72. B | 116. B |
| 29. C | 73. D | 117. B |
| 30. B | 74. B | 118. A |
| 31. D | 75. B | 119. A |
| 32. B | 76. A | 120. D |
| 33. C | 77. C | 121. C |
| 34. B | 78. A | 122. B |
| 35. A | 79. B | 123. B |
| 36. A | 80. B | 124. B |
| 37. C | 81. A | 125. C |
| 38. A | 82. A | 126. A |
| 39. A | 83. A | 127. A |
| 40. B | 84. B | 128. B |
| 41. B | 85. C |        |
| 42. C | 86. B |        |
| 43. B | 87. C |        |
| 44. D | 88. A |        |