

Precalculus Chapter 2 Quiz Part I (sections 1 – 4)

Submit your answers by midnight, February 20.

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. Evaluate the function $f(x) = -5x + 4$ at $f(-7)$.
- $f(-7) = 29$
 - $f(-7) = -33$
 - $f(-7) = 39$
 - $f(-7) = 34$
 - $f(-7) = -1$
- _____ 2. Evaluate the function $f(x) = x^2 + 6x$ at $f(8)$.
- $f(8) = 56$
 - $f(8) = 16$
 - $f(8) = 112$
 - $f(8) = 72$
 - $f(8) = 120$
- _____ 3. Evaluate the function $f(x) = \frac{13-x}{-1+x}$ at $f(5)$.
- $f(5) = 1.5$
 - $f(5) = 1.75$
 - $f(5) = 2.25$
 - $f(5) = 1.25$
 - $f(5) = 2$
- _____ 4. Evaluate the function $f(x) = 7|x - 2|$ at $f(6)$.
- $f(6) = 23$
 - $f(6) = 29$
 - $f(6) = 28$
 - $f(6) = 56$
 - $f(6) = 24$
- _____ 5. Use the function $f(x) = 3x + 2$ to evaluate the following expressions:
- | $f(x^2)$ | and | $(f(x))^2$ |
|--------------------------------|-----|-----------------------------|
| a. $f(x^2) = 3x^2 + 2$ | and | $(f(x))^2 = 9x^2 + 6x + 4$ |
| b. $f(x^2) = 3x^2 + 4$ | and | $(f(x))^2 = 9x^2 + 12x + 4$ |
| c. $(f(x))^2 = 9x^2 + 12x + 4$ | and | $(f(x))^2 = 9x^2 + 12x + 4$ |
| d. $f(x^2) = 3x^2 + 2$ | and | $(f(x))^2 = 9x^2 + 12x + 4$ |
| e. $f(x^2) = 3x^2 + 2$ | and | $(f(x))^2 = 9x^2 + 6x + 4$ |

_____ 6. For the function $f(x) = 3x^2 + 7$, find the difference quotient $\frac{f(a+h) - f(a)}{h}$, $h \neq 0$.

a. $\frac{f(a+h) - f(a)}{h} = 9h + 6a$

b. $\frac{f(a+h) - f(a)}{h} = 3h + 6a$

c. $\frac{f(a+h) - f(a)}{h} = 3h + 3a$

d. $\frac{f(a+h) - f(a)}{h} = 6h + 3a$

e. $\frac{f(a+h) - f(a)}{h} = 3h + 12a$

_____ 7. For the function $f(x) = 4x^3$, find the difference quotient $\frac{f(a+h) - f(a)}{h}$.

a. $\frac{f(a+h) - f(a)}{h} = 12a^2 + 4ah + 12h^2$

b. $\frac{f(a+h) - f(a)}{h} = 12a^2 - 12ah + 4h^2$

c. $\frac{f(a+h) - f(a)}{h} = 12a^2 + 12ah + 4h^2$

d. $\frac{f(a+h) - f(a)}{h} = 4a^3 + 12ah + 12h^2$

e. $\frac{f(a+h) - f(a)}{h} = 8a^3 + 12ah - 4h^2$

_____ 8. Find the domain of the function $f(x) = 3x$, $-6 \leq x \leq 8$:

a. $[-6, 8]$

b. $[-18, 24]$

c. $(-18, 24)$

d. $(-6, 8)$

e. $(-\infty, \infty)$

_____ 9. What is the domain of the function $f(x) = \frac{x+6}{x^2-9}$?

a. $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

b. $(-\infty, 3] \cup [3, \infty)$

c. $(-\infty, -6) \cup (-6, -3) \cup (-3, 3) \cup (3, \infty)$

d. $(-\infty, \infty)$

e. $(-\infty, 3) \cup (3, \infty)$

_____ 10. Find the domain of the function $f(x) = \sqrt[9]{x-4}$:

a. $(-\infty, \infty)$

b. $[0, \infty)$

c. $(0, \infty)$

d. $[4, \infty)$

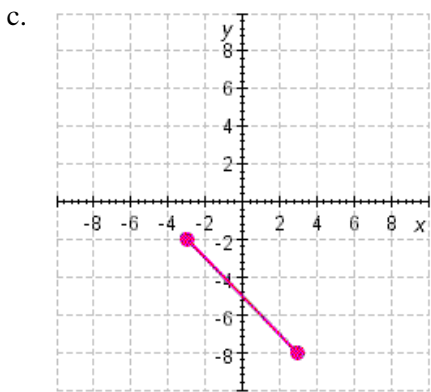
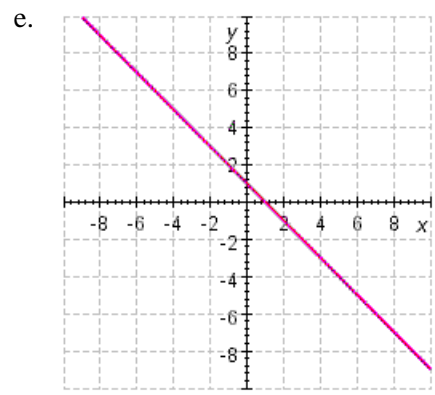
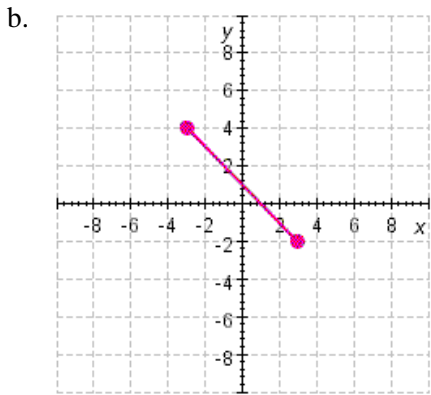
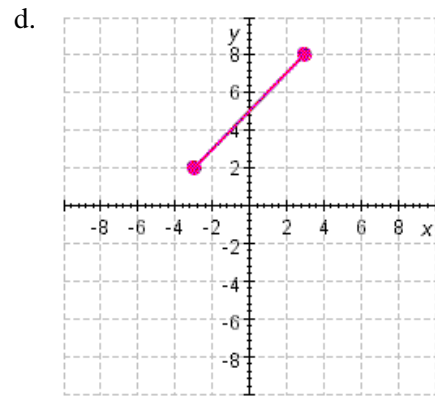
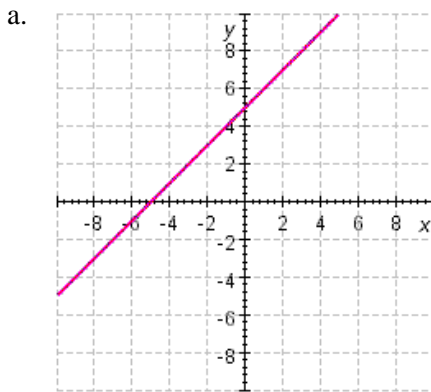
e. $(-\infty, 4]$

___ 11. Find the domain of the following function:

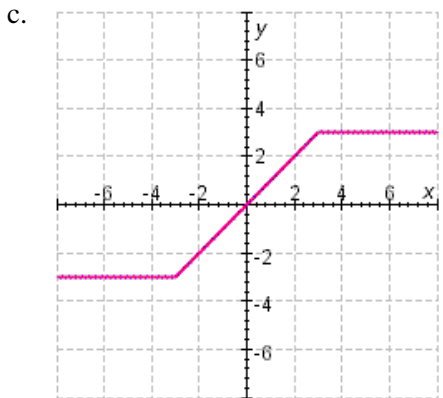
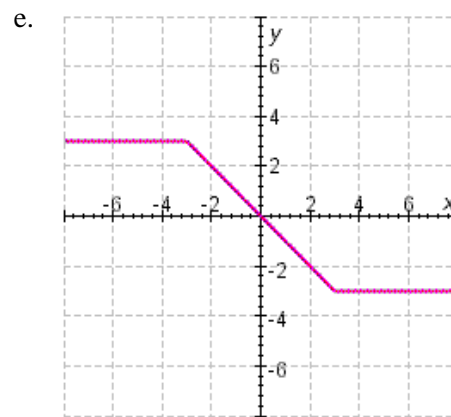
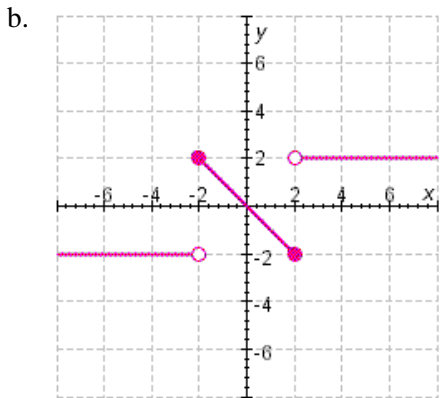
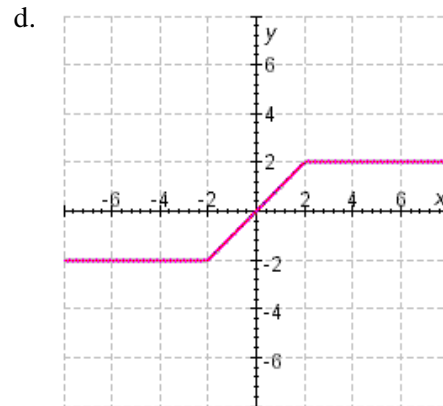
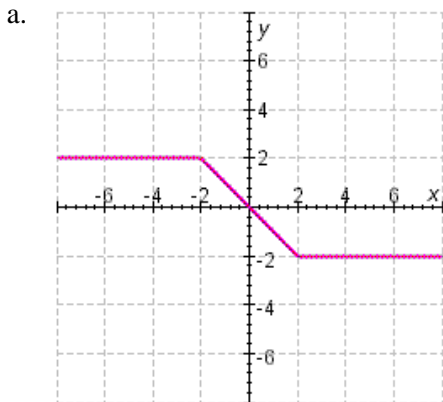
$$f(x) = \frac{\sqrt{x}}{x^2 - 16x + 48}$$

- a. $[0, 4) \cup (4, 12) \cup (12, \infty)$
- b. $(4, 12)$
- c. $[4, 12]$
- d. $(-\infty, \infty)$
- e. $(-\infty, 4) \cup (4, 12) \cup (12, \infty)$

___ 12. Sketch the graph of the function $f(x) = x + 5$, $-3 \leq x \leq 3$ by first making a table of values.



_____ 13. Sketch the graph of the piecewise defined function: $f(x) = \begin{cases} 2 & \text{if } x < -2 \\ -x & \text{if } -2 \leq x \leq 2 \\ -2 & \text{if } x > 2 \end{cases}$



_____ 14. Determine whether the equation $x^2 + 3y = 3$ defines y as a function of x .

- a. no
- b. yes

_____ 15. Determine whether the equation $4x + 7y = 28$ defines y as a function of x .

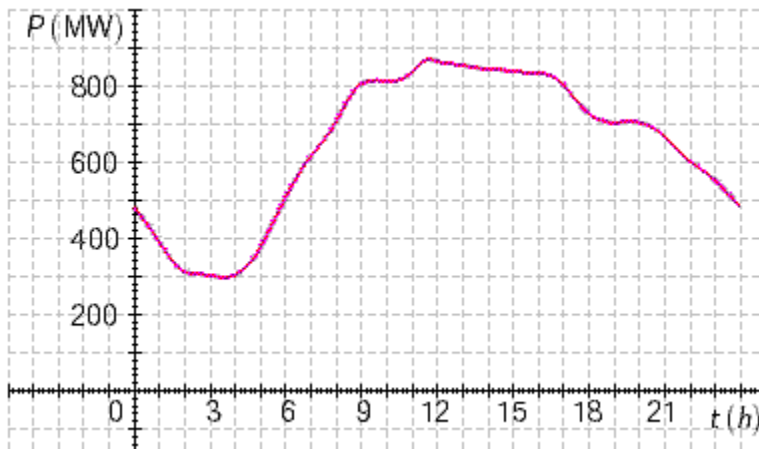
- a. no
- b. yes

16. Consider a family of functions $f(x) = 2(x - c)^3$. Graph all the given members of the family in the viewing rectangle indicated.
- (a) $c = 0, 2, 4, 6$; $[-10, 10]$ by $[-20, 20]$ (b) $c = 0, -2, -4, -6$; $[-10, 10]$ by $[-20, 20]$

How does the value of c affect the graph?

- The graphs in part (a) are obtained by shifting the graph of $f(x) = 2x^3$ to the left and downwards c units, $c > 0$. The graphs in part (b) are obtained by shifting the graph of $f(x) = 2x^3$ to the right and up $|c|$ units, $c < 0$.
- The graphs in part (a) are obtained by shifting the graph of $f(x) = 2x^3$ to the right c units, $c > 0$. The graphs in part (b) are obtained by shifting the graph of $f(x) = 2x^3$ to the left $|c|$ units, $c < 0$.
- The graphs in part (a) are obtained by shifting the graph of $f(x) = 2x^3$ downwards c units, $c > 0$. The graphs in part (b) are obtained by shifting the graph of $f(x) = 2x^3$ up $|c|$ units, $c < 0$.
- The graphs in part (a) are obtained by shifting the graph of $f(x) = 2x^3$ up c units, $c > 0$. The graphs in part (b) are obtained by shifting downwards the graph of $f(x) = 2x^3$ $|c|$ units, $c < 0$.
- The graphs in part (a) are obtained by shifting the graph of $f(x) = 2x^3$ to the left c units, $c > 0$. The graphs in part (b) are obtained by shifting the graph of $2f(x) = x^3$ to the right $|c|$ units, $c < 0$.

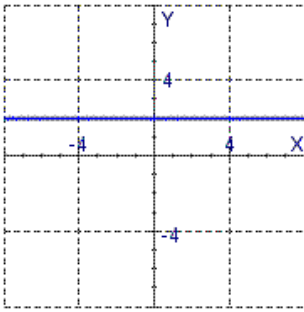
17. The figure shows the power consumption in the city (P is measured in megawatts; t is measured in hours starting at midnight).



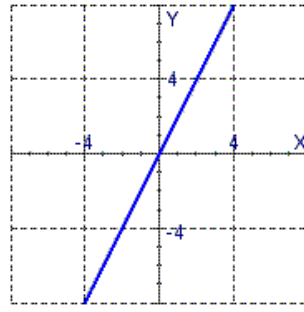
- At 6 A.M. the power consumption is about 727 megawatts.
At 6 P.M. the power consumption is about 572 megawatts.
The power consumption is lowest between 3 A.M. and 4 A.M.
The power consumption is highest at exactly 12 noon.
- At 6 A.M. the power consumption is about 500 megawatts.
At 6 P.M. the power consumption is about 725 megawatts.
The power consumption is lowest between 3 A.M. and 4 A.M.
The power consumption is highest just before 12 noon.
- At 6 A.M. the power consumption is about 572 megawatts.
At 6 P.M. the power consumption is about 727 megawatts.
The power consumption is lowest between 2 A.M. and 3 A.M.
The power consumption is highest at exactly 5 P.M.
- At 6 A.M. the power consumption is about 725 megawatts.
At 6 P.M. the power consumption is about 500 megawatts.
The power consumption is lowest between 3 A.M. and 4 A.M.
The power consumption is highest just before 12 noon.

18. Select the correct graph of the function $f(x) = 2$.

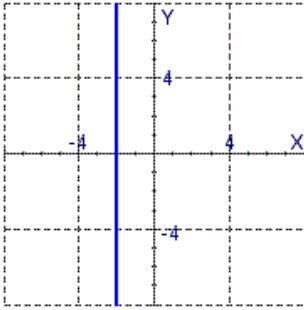
a.



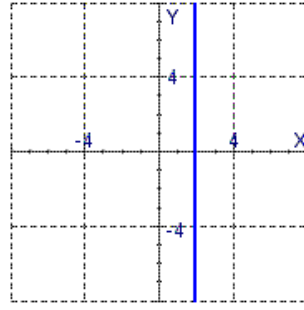
d.



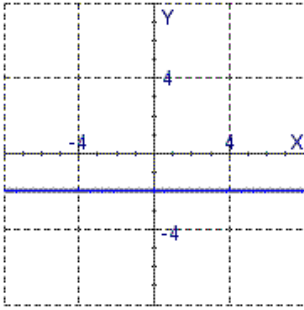
b.



e.

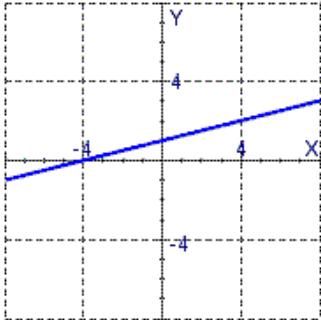


c.

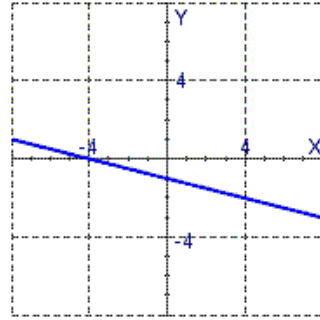


19. Select the correct graph of the function $f(x) = \frac{x+4}{4}$, $-2 \leq x \leq 2$:

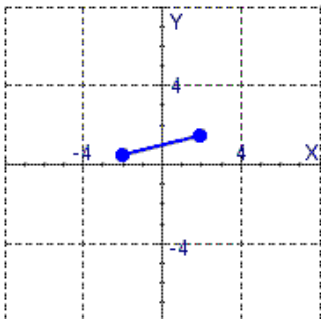
a.



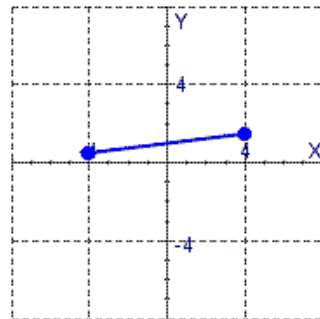
c.



b.

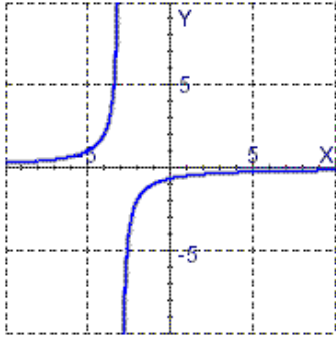


d.

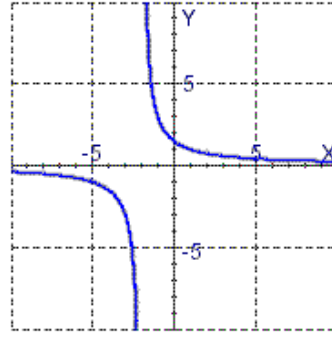


___ 20. Select the correct graph of the function $G(x) = \frac{3}{x+2}$:

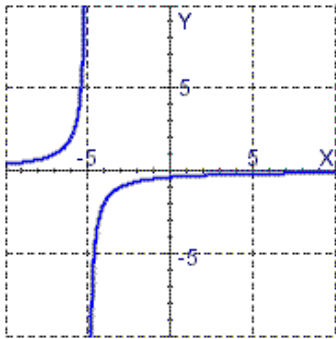
a.



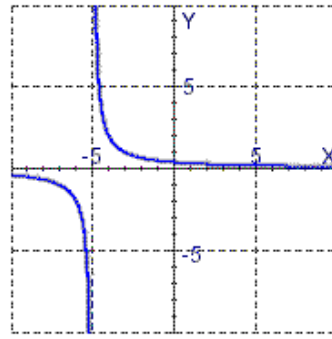
d.



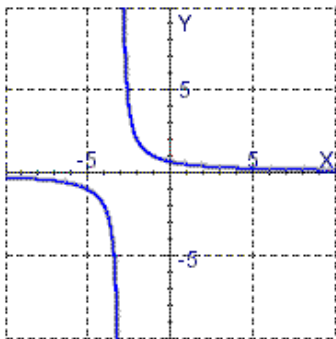
b.



e.

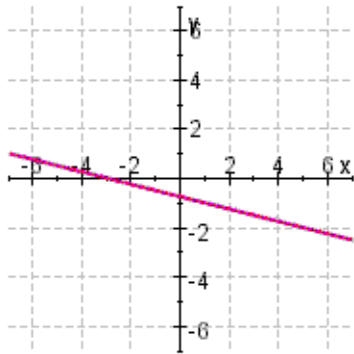


c.



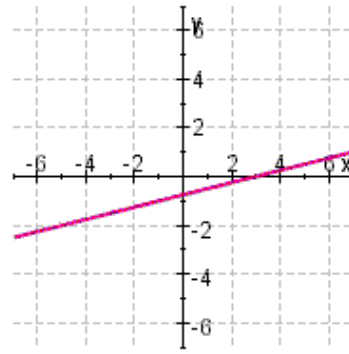
___ 21. Sketch the correct graph and domain of the function $f(x) = \frac{1}{4}(x + 3)$.

a.



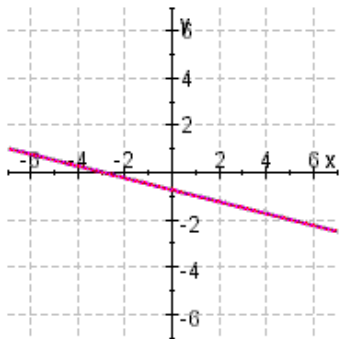
Domain: $(-\infty, \infty)$

d.



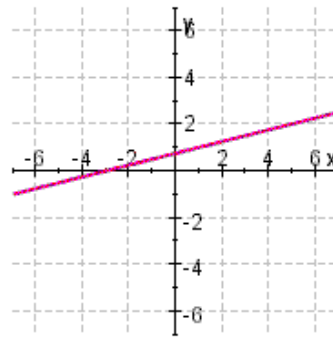
Domain: $(-\infty, \infty)$

b.



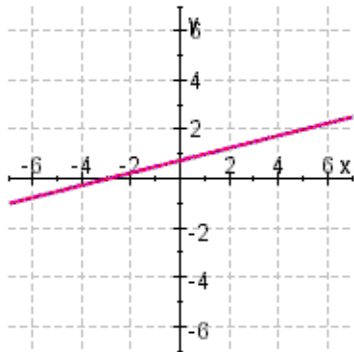
Domain: $(-4, \infty)$

e.



Domain: $(-4, \infty)$

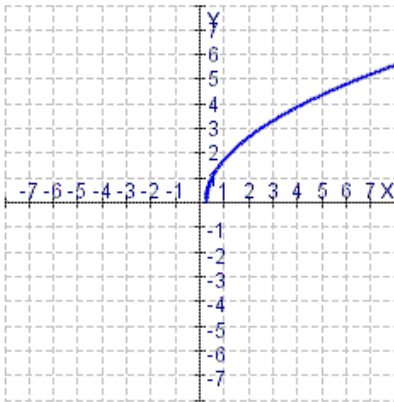
c.



Domain: $(-\infty, \infty)$

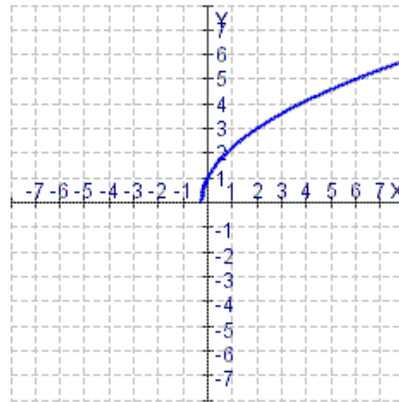
22. Select the correct graph and domain of the function $f(x) = \sqrt{4x+1}$.

a.



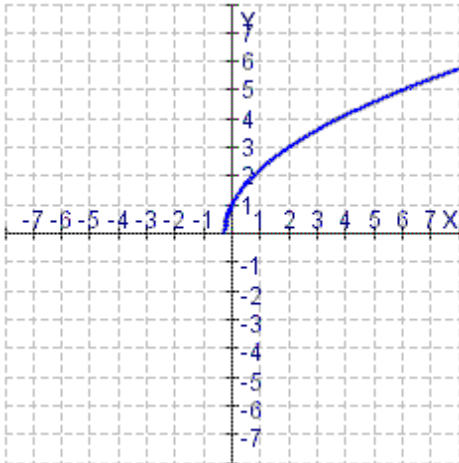
Domain: $\left[\frac{1}{4}, \infty\right)$

d.



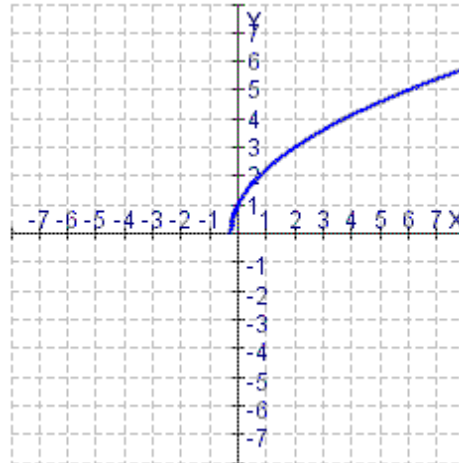
Domain: $\left[-\frac{1}{4}, 6\right)$

b.



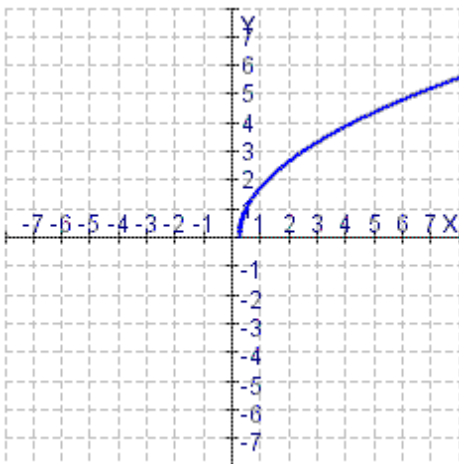
Domain: $\left[-\frac{1}{4}, \infty\right)$

e.



Domain: $[0, \infty)$

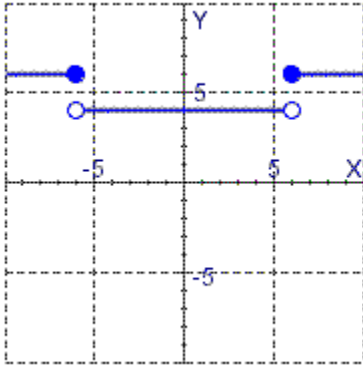
c.



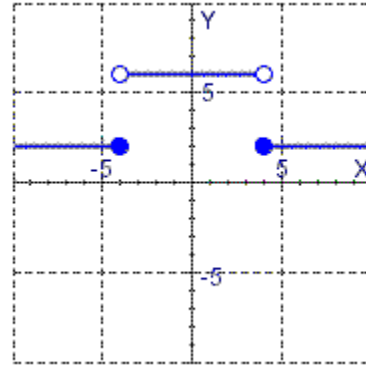
Domain: $[0, \infty)$

23. Select the correct graph of the function $f(x) = \begin{cases} 6 & \text{if } |x| \leq 4 \\ 2 & \text{if } |x| > 4 \end{cases}$:

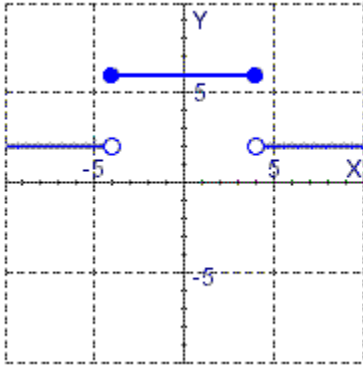
a.



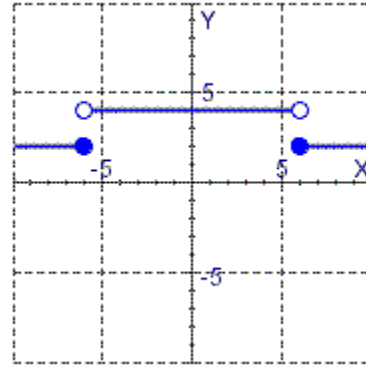
d.



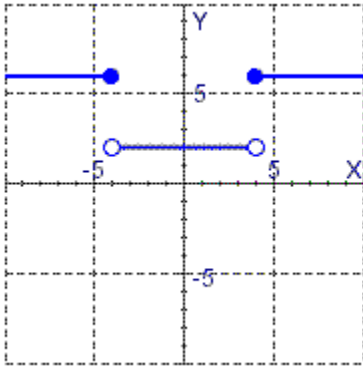
b.



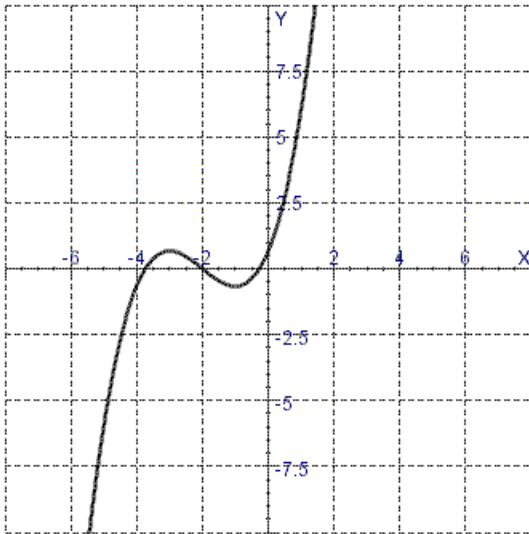
e.



c.



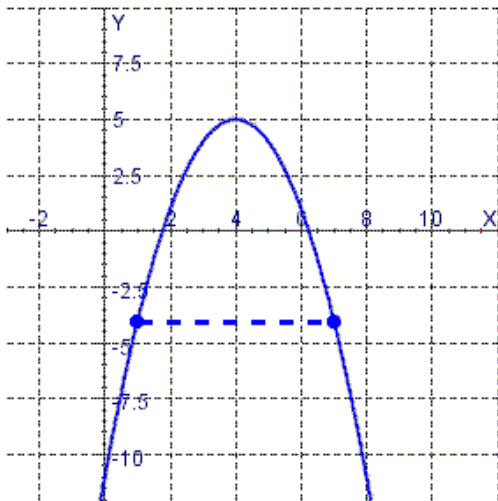
24. The graph of a function is sketched below.



Determine the interval on which the function is decreasing.

- a. $(-\infty, -3] \cap [-1, \infty)$
- b. $[1, 3]$
- c. $[-1, -1]$
- d. $(-\infty, -3] \cup [-1, \infty)$
- e. $[-3, -1]$

25. The graph of a function is given below. What is the average rate of change of the function between the indicated values of the variable?



- a. -4
- b. 0
- c. -1
- d. 1

26. What is the average rate of change of the function $f(x) = x + x^2$ between $x = 0$ and $x = 5$?

- a. 6
- b. 7
- c. 10
- d. 8
- e. 5

___ 27. Determine the average rate of change for the function $f(x) = \frac{1}{x}$ between the $x = 1$ and $x = 6$.

- a. $-\frac{1}{216}$
- b. $\frac{1}{216}$
- c. $-\frac{1}{36}$
- d. $\frac{1}{6}$
- e. $-\frac{1}{6}$

___ 28. Find the average rate of change for the function $f(x) = \frac{1}{7}x + 3$ between $x = a$ and $x = a + h$.

- a. $\frac{1}{7}$
- b. $\frac{1}{49}$
- c. $-\frac{1}{7}$
- d. 7
- e. -7

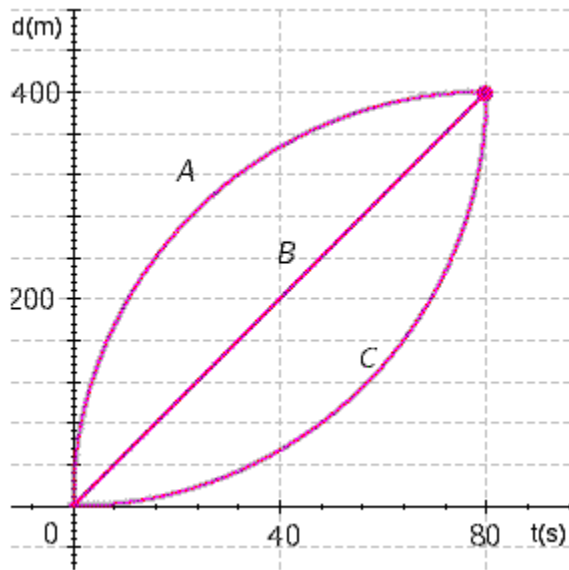
___ 29. The table shows the number of CD players sold in a small electronics store in the years 1989 - 1999 as follows:

Year	CD players sold
1989	545
1990	675
1991	665
1992	665
1993	600
1994	550
1995	680
1996	560
1997	545
1998	560
1999	695

What was the average rate of change of sales between 1989 and 1999?

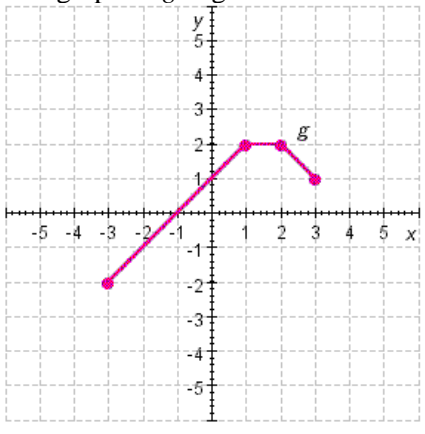
- a. 70 CD players/year
- b. 695 CD players/year
- c. 150 CD players/year
- d. 15 CD players/year
- e. 37.5 CD players/year

30. A 100-m race ends in a three-way tie for first place. The graph shows distance as a function of time for each of the three winners. Find the average speed for each winner.

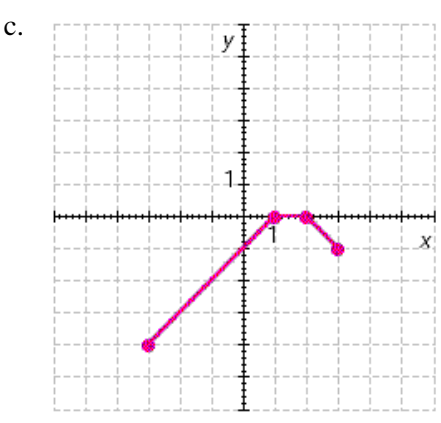
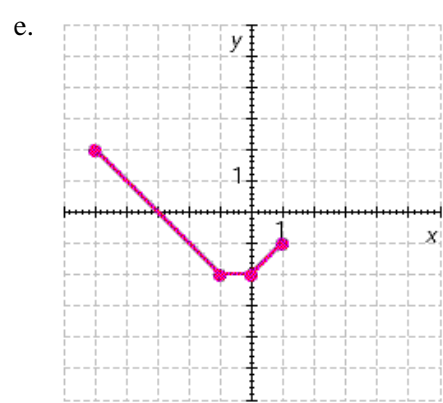
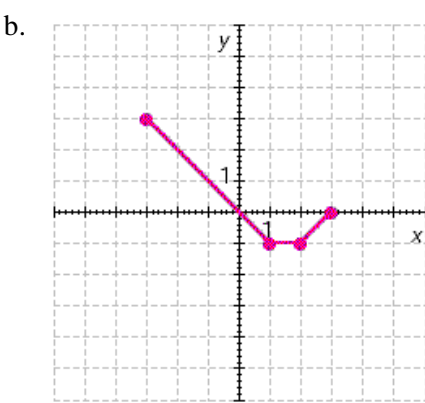
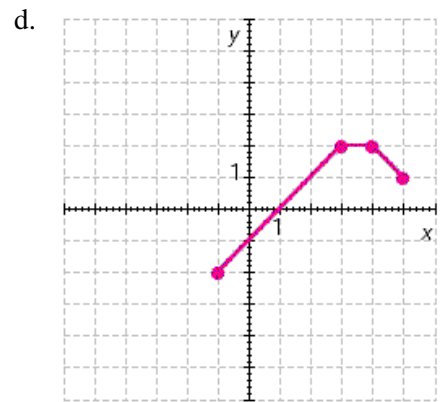
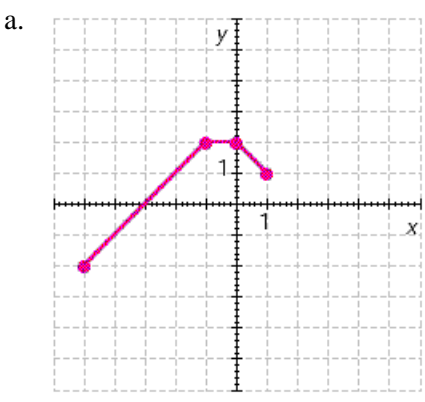


- $A: 2.5 \text{ m/sec}, B: 5 \text{ m/sec}, C: 5 \text{ m/sec}$
 - $A: 2.5 \text{ m/sec}, B: 2.5 \text{ m/sec}, C: 2.5 \text{ m/sec}$
 - $A: 5 \text{ m/sec}, B: 5 \text{ m/sec}, C: 5 \text{ m/sec}$
 - $A: 2.5 \text{ m/sec}, B: 5 \text{ m/sec}, C: 2.5 \text{ m/sec}$
 - $A: 5 \text{ m/sec}, B: 5 \text{ m/sec}, C: 2.5 \text{ m/sec}$
31. Suppose the graph of f is given. Describe how the graph of $y = f(-x)$ can be obtained from the graph of f .
- Reflect the graph of $y = f(x)$ about the x -axis and stretch vertically by a factor of 6.
 - Reflect the graph of $y = f(x)$ about the y -axis.
 - Reflect the graph of $y = f(x)$ about the x -axis.
 - Reflect the graph of $y = f(x)$ about the x -axis, and then shift upward 3 units.
 - Reflect the graph of $y = f(x)$ about the y -axis and stretch vertically by a factor of 3.
32. Suppose the graph of f is given. Describe how the graph of $y = 4f(x+5) - 3$ can be obtained from the graph of f .
- Shift the graph of $y = f(x)$ to the right 4 units, stretch vertically by a factor of 5, and then shift downward 3 units.
 - Shift the graph of $y = f(x)$ to the left 4 units, stretch vertically by a factor of 5, and then shift downward 3 units.
 - Shift the graph of $y = f(x)$ to the right 5 units, stretch vertically by a factor of 4, and then shift downward 3 units.
 - Shift the graph of $y = f(x)$ to the left 5 units, stretch vertically by a factor of 4, and then shift upward 3 units.
 - Shift the graph of $y = f(x)$ to the left 5 units, stretch vertically by a factor of 4, and then shift downward 3 units.

33. The graph of g is given below.

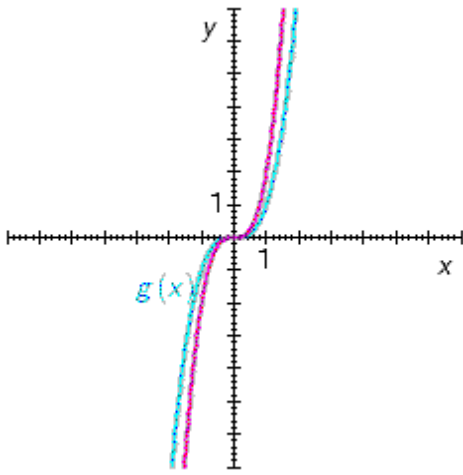


Find the graph of the function $y = g(x) - 2$:

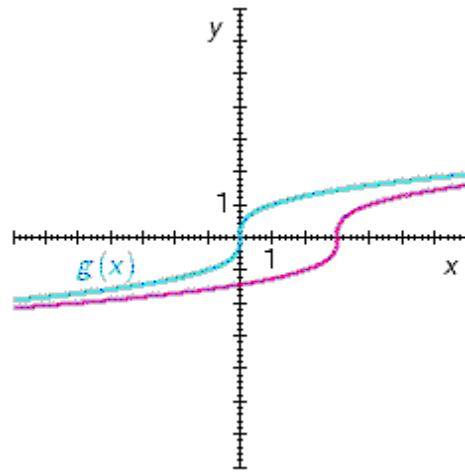


34. Sketch the graph of $g(x) = \sqrt[3]{x}$ by plotting points.
Use the graph of g to sketch the graph $y = 2\sqrt[3]{x}$.

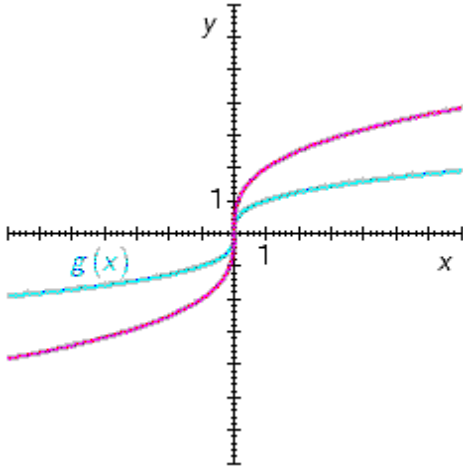
a.



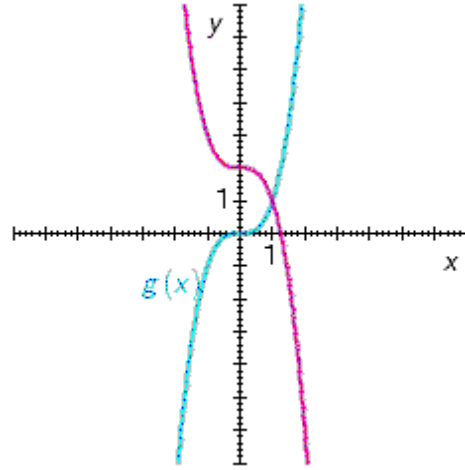
d.



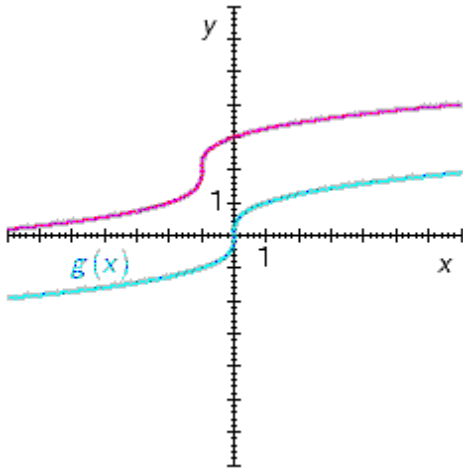
b.



e.



c.

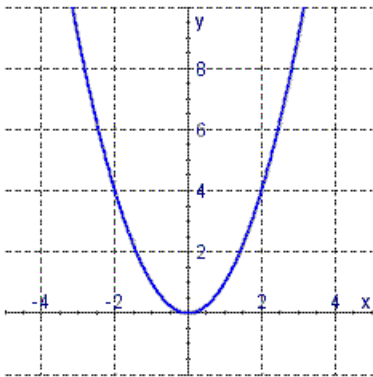


___ 35. Explain how the graph of g is obtained from the graph of f ; these functions are defined by:

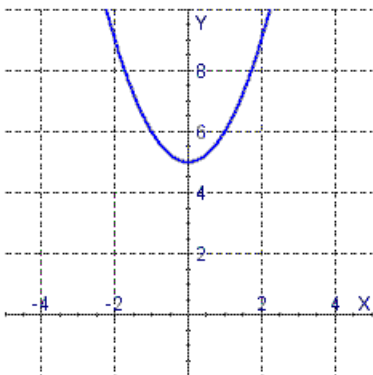
$$f(x) = \sqrt{x}, \quad g(x) = \frac{1}{2} \sqrt{x-5}$$

- The graph of $g(x) = \frac{1}{2} \sqrt{x-5}$ is obtained by shifting the graph of $f(x) = \sqrt{x}$ upward 5 units, and then shrinking the graph vertically by a factor of $\frac{1}{2}$.
- The graph of $g(x) = \frac{1}{2} \sqrt{x-5}$ is obtained by shifting the graph of $f(x) = \sqrt{x}$ to the left 5 units, and then shrinking the graph vertically by a factor of $\frac{1}{2}$.
- The graph of $g(x) = \frac{1}{2} \sqrt{x-5}$ is obtained by shifting the graph of $f(x) = \sqrt{x}$ to the right 5 units.
- The graph of $g(x) = \frac{1}{2} \sqrt{x-5}$ is obtained by shifting the graph of $f(x) = \sqrt{x}$ downward 5 units.
- The graph of $g(x) = \frac{1}{2} \sqrt{x-5}$ is obtained by shifting the graph of $f(x) = \sqrt{x}$ to the right 5 units, and then shrinking the graph vertically by a factor of $\frac{1}{2}$.

___ 36. The graph of $g(x) = x^2$ is given below:

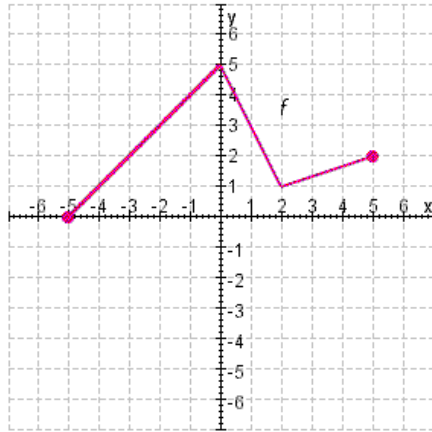


The function $u(x)$ was obtained $g(x)$ and is graphed below. What is $u(x)$?



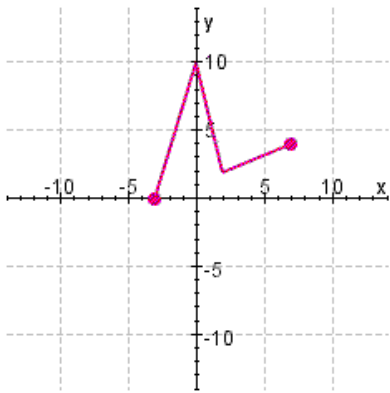
- a. $u(x) = (x + 5)^2$
- b. none of these
- c. $u(x) = (x + 5)^2 + 5$
- d. $u(x) = x^2 + 5$
- e. $u(x) = x + 5$

___ 37. The graph of f is given below.

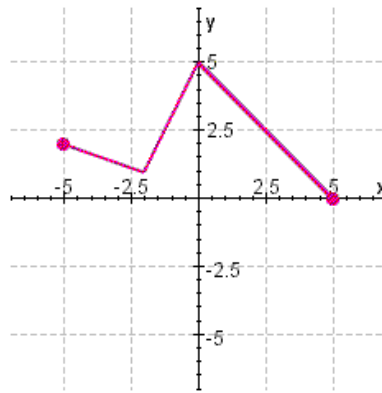


Find the graph of the function $y = -f(x) + 3$:

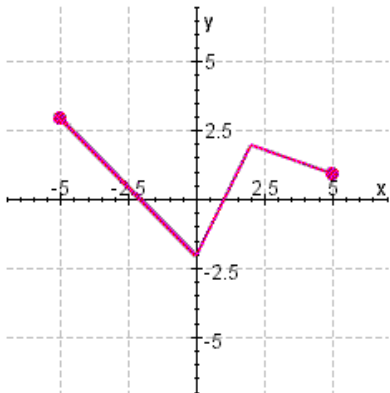
a.



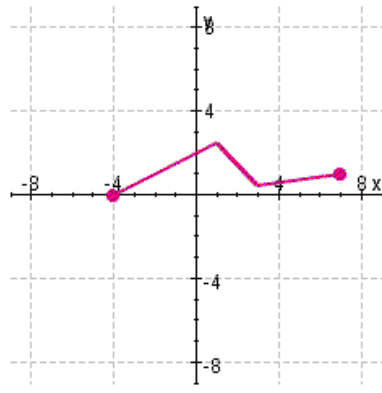
d.



b.



e.

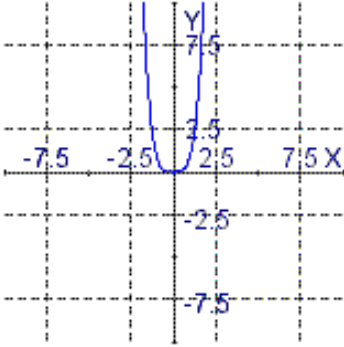


___ 38. How many units must we shift the graph of $f(x) = 2(x + 8)^4$,
to obtain the graph of $f(x) = 2(x + 12)^4$?

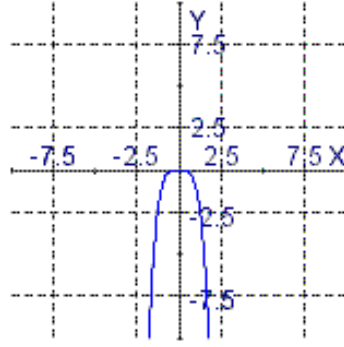
- a. 3
- b. 4
- c. 11
- d. 2
- e. 8

___ 39. Sketch the function $g(x) = |x^4|$.

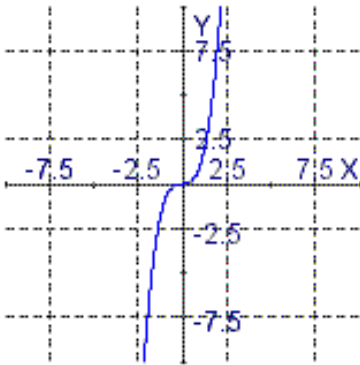
a.



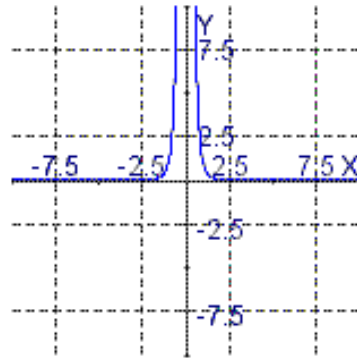
d.



b.



e.



c. none of these

40. A taxi company charges \$3.00 for the first mile (or part of a mile) and 30 cents for each succeeding two-tenths of a mile (or part). Express the cost C (in dollars) of a ride as a function of the distance x traveled (in miles) for $0 < x < 2$.

a.
$$C(x) = \begin{cases} 3.00 & \text{for } 0 < x \leq 1 \\ 3 + 3x & \text{for } 1 < x < 2 \end{cases}$$

b. $C(x) = 3x$ for $0 < x < 2$

c.
$$C(x) = \begin{cases} 3.00 & \text{for } 0 \leq x < 1 \\ 3.30 & \text{for } 1 \leq x < 1.2 \\ 3.60 & \text{for } 1.2 \leq x < 1.4 \\ 3.90 & \text{for } 1.4 \leq x < 1.6 \\ 4.10 & \text{for } 1.6 \leq x < 1.8 \\ 4.10 & \text{for } 1.8 \leq x < 2.0 \end{cases}$$

d.
$$C(x) = \begin{cases} 3.00 & \text{for } 0 < x \leq 1 \\ 3.30 & \text{for } 1 < x \leq 1.2 \\ 3.60 & \text{for } 1.2 < x \leq 1.4 \\ 3.90 & \text{for } 1.4 < x \leq 1.6 \\ 4.10 & \text{for } 1.6 < x \leq 1.8 \\ 4.10 & \text{for } 1.8 < x < 2.0 \end{cases}$$

e.
$$C(x) = \begin{cases} 3.00 & \text{for } 0 < x \leq 1 \\ 3 + 3(x-1) & \text{for } 1 < x \leq 2 \end{cases}$$