Name:_____ Class:_____ Date:_____

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Indicate the answer choice that best completes the statement or answers the question.

1. Which statement is true for the graph of $f(x) = 2x^3 - 6x^2 - 48x + 24$? (Answer B)

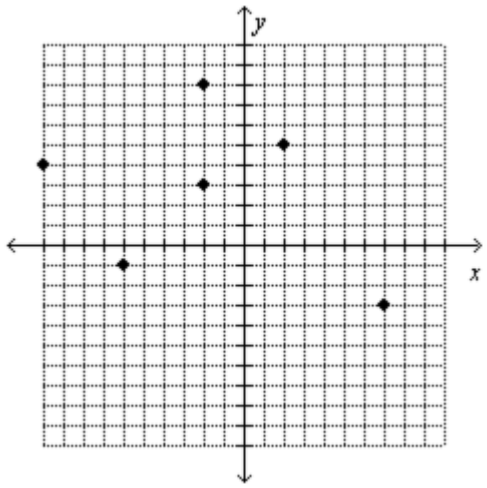
   a. (4, –140) is a relative minimum; (–2, 77) is a relative maximum
   b. (4, –136) is a relative minimum; (–2, 80) is a relative maximum
   c. (–2, 80) is a relative minimum; (4, –136) is a relative maximum
   d. (–2, 77) is a relative minimum; (4, –140) is a relative maximum

2. Which statement best describes how a graph of $y = 3|x|$ is related to the parent graph?A

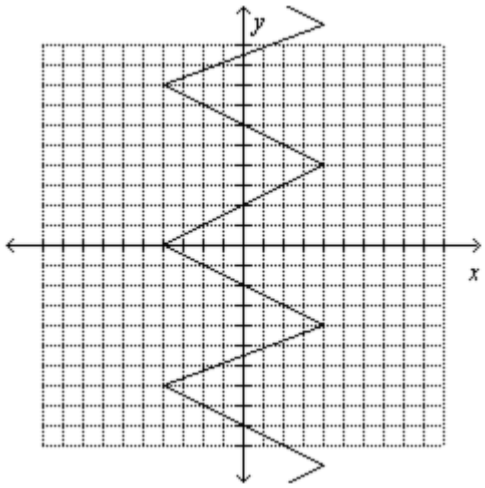
   a. The graph is stretched vertically.
   b. The graph is stretched horizontally.
   c. The graph is shrunk vertically.
   d. The graph is shrunk horizontally.

3. Which of the following graphs is a function?D

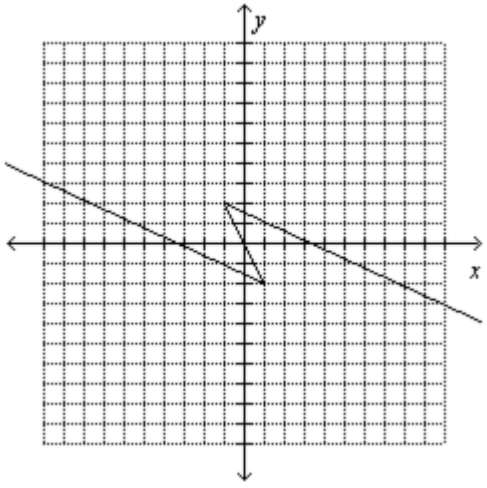
a.



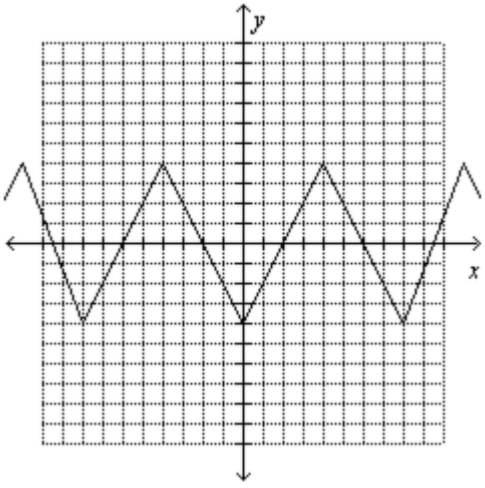
b.



c.



d.



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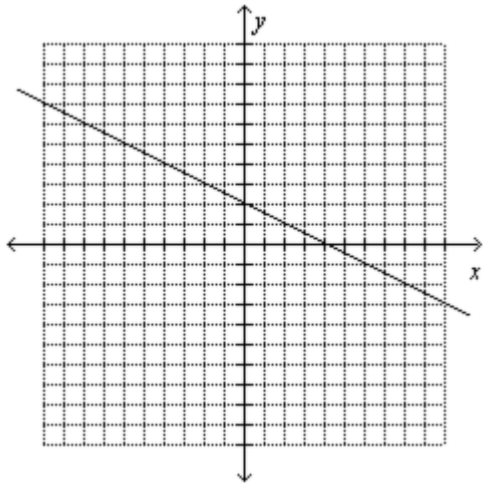
4. One of the following functions is neither odd nor even. Which one?C

a. $x^9 + 5x^5 + 10x$ b. $10x^4 - |x^4| + 5$

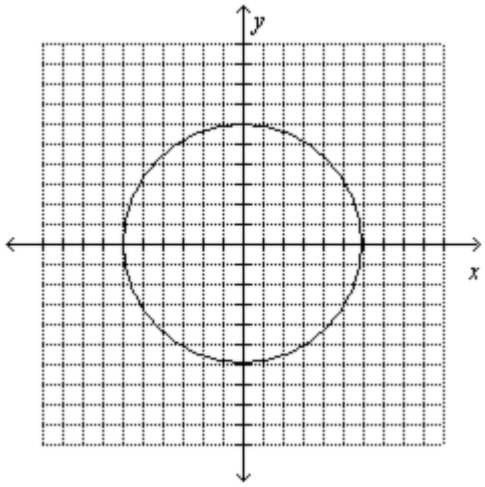
c. $x^4 + 5x + 5 + |x - 5|$ d. $x^5 + 5x$

5. Which of the following graphs is a function?A

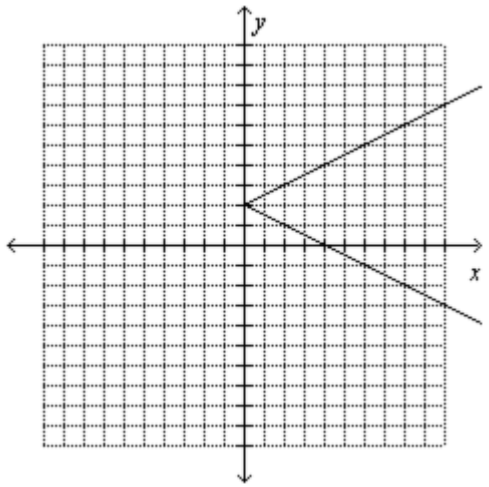
a.



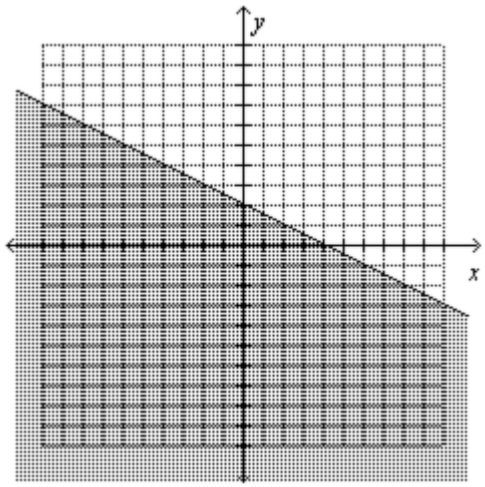
b.



c.



d.



6. Identify the function for which an inverse function exists.C

a. $f(x) = 5x^2 - 3$ b. $f(x) = |x - 1|$

c. $f(x) = \sqrt{x + 2}$ d. $f(x) = [[x + 5]]$

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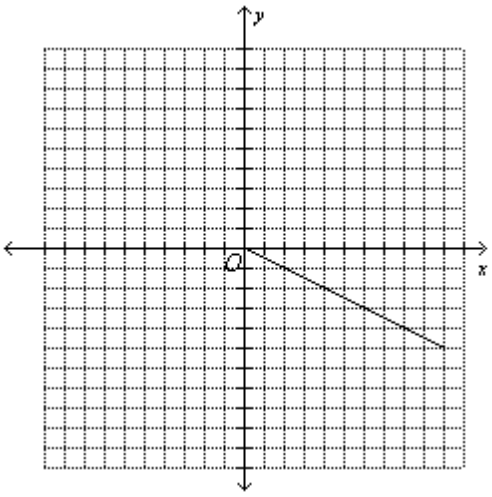
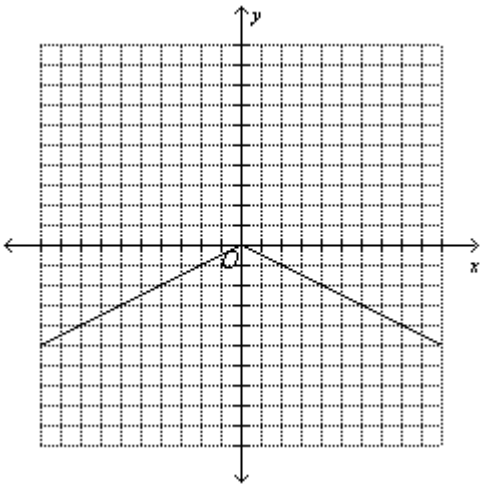
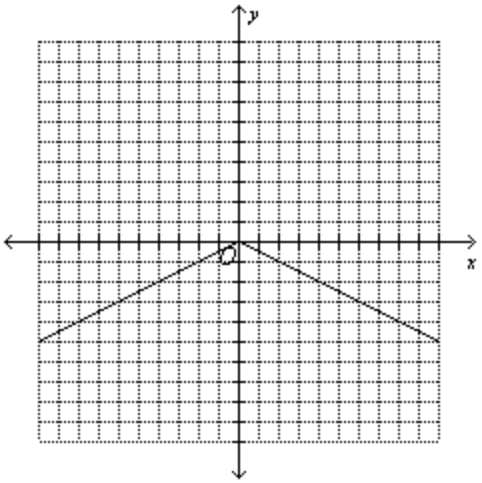
7. The graph below is a portion of a complete graph. Which graph below is the complete graph assuming it is an even function?C



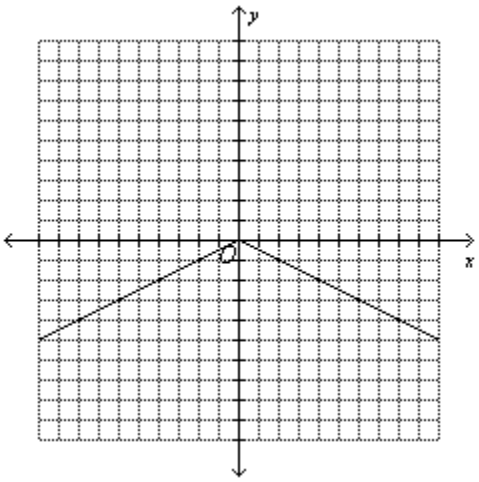
a.



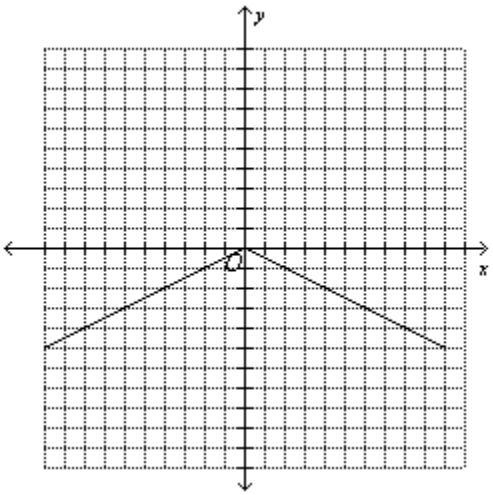
b.



c.



d.



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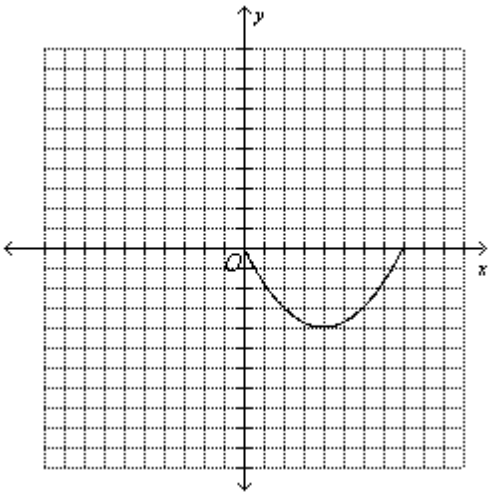
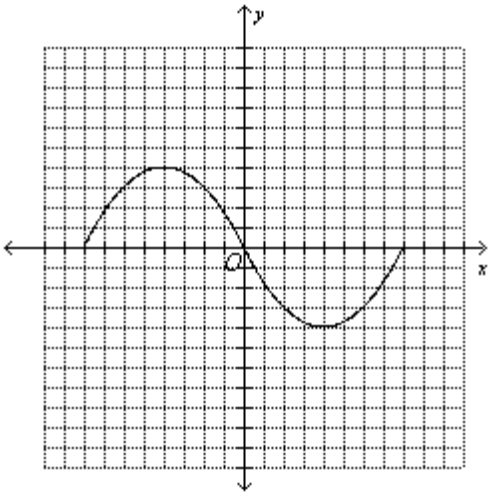
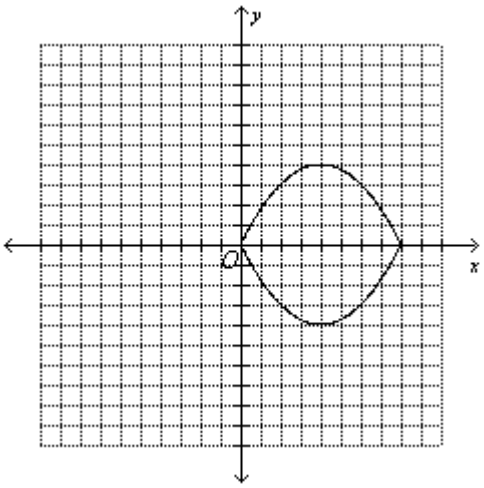
8. The graph below is a portion of a complete graph. Which graph below is the complete graph assuming it is an even function?D



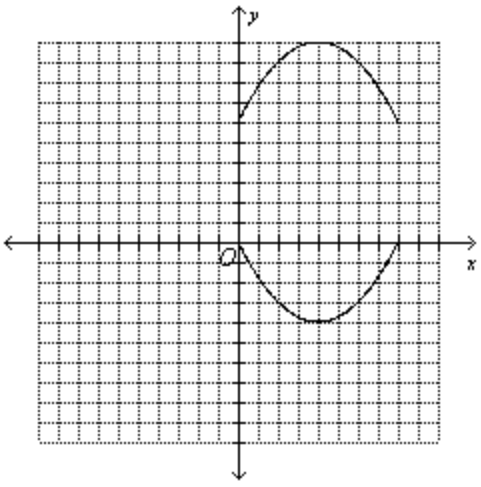
a.



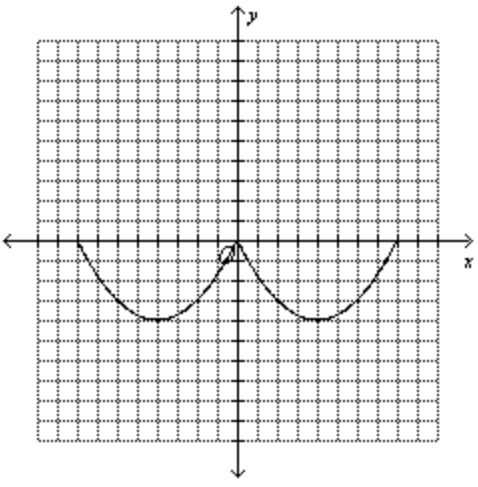
b.



c.



d.



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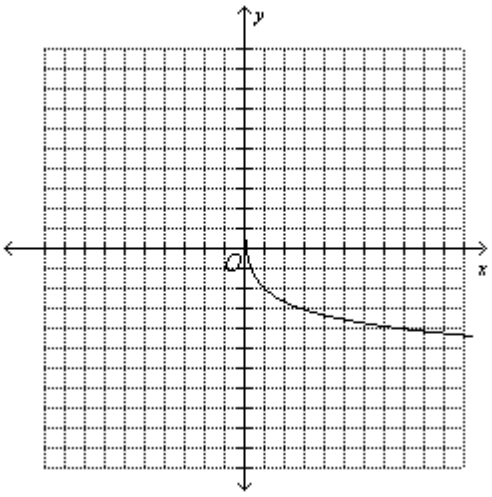
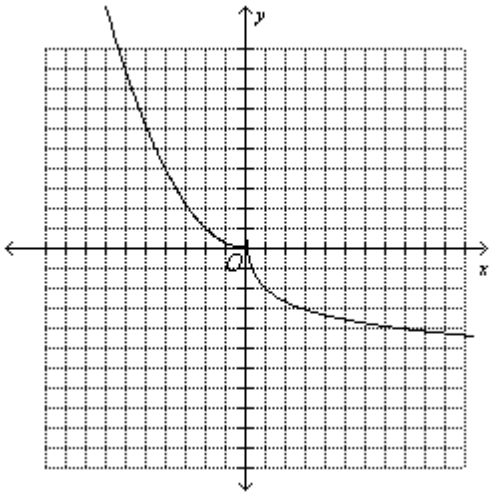
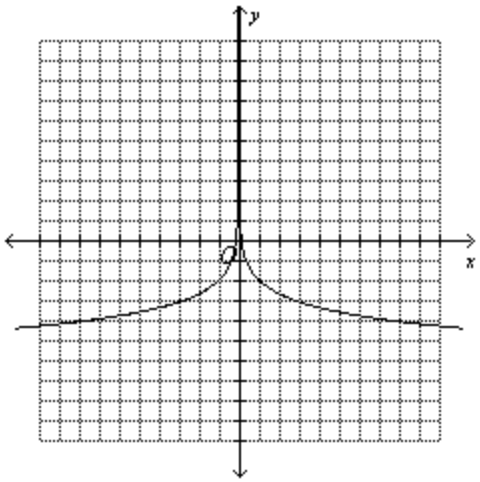
9. The graph below is a portion of a complete graph. Which graph below is the complete graph assuming it is an even function?B



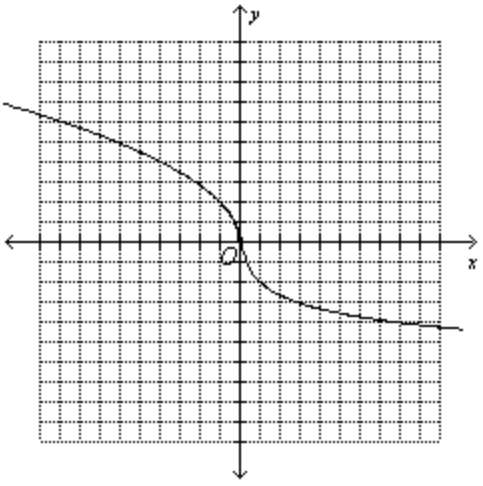
a.



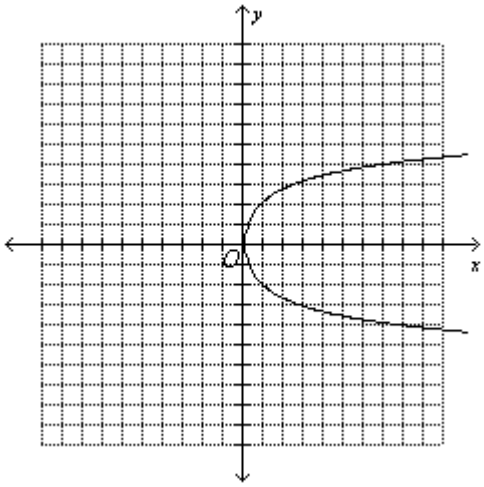
b.



c.



d.



10. Use the domain and range of each of the following relations to determine which is a function.B

a. {(–4, 3), (–2, –1), (–4, 8)}
b. {(–4, 3), (–2, –1), (–7, 8)}
c. {–4, –2, –7, 7}
d. {(–4, 3), (–2, –1), (–2, –8), (–7, 8)}

Which statement best describes a method that can be used to sketch the graph.

11. $y = |x + 1|$ C

a. Translate the graph of $y = |x|$ one unit up.
b. Translate the graph of $y = |x|$ one unit down.
c. Translate the graph of $y = |x|$ one unit left.
d. Translate the graph of $y = |x|$ one unit right.

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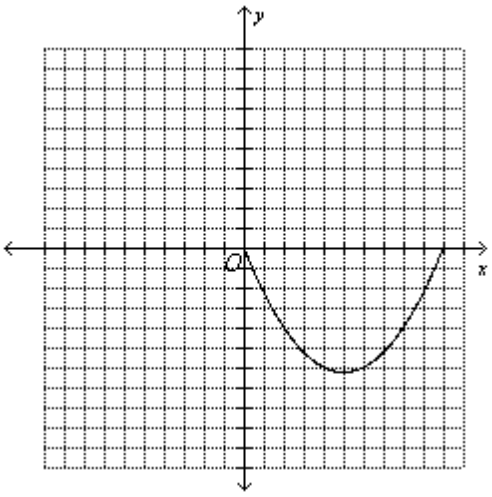
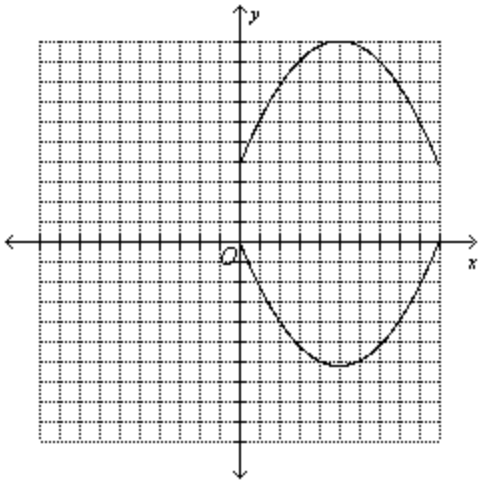
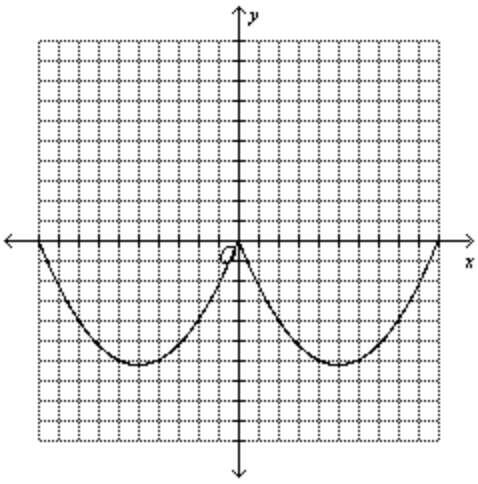
12. The graph below is a portion of a complete graph. Which graph below is the complete graph assuming it is an even function? B



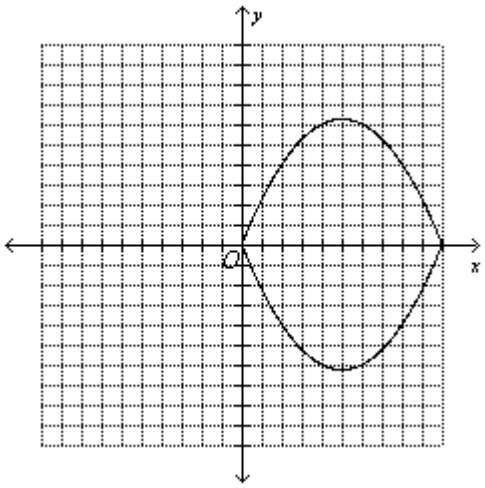
a.



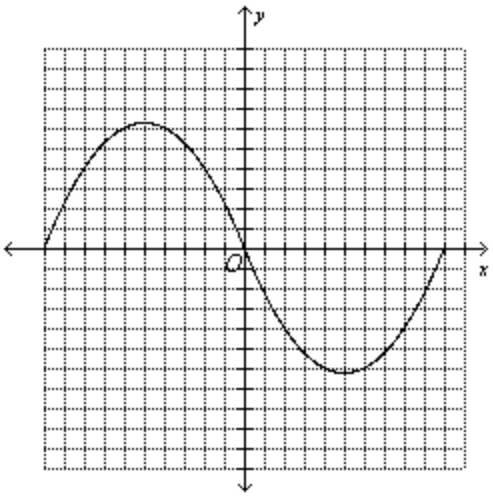
b.



c.



d.



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13. Which statement best describes how a graph of $y = 3|x|$ is related to the parent graph?A

a. The graph is stretched vertically. b. The graph is stretched horizontally.
c. The graph is shrunk vertically. d. The graph is shrunk horizontally.

14. The graph of the equation $y = x^2 - 9$ is symmetric with respect to which of the following?D

a. the line $y = x$ b. the line $y = -x + 9$
c. the x-axis d. the y-axis

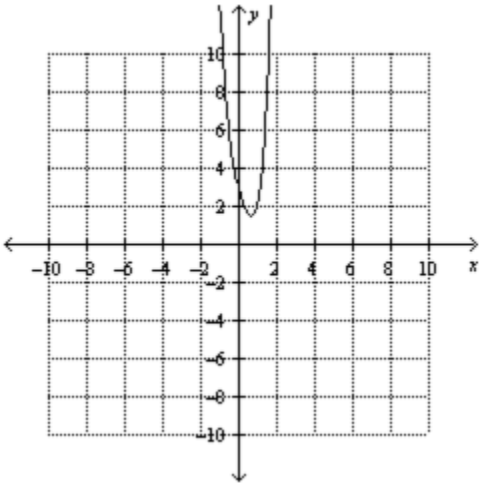
15. ACME Company's expected sales can be modeled by $g(t) = t^3 - 4t^2 + 4t - 4$, where $g(t)$ is measured in thousands of dollars and t is the number of years after 2013. Find the average rate of change in expected sales from 2014 to 2020.B

a. –$29,000 b. $29,000
c. $24,000 d. $174,000

16. Find the average rate of change of $f(x) = \frac{x-5}{x+8}$ on [4, 10]. Round your answer to the nearest hundredth.B

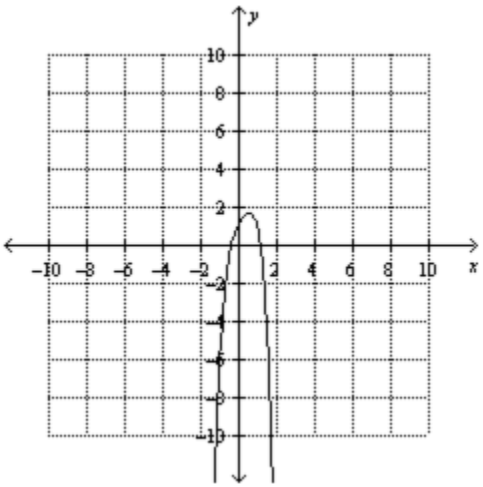
a. 0.05 b. 0.06
c. –0.06 d. 0.36

17. Use the graph of $f(x)$ to estimate $f(1)$.B



a. $f(1) = 3$ b. $f(1) = 2$
c. $f(1) = –2$ d. $f(1) = 1$

18. Use the graph of $f(x)$ to estimate $f(-1)$.C



a. $f(-1) = 7$ b. $f(-1) = -8$
c. $f(-1) = -7$ d. $f(-1) = -6$

19. Given $f(x) = 7x^2$, find $f^{-1}(x)$. Then state whether $f^{-1}(x)$ is a function.A

a. $y = \pm\left(\frac{x}{7}\right)^{\frac{1}{2}}$; $f^{-1}(x)$ is not a function.

b. $y = \pm\left(\frac{x}{7}\right)^{2}$; $f^{-1}(x)$ is not a function.

c. $y = \pm\left(\frac{x}{7}\right)^{\frac{1}{2}}$; $f^{-1}(x)$ is a function.

d. $y = \pm\left(\frac{x}{7}\right)^{2}$; $f^{-1}(x)$ is a function.

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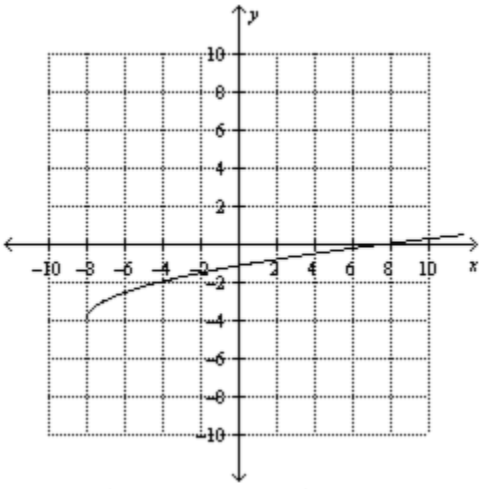
20. Use the graph below to identify the *y*-intercept and zeros.C



a. *y*-intercept: 8No *y*-intercept
zero: − 1.17

b. *y*-intercept: –1.17
zeros: 8 and − 24

c. *y*-intercept: –1.17
zero: 8No zeros

d. *y*-intercept: –1.17
zero: − 24

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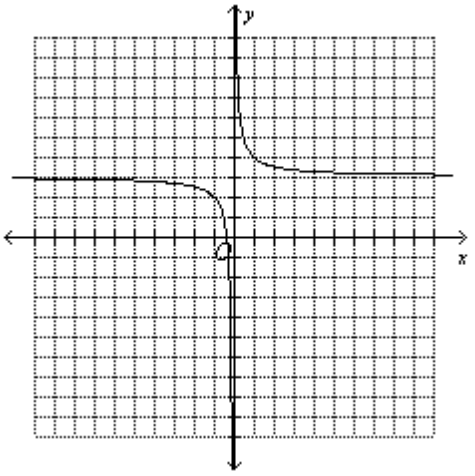
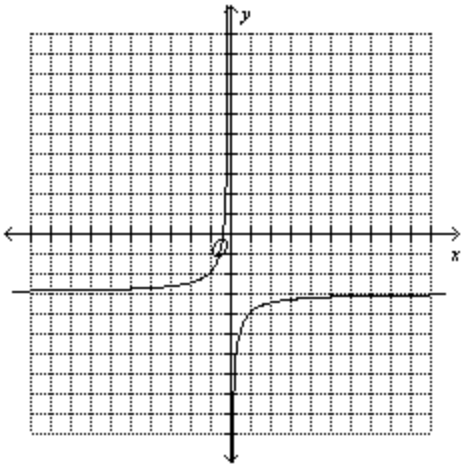
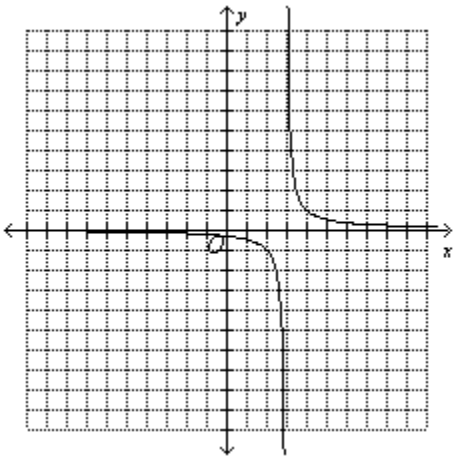
21. The graph of a function *f* is illustrated below. What is the graph of the inverse function of *f*?B



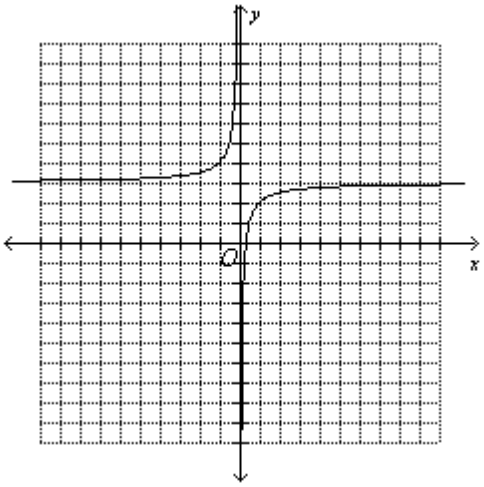
a.



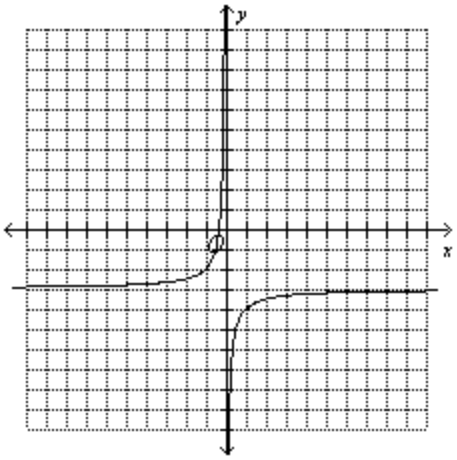
b.



c.



d.



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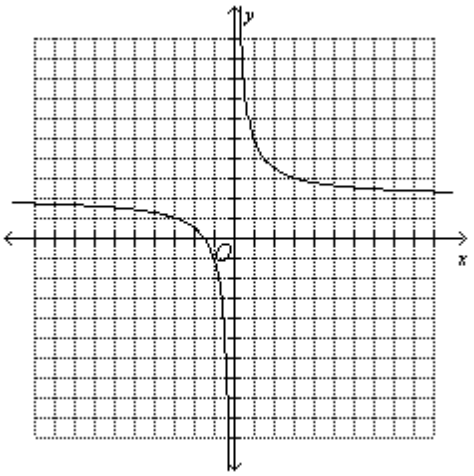
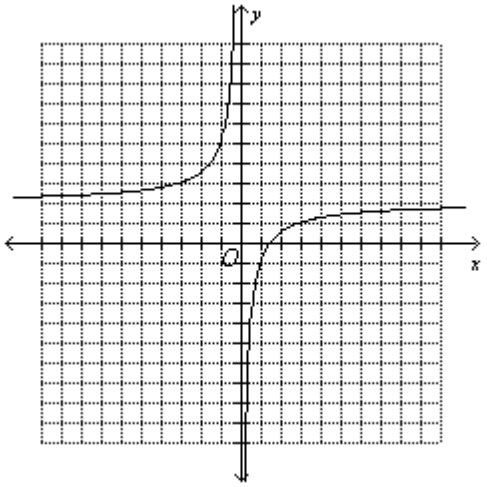
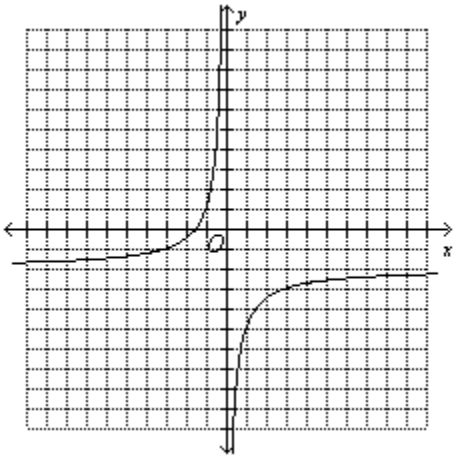
22. The graph of a function *f* is illustrated below. What is the graph of the inverse function of *f*?C



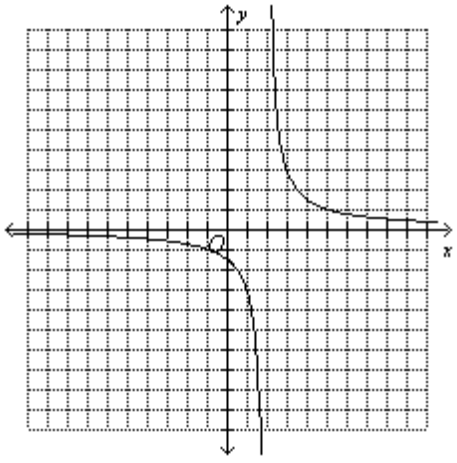
a.



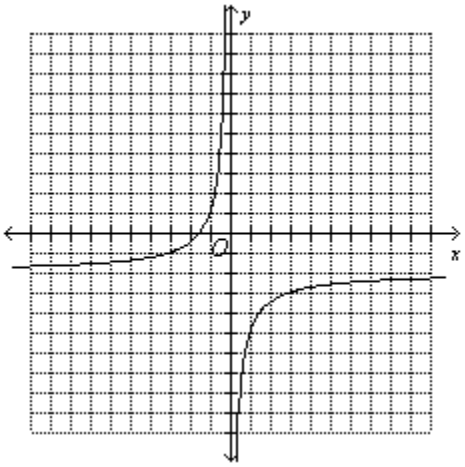
b.



c.



d.



23. Find the average rate of change of $f(x) = \sqrt{x+6}$ on [4, 9]. Round your answer to the nearest hundredth.A

a. 0.14 b. 0.71
c. –0.36 d. –0.14

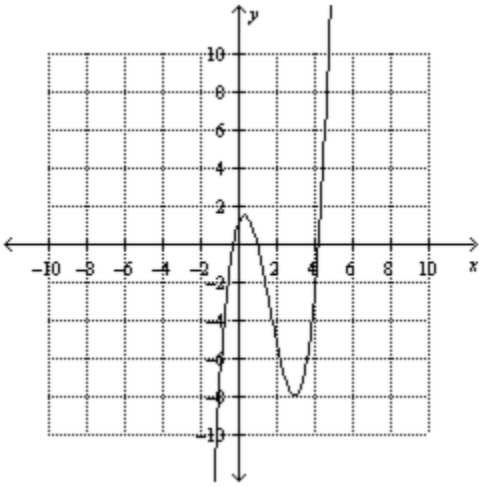
24. Determine the domain of the function $h(x) = \dfrac{6x}{x\left(x^2-1\right)}$. A

a. $\left\{x \mid x \neq \pm 1, x \neq 0\right\}$ b. $\left\{x \mid x \neq 1\right\}$
c. $\left\{x \mid x \neq \pm 1, x \neq 0\right\}$ d. $\left\{x \mid x \neq \pm 1\right\}$

25. State whether the graph of $f(x) = \dfrac{x^3+5x^2+6x}{x}$ has infinite discontinuity, jump discontinuity, point discontinuity, or is continuous. B

a. The function has infinite discontinuity. b. The function has point discontinuity.
c. The function has jump discontinuity. d. The function is continuous.

26. Use the graph of $f(x)$ to estimate $f(3)$.B



a. $f(3) = -9$ b. $f(3) = -8$
c. $f(3) = 8$ d. $f(3) = -7$

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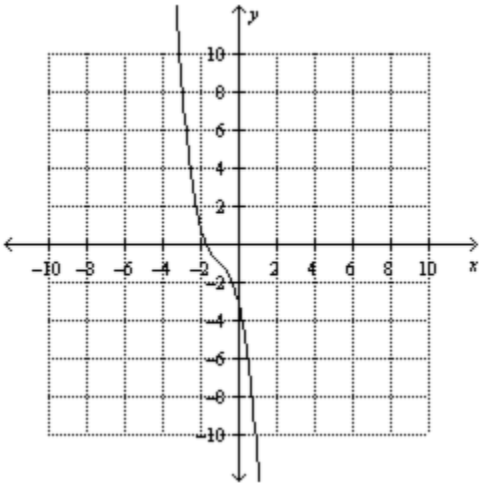
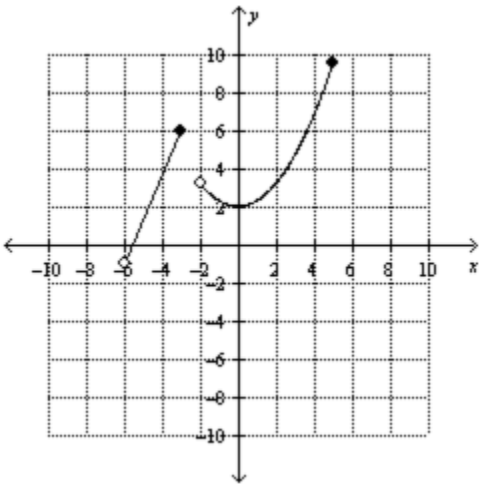
27. Use the graph of $f(x)$ to estimate $f(-2)$.A



a. $f(-2) = 1$ b. $f(-2) = -1$
c. $f(-2) = 2$ d. $f(-2) = 0$

28. Use the graph below to find the domain and range.A



a. D: (–6, –3], (–2, 5]
R: (–1, 9.5]

b. D: (–6, 5]
R: (–1, 9.5]

c. D: (–6, –3), (–2, 5)
R: (–1, 9.5)

d. D: [–6, –3], [–2, 5]
R: [–1, 9.5]

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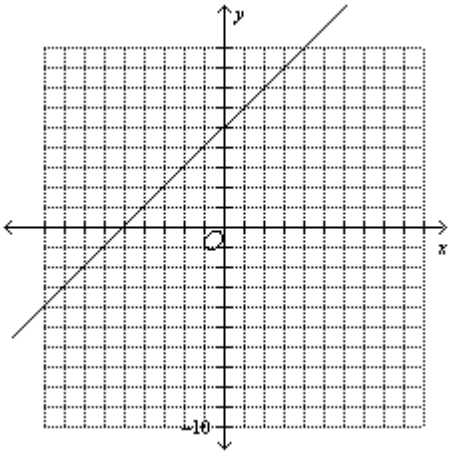
29. State whether the graph of $f(x) = -\frac{x^3 - 10x^2 + 9x}{9}$ has infinite discontinuity, jump discontinuity, point discontinuity, or is continuous.B

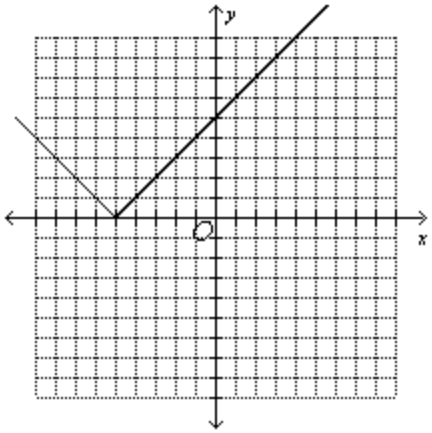
a. The function has point discontinuity.
b. The function is continuous.
c. The function has infinite discontinuity.
d. The function has jump discontinuity.

30. Graph the function defined by $f(x) = |x + 5|$. B

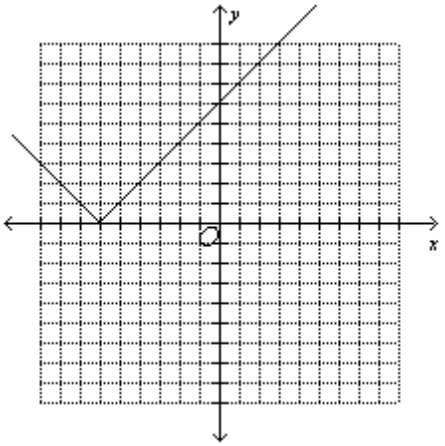
a.



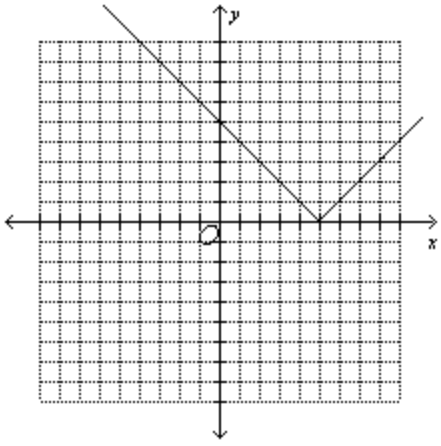
b.



c.



d.



31. Determine whether the graph of $5xy = 9$ is odd or even.B

a. neither
b. odd
c. even
d. both

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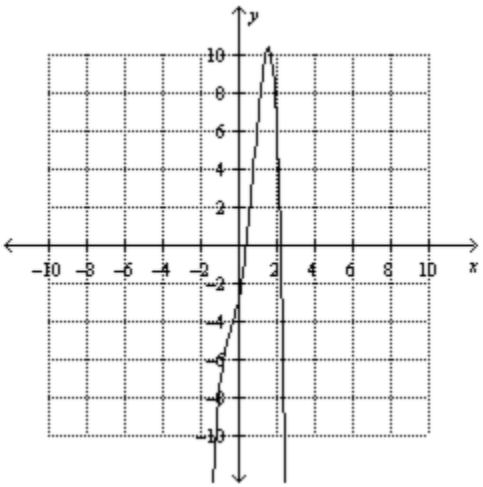
32. Use the graph of $f(x)$ to estimate $f(2)$.B

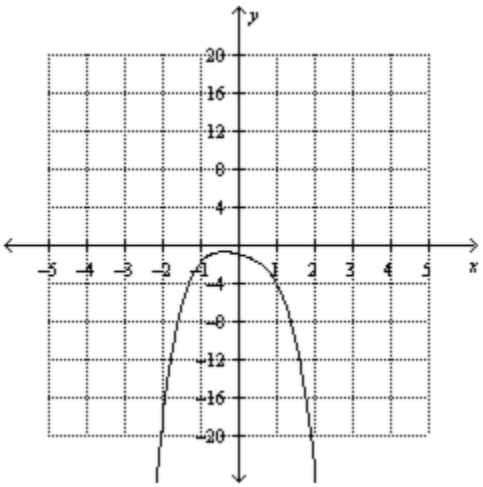


a. $f(2) = 6$ b. $f(2) = 7$
c. $f(2) = 8$ d. $f(2) = -7$

33. Determine the domain of the function $h(x) = \dfrac{2x}{x\left(x^2 - 9\right)}$. A

a. $\left\{x \mid x \neq \pm 3, x \neq 0\right\}$ b. $\left\{x \mid x \neq 3\right\}$
c. $\left\{x \mid x \neq \pm 3\right\}$ d. $\left\{x \mid x \neq \pm 9, x \neq 0\right\}$

34. Describe the end behavior of the graph.A



a. $f(x) \to -\infty$ as $x \to -\infty$ and $f(x) \to -\infty$ as $x \to +\infty$
b. $f(x) \to +\infty$ as $x \to -\infty$ and $f(x) \to +\infty$ as $x \to +\infty$
c. $f(x) \to -\infty$ as $x \to -\infty$ and $f(x) \to +\infty$ as $x \to +\infty$
d. $f(x) \to +\infty$ as $x \to -\infty$ and $f(x) \to -\infty$ as $x \to +\infty$

35. Describe the set of numbers using set-builder notation.B

all multiples of 10

a. $\{x \mid x = \frac{1}{10}n, n \in Z\}$
b. $\{x \mid x = 10n, n \in Z\}$
c. $\{x \mid x = 10n, n \in \mathrm{I}\}$
d. $\{x \mid x = 10 + n, n \in Z\}$

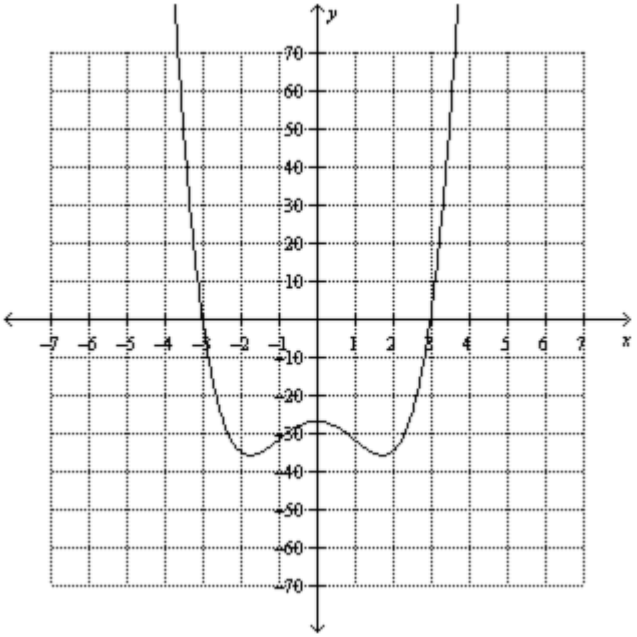
36. Find $f(t - 3)$ for $f(x) = 4x^2 - 8x + 4$.A

a. $4t^2 - 32t + 64$
b. 64
c. $4t^2 - 32t - 64$
d. $4t^2 + 32t + 64$

37. Determine between which consecutive integers the real zeros of $f(x) = -4x^3 - 2x^2 + 5x + 7$ are located on the interval [–10, 10]. If the zero occurs at an integer, write the integer.B

a. $-8 < x < -7$
b. $1 < x < 2;$
c. $0 < x < 1; 2 < x < 3;$
d. $-3 < x < -2; -2 < x < -1; -1 < x < 0; 1 < x < 2;$

38. Use the graph below to identify the *y*-intercept and zeros.A



a. *y*-intercept: –27
zeros: 3, –3 , 0, 0

b. *y*-intercepts:3, –3 , 0, 0
zero: –27

c. *y*-intercept: –27
zeros: No zeros

d. *y*-intercept: 27
zeros: 3, –3 , 0, 0

39. Determine between which consecutive integers the real zeros of $f(x) = -5x^3 + 3x^2 + 3x + 6$ are located on the interval [–10, 10]. If the zero occurs at an integer, write the integer. C

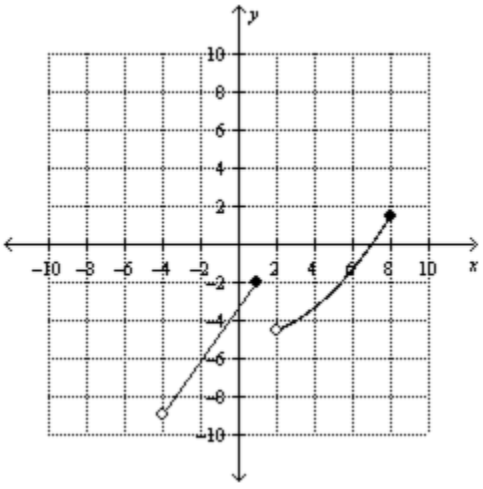
a. $-3 < x < -2; -2 < x < -1; -1 < x < 0; 1 < x < 2;$

b. $0 < x < 1; 2 < x < 3;$

c. $1 < x < 2;$

d. $-8 < x < -7$

40. Use the graph below to find the domain and range.A



a. D: (–4, 1], (2, 8]
R: (–9, 1.4]

b. D: [–4, 1], [2, 8]
R: [–9, 1.4]

c. D: (–4, 1), (2, 8)
R: (–9, 1.4)

d. D: (–4, 8]
R: (–9, 1.4]

Without graphing, describe the end behavior of the graph of the function.

41. $f(x) = 3x^3$ D

a. As $x \to \infty$, $f(x) \to -\infty$.
As $x \to -\infty$, $f(x) \to \infty$.

b. As $x \to \infty$, $f(x) \to -\infty$.
As $x \to -\infty$, $f(x) \to -\infty$.

c. As $x \to \infty$, $f(x) \to \infty$.
As $x \to -\infty$, $f(x) \to \infty$.

d. As $x \to \infty$, $f(x) \to \infty$.
As $x \to -\infty$, $f(x) \to -\infty$.

42. $h(x) = -2x^4$ C

a. As $x \to \infty$, $h(x) \to -\infty$.
As $x \to -\infty$, $h(x) \to \infty$.

b. As $x \to \infty$, $h(x) \to \infty$.
As $x \to -\infty$, $h(x) \to \infty$.

c. As $x \to \infty$, $h(x) \to -\infty$.
As $x \to -\infty$, $h(x) \to -\infty$.

d. As $x \to \infty$, $h(x) \to \infty$.
As $x \to -\infty$, $h(x) \to -\infty$.

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