

1.2 Functions

1. Which set of ordered pairs represents a function from A to B ?

$$A = \{3, 1, 2, 4\} \text{ and } B = \{-4, -5, 3, 1, 2\}$$

- a. $\{(3, -4), (1, -5), (2, -4), (3, -5)\}$
- b. $\{(3, -4), (2, 2), (1, -5), (4, 3), (1, 1)\}$
- c. $\{(3, 2), (4, 3), (1, 1)\}$
- d. $\{(3, 1), (1, -4), (2, 3), (4, 2)\}$
- e. $\{(3, -4), (1, 1), (4, 3)\}$

ANSWER:

d

2. Which set of ordered pairs represents a function from A to B ?

$$A = \{a, b, c\} \text{ and } B = \{3, 2, 4, 1\}$$

- a. $\{(a, 3), (b, 2)\}$
- b. $\{(a, 1), (c, 2), (b, 3)\}$
- c. $\{(a, 3), (c, 4)\}$
- d. $\{(a, 4), (c, 2), (c, 4), (b, 3)\}$
- e. $\{(a, 3), (c, 2), (c, 4), (b, 4)\}$

ANSWER:

b

3. Which of the following equation represents y as a function of x ?

- a. $y^2 = 1 - x$
- b. $y^3 = x + 1$
- c. $y^2 = x + 1$
- d. $x^2 + y = 1$
- e. $x^2 + y^2 = 1$

ANSWER:

d

4. Which of the following equation does not represent y as a function of x ?

- a. $y^2 = 4 - x$
- b. $y = x^2 + 4$
- c. $x^2 + y = 4$
- d. $y = x^2 + x - 4$
- e. $y = x^2 - 4$

ANSWER:

a

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5. Evaluate $f(3)$ if $f(x) = 14x - 1$.

- a. $f(3) = 41$
- b. $f(3) = 40$
- c. $f(3) = 43$
- d. $f(3) = 39$
- e. $f(3) = 42$

ANSWER:

a

6. Evaluate $f(-1)$ if $f(x) = 4x - 5$.

- a. $f(-1) = -6$
- b. $f(-1) = -8$
- c. $f(-1) = -5$
- d. $f(-1) = -9$
- e. $f(-1) = -7$

ANSWER:

d

7. Evaluate $g(s + 11)$ if $g(y) = 9 - 13y$.

- a. $g(s + 11) = 134 + 13s$
- b. $g(s + 11) = 134 - 13s$
- c. $g(s + 11) = -134 + 13s$
- d. $g(s + 11) = -134 - 13s$
- e. $g(s + 11) = 9 - 13s$

ANSWER:

d

8. Evaluate $S(8)$ if $S(r) = 4\pi r^2$.

- a. $S(8) = 260\pi$
- b. $S(8) = 64\pi$
- c. $S(8) = 258\pi$
- d. $S(8) = 256\pi$
- e. $S(8) = 257\pi$

ANSWER:

d

9. Evaluate $g(t) - g(4)$ if $g(t) = 9t^2 - 7t + 4$.

- a. $g(t) - g(4) = 9t^2 - 116 + 7t$

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- b. $g(t) - g(4) = 7t^2 - 116t + 9$
- c. $g(t) - g(4) = 9t^2 - 116t - 7$
- d. $g(t) - g(4) = 7t^2 + 9t - 116$
- e. $g(t) - g(4) = 9t^2 - 7t - 116$

ANSWER:

e

10. Evaluate $f(-12)$ if $f(x) = \sqrt{x + 12} + 5$.

- a. $f(-12) = 4$
- b. $f(-12) = 6$
- c. $f(-12) = 3$
- d. $f(-12) = 7$
- e. $f(-12) = 5$

ANSWER:

e

$$f(x) = \frac{|x|}{x}$$

11. Evaluate $f(-19)$ if

- a. $f(-19) = -3$
- b. $f(-19) = 0$
- c. $f(-19) = -2$
- d. $f(-19) = -1$
- e. $f(-19) = 1$

ANSWER:

d

12. Evaluate $q(4)$ if $q(x) = \frac{1}{(x^2 - 6)}$.

- a. $q(4) = \frac{1}{14}$
- b. $q(4) = \frac{1}{12}$
- c. $q(4) = \frac{1}{10}$
- d. $q(4) = \frac{1}{13}$
- e. $q(4) = \frac{1}{11}$

ANSWER:

c

1.2 Functions

13. Evaluate $f(0)$ if $f(x) = \begin{cases} 9x + 3, & x < 0 \\ 9x + 9, & x \geq 0 \end{cases}$.

- a. $f(0) = -9$
- b. $f(0) = 3$
- c. $f(0) = 9$
- d. $f(0) = -3$
- e. $f(0) = 0$

ANSWER:

c

14. Evaluate $f(-3)$ if $f(x) = \begin{cases} x^2 + 6, & x < 1 \\ 6x^2 + 6, & x \geq 1 \end{cases}$.

- a. $f(-3) = 13$
- b. $f(-3) = 3$
- c. $f(-3) = 9$
- d. $f(-3) = 17$
- e. $f(-3) = 15$

ANSWER:

e

15. Evaluate the function $f(x) = \begin{cases} 9x - 8, & x < -1 \\ 3, & -1 \leq x \leq 1 \\ x^2, & x > 1 \end{cases}$ at $f\left(-\frac{1}{5}\right)$.

- a. $f\left(-\frac{1}{5}\right) = -53$
- b. $f\left(-\frac{1}{5}\right) = 53$
- c. $f\left(-\frac{1}{5}\right) = -3$
- d. $f\left(-\frac{1}{5}\right) = -25$
- e. $f\left(-\frac{1}{5}\right) = 3$

ANSWER:

e

1.2 Functions

$$f(x) = \begin{cases} 4 - 3x, & x < -2 \\ 0, & -2 \leq x \leq 2 \\ x^2 + 9, & x > 2 \end{cases}$$

16. Evaluate the function at $f(6)$.

- a. $f(6) = 49$
- b. $f(6) = 46$
- c. $f(6) = 45$
- d. $f(6) = 47$
- e. $f(6) = 48$

ANSWER:

c

17. Complete the table.

$$f(x) = x^2 - 3$$

x	-5	-3	0	2	4
$f(x)$					

a.

x	-5	-3	0	2	4
$f(x)$	22	6	1	-3	13

b.

x	-5	-3	0	2	4
$f(x)$	22	6	-3	13	1

c.

x	-5	-3	0	2	4
$f(x)$	6	22	-3	1	13

d.

x	-5	-3	0	2	4
$f(x)$	22	6	0	1	13

e.

x	-5	-3	0	2	4
$f(x)$	22	6	-3	1	13

ANSWER:

e

18. Complete the table.

$$h(t) = \frac{1}{2}|t + 3|$$

t	-11	-9	0	-5	-1
$h(t)$					

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a.

t	-11	-9	0	-5	-1
$h(t)$	3	4	-3	1	1

b.

t	-11	-9	0	-5	-1
$h(t)$	4	3	$\frac{3}{2}$	1	1

c.

t	-11	-9	0	-5	-1
$h(t)$	4	3	1	$\frac{3}{2}$	1

d.

t	-11	-9	0	-5	-1
$h(t)$	4	3	$\frac{3}{2}$	1	1

e.

t	-11	-9	0	-5	-1
$h(t)$	4	3	0	1	1

ANSWER:

d

19. Complete the table.

$f(s) = \frac{|s - 2|}{s - 2}$

s	0	1	$\frac{9}{2}$	$\frac{11}{2}$	6
$f(s)$					

a.

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s	0	1	$\frac{9}{2}$	$\frac{11}{2}$	6
$f(s)$	-1	-1	1	1	1

b.

s	0	1	$\frac{9}{2}$	$\frac{11}{2}$	6
$f(s)$	-1	-1	1	3	1

c.

s	0	1	$\frac{9}{2}$	$\frac{11}{2}$	6
$f(s)$	-1	-1	3	1	1

d.

s	0	1	$\frac{9}{2}$	$\frac{11}{2}$	6
$f(s)$	1	-1	3	1	1

e.

s	0	1	$\frac{9}{2}$	$\frac{11}{2}$	6
$f(s)$	-1	1	1	1	1

ANSWER:

a

20. Complete the table.

$$f(x) = \begin{cases} -\frac{1}{2}x + 4, & x \leq 0 \\ (x - 2)^2, & x > 0 \end{cases}$$

x	-10	-4	0	3	4
$f(x)$					

a.

x	-10	-4	0	3	4
$f(x)$	11	9	-3	1	4

b.

x	-10	-4	0	3	4
$f(x)$	9	6	4	3	6

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c.

x	-10	-4	0	3	4
$f(x)$	9	6	4	1	4

d.

x	-10	-4	0	3	4
$f(x)$	9	6	0	1	4

e.

x	-10	-4	0	3	4
$f(x)$	9	8	4	4	1

ANSWER:

c

21. Find all real values of x such that $f(x) = 0$.

$$f(x) = 16 - 8x$$

- a. $x = 2$
- b. $x = 1$
- c. $x = 3$
- d. $x = 0$
- e. $x = 4$

ANSWER:

a

22. Find all real value of x such that $f(x) = 0$.

$$f(x) = \frac{8x - 8}{8}$$

- a. $x = 1$
- b. $x = \frac{1}{8}$
- c. $x = \pm 1$
- d. $x = -1$
- e. $x = \pm \frac{1}{8}$

ANSWER:

a

23. Find all real values of x such that $f(x) = 0$.

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$$f(x) = \frac{16 - x^2}{8}$$

- a. $x = \pm 7$
- b. $x = \pm 8$
- c. $x = \pm 6$
- d. $x = \pm 5$
- e. $x = \pm 4$

ANSWER:

e

24. Find all real values of x such that $f(x) = 0$.

$$f(x) = x^2 - 10x - 75$$

- a. $x = -15, 5$
- b. $x = -15, -5$
- c. $x = 5, 15$
- d. $x = -5, 15$
- e. $x = -10, 10$

ANSWER:

d

25. Find the domain of the function.

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

- a. All real numbers x such that $x > 0$
- b. All real numbers x
- c. All real numbers x such that $x < 0$
- d. Non-negative real numbers x
- e. Non-negative real numbers x except $x = 0$

ANSWER:

b

26. Find the domain of the function.

$$h(t) = \frac{4}{t}$$

- a. All real numbers t except $t = 0$
- b. Negative real numbers t
- c. All real numbers t such that $t > 0$

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- d. Non-negative real numbers t
- e. All real numbers t such that $t = 0$

ANSWER:

a

27. Find the domain of the function.

$$f(x) = \frac{x-3}{\sqrt{x}}$$

- a. Non-negative real numbers x except $x = 3$
- b. All real numbers x except $x = 0$
- c. Non-negative real numbers x
- d. All real numbers x
- e. All real numbers x such that $x > 0$

ANSWER:

e

28. Find the domain of the function.

$$f(x) = \frac{\sqrt{x+5}}{5+x}$$

- a. Non-negative real numbers x
- b. All real numbers x
- c. All real numbers x such that $x > -5$
- d. Non-negative real numbers x except $x = 5$
- e. All real numbers x such that $x < 5$

ANSWER:

c

29. Assume that the domain of f is the set $A = \{-4, -2, 0, 2, 4\}$. Determine the set of ordered pairs that represents the function f .

$$f(x) = x^2$$

- a. $\{(-4, 16), (-2, 16), (0, 0), (2, 16), (4, 16)\}$
- b. $\{(-4, -64), (-2, 4), (0, 0), (2, 4), (4, -64)\}$
- c. $\{(-4, 16), (-2, -8), (0, 0), (2, -8), (4, 16)\}$
- d. $\{(-4, 256), (-2, 4), (0, 0), (2, 4), (4, 256)\}$
- e. $\{(-4, 16), (-2, 4), (0, 0), (2, 4), (4, 16)\}$

ANSWER:

e

30. Assume that the domain of f is the set $A = \{-5, -3, 0, 3, 4\}$. Determine the set of ordered pairs that

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represents the function f .

$$f(x) = (x - 3)^2$$

- a. $\{(-5, 64), (-3, 0), (0, 9), (3, 1296), (4, 64)\}$
- b. $\{(-5, -512), (-3, 0), (0, 9), (3, 36), (4, -512)\}$
- c. $\{(-5, 64), (-3, -216), (0, 0), (3, -216), (4, 64)\}$
- d. $\{(-5, 4096), (-3, 0), (0, 0), (3, 36), (4, 4096)\}$
- e. $\{(-5, 64), (-3, 36), (0, 9), (3, 0), (4, 1)\}$

ANSWER:

e

31. Assume that the domain of f is the set $A = \{-5, -3, 0, 2, 4\}$. Determine the set of ordered pairs that represents the function f .

$$f(x) = |x + 1|$$

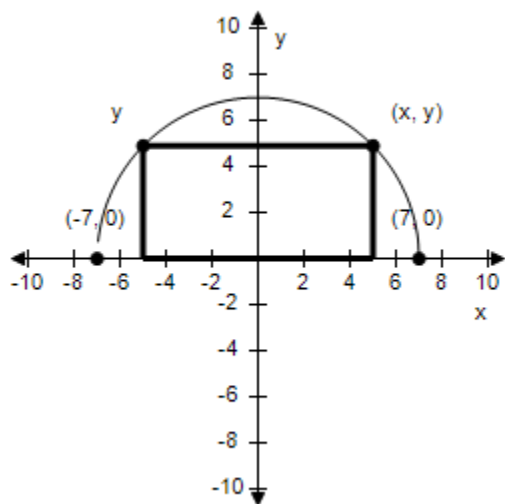
- a. $\{(-5, 4), (-3, 4), (0, 1), (2, 5), (4, 3)\}$
- b. $\{(-5, 4), (-3, 5), (0, 1), (2, 5), (4, 4)\}$
- c. $\{(-5, 7), (-3, 3), (0, 1), (2, 2), (4, 7)\}$
- d. $\{(-5, 4), (-3, 2), (0, 1), (2, 3), (4, 5)\}$
- e. $\{(-5, 6), (-3, 2), (0, 1), (2, 3), (4, 6)\}$

ANSWER:

d

$$y = \sqrt{49 - x^2}$$

32. A rectangle is bounded by the x -axis and the semicircle (see figure). Select the area A of the rectangle as a function of x , and determine the domain of the function.



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- a. $A(x) = 2|x|\sqrt{49 - x^2}$, $-7 \leq x \leq 7$
 b. $A(x) = -2x\sqrt{49 - x^2}$, $-7 \leq x \leq 7$
 c. $A(x) = x\sqrt{49 - x^2}$, $x \geq 0$
 d. $A(x) = 2x\sqrt{49 - x^2}$, $x \geq 0$
 e. $A(x) = |x|\sqrt{49 - x^2}$, all real numbers

ANSWER:

a

33. Find all real values of x such that $f(x) = 0$.

$$f(x) = x^3 - x^2 - 25x + 25$$

- a. $x = 0, 5$
 b. $x = 1, -5$
 c. $x = 0, -5$
 d. $x = 1, 5$
 e. $x = 1, \pm 5$

ANSWER:

e

34. Find the difference quotient and simplify your answer.

$$f(x) = x^2 - x + 1, \quad \frac{f(8 + h) - f(8)}{h}, \quad h \neq 0$$

- a. $\frac{f(8 + h) - f(8)}{h} = h + 15$, $h \neq 0$
 b. $\frac{f(8 + h) - f(8)}{h} = h + 19$, $h \neq 0$
 c. $\frac{f(8 + h) - f(8)}{h} = h + 18$, $h \neq 0$
 d. $\frac{f(8 + h) - f(8)}{h} = h + 16$, $h \neq 0$
 e. $\frac{f(8 + h) - f(8)}{h} = h + 17$, $h \neq 0$

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ANSWER:

a

35. Find the difference quotient and simplify your answer.

$$f(x) = 5x - x^2, \quad \frac{f(5+h) - f(5)}{h}, \quad h \neq 0$$

a. $\frac{f(5+h) - f(5)}{h} = -h-4, \quad h \neq 0$

b. $\frac{f(5+h) - f(5)}{h} = -h-2, \quad h \neq 0$

c. $\frac{f(5+h) - f(5)}{h} = -h-1, \quad h \neq 0$

d. $\frac{f(5+h) - f(5)}{h} = -h-5, \quad h \neq 0$

e. $\frac{f(5+h) - f(5)}{h} = -h-3, \quad h \neq 0$

ANSWER:

d

36. Does the table describe a function?

Input value	2001	2002	2003	2004	2005
Output value	50	80	50	70	60

- a. No
b. Yes

ANSWER:

b

37. Does the table describe a function?

Input value	40	60	40	50	70
Output value	2001	2002	2003	2004	2005

- a. Yes
b. No

ANSWER:

b

38. Does the table describe a function?

Input value	2	6	11	6	2
Output value	-12	-8	0	8	12

- a. Yes
b. No

ANSWER:

b

1.2 Functions

39. Does the table describe a function?

Input value	-3	-2	0	2	3
Output value	3	3	3	3	3

- a. No
b. Yes

ANSWER:

b

40. Which set of ordered pairs represents a function from P to Q ?

$$P = \{1, 2, 3, 4\} \quad Q = \{-1, 1, 3\}$$

- a. $\{(1, 3), (3, 1), (1, -1), (3, 3)\}$
 b. $\{(3, -1), (3, 1), (3, 3)\}$
 c. $\{(1, -1), (2, 1), (2, 3), (3, 1), (4, -1)\}$
 d. $\{(3, 1), (2, -1), (1, 1), (2, 3), (3, -1)\}$
 e. $\{(1, -1), (2, 1), (3, 3), (4, -1)\}$

ANSWER:

e

41. Which equation does not represent y as a function of x ?

- a. $8x = -2y$
 b. $-3y = 2$
 c. $-4x^2 - 5y = -9$
 d. $x + 7y = -2$
 e. $4y^2 - 8x = -2$

ANSWER:

e

42. Which equation does not represent y as a function of x ?

- a. $y = \sqrt{7 + 3x}$
 b. $y = |-8 - 2x^2|$
 c. $x = -5y - 5$
 d. $x = 3$
 e. $y = 8x - 8$

ANSWER:

d

43. Evaluate the function at the specified value of the independent variable and simplify.

$$g(p) = 8p + 1$$

$$g(16)$$

- a. $g(16) = 127$
 b. $g(16) = 128p + 8$

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- c. $g(16) = 16p - 1$
 d. $g(16) = 16p + 1$
 e. $g(16) = 129$

ANSWER:

e

44. Evaluate the function at the specified value of the independent variable and simplify.

$$f(p) = \begin{cases} -p, & p \leq -1 \\ -p^2 - 3p, & -1 < p \leq 1 \\ -p^3 - 3p^3, & p > 1 \end{cases}$$

$$f\left(\frac{1}{5}\right)$$

- a. $f\left(\frac{1}{5}\right) = \frac{1}{5}$
 b. $f\left(\frac{1}{5}\right) = -\frac{14}{125}$
 c. $f\left(\frac{1}{5}\right) = -\frac{44}{25}$
 d. $f\left(\frac{1}{5}\right) = \frac{14}{5}$
 e. $f\left(\frac{1}{5}\right) = \frac{14}{25}$

ANSWER:

e

45. Find all real values of x such that $f(x) = 0$.

$$f(x) = \frac{2x - 4}{6}$$

- a. $x = \frac{7}{2}$
 b. $x = \frac{5}{2}$
 c. $x = 3$
 d. $x = 2$
 e. $x = 4$

ANSWER:

d

46. Find all real value of x such that $f(x) = 0$.

$$f(x) = 36x^2 - 81$$

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- a. $x = \pm \sqrt[2]{3}$
- b. $x = \pm \sqrt[3]{2}$
- c. $x = -\sqrt[9]{4}$
- d. $x = \sqrt[2]{3}$
- e. $x = \pm \sqrt[9]{4}$

ANSWER:

b

47. Find the value(s) of x for which $f(x) = g(x)$.

$$f(x) = x^2 - 10x + 67$$

$$g(x) = 6x + 4$$

- a. $x = 7, 9$
- b. $x = -7, -9$
- c. $x = 67, -10, \sqrt[2]{3}$
- d. $x = 67, 77, \sqrt[2]{3}$
- e. $x = -57, \sqrt[2]{3}$

ANSWER:

a

48. Find the domain of the function.

$$f(w) = \frac{7w}{w+3}$$

- a. $w = -3, w = 0$
- b. $w = -3$
- c. all real numbers $w \neq -3, w \neq 0$
- d. all real numbers
- e. all real numbers $w \neq -3$

ANSWER:

e

49. Find the difference quotient and simplify your answer.

$$f(s) = -6s^2 + 6s, \quad \frac{f(4+h) - f(4)}{h}, \quad h \neq 0$$

a. $\frac{f(4+h) - f(4)}{h} = -42 - 6h$

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b. $\frac{f(4 + h) - f(4)}{h} = 6 - 6s + \frac{48}{s}$

c. $\frac{f(4 + h) - f(4)}{h} = 6 - 6h$

d. $\frac{f(4 + h) - f(4)}{h} = -42 - 6s + \frac{48}{s}$

e. $\frac{f(4 + h) - f(4)}{h} = 14 + h$

ANSWER:

a

50. Evaluate the function at the specified value of the independent variable and simplify.

$$g(s) = 4s + 9$$

$$g(2.4)$$

a. $g(2.4) = 9.6s + 36$

b. $g(2.4) = 0.6$

c. $g(2.4) = 18.6$

d. $g(2.4) = 2.4s + 9$

e. $g(2.4) = 2.4s - 9$

ANSWER:

c

51. Evaluate the function at the specified value of the independent variable and simplify.

$$f(p) = \frac{-7p}{4p - 3}$$

$$f(y - 5)$$

a. $f(y - 5) = \frac{-7y + 35}{4y - 23}$

b. $f(y - 5) = \frac{-7y - 35}{4y - 23}$

c. $f(y - 5) = \frac{-7p + 35}{4p - 23}$

d. $f(y - 5) = \frac{35}{17}$

e. $f(y - 5) = \frac{35}{23}$

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ANSWER:

a

52. Find the domain of the function.

$$g(s) = \sqrt{49 - s^2}$$

- a. $-7 \leq s \leq 7$
- b. $s \leq -7$ or $s \geq 7$
- c. $s \geq 0$
- d. $s \leq 7$
- e. all real numbers

ANSWER:

a

53. Let the function f be defined by the equation $y = f(x)$, where x and $f(x)$ are real numbers. Find the domain

$$f(x) = \sqrt{4x^2 + 4}$$

of the function

- a. $(-\infty, -\frac{4}{16}) \cup (\frac{4}{16}, +\infty)$
domain:
- b. $(-\infty, -\frac{\sqrt{4}}{4})$
domain:
- c. $(\frac{4}{16}, +\infty)$
domain:
- d. $(-\frac{\sqrt{4}}{4}, \frac{\sqrt{4}}{4})$
domain:
- e. $(-\infty, -\frac{\sqrt{4}}{4}] \cup [\frac{\sqrt{4}}{4}, +\infty)$
domain:

ANSWER:

e

54. Let the function f be defined by the equation $y = f(x)$, where x and $f(x)$ are real numbers. Find the domain

$$f(x) = \sqrt{25x^2 - 11}$$

and range of the function

- a. $(-\infty, -\frac{11}{25})$
domain:
- b. $(-\frac{11}{5}, \frac{11}{5})$
domain:

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c. $(-\infty, -\frac{11}{25}] \cup [\frac{11}{25}, +\infty)$

domain:

d. $(\frac{\sqrt{11}}{5}, +\infty)$

domain:

e. $(-\infty, -\frac{\sqrt{11}}{5}] \cup [\frac{\sqrt{11}}{5}, +\infty)$

domain:

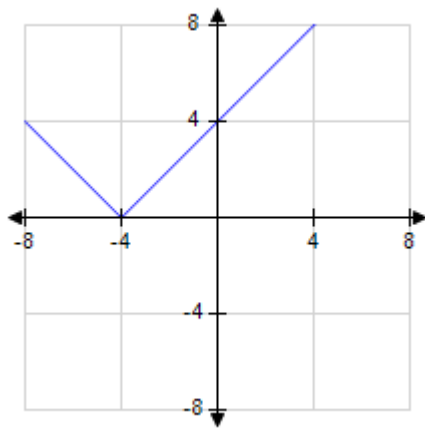
ANSWER:

e

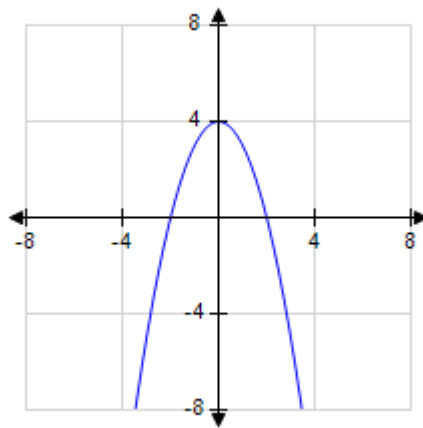
55. Find the graph of the equation.

$$f(x) = |x - 4|$$

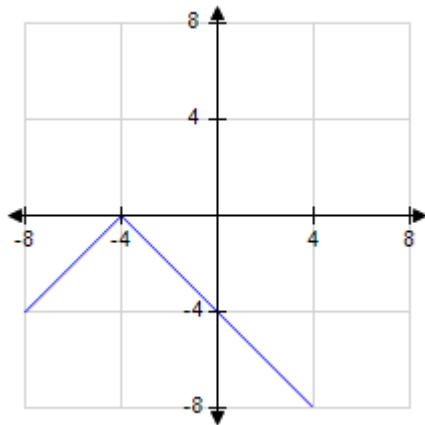
a.



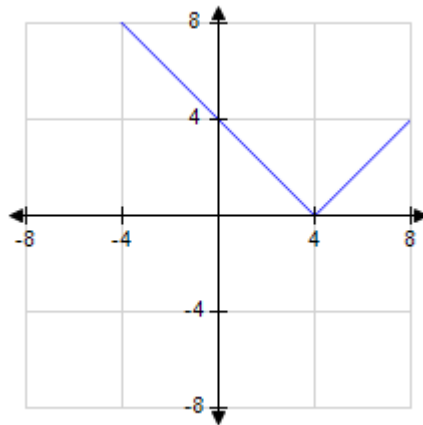
b.



c.



d.



ANSWER:

d

56. Evaluate the difference quotient for the function.

1.2 Functions

$$f(x) = 4x - 9$$

- a. -9
- b. $\frac{9}{4}$
- c. 9
- d. $4x + 9$
- e. 4

ANSWER:

e

Indicate whether the equation determines y to be a function of x . Match each equation with the corresponding answer.

Choose the correct letter for each question.

- a. $y - 2x = 0$
- b. $x = -2$

57. yes

ANSWER:

a

58. no

ANSWER:

b