

**Student:** \_\_\_\_\_  
**Date:** \_\_\_\_\_

**Instructor:** Joe Betters  
**Course:** Pre-Calculus Pre AP (Master Course)

**Assignment:** Chapter 2 Review

1. For the function  $f$  defined by  $f(x) = \frac{7x}{x^2 + 6}$ , find the following values.

- (a)  $f(-5) =$  \_\_\_\_\_ (Simplify your answer.)  
 (b)  $f(-x) =$  \_\_\_\_\_ (Simplify your answer.)  
 (c)  $-f(x) =$  \_\_\_\_\_ (Simplify your answer.)  
 (d)  $f(x+h) =$  \_\_\_\_\_ (Simplify your answer.)

ID: 2.1.41

2. Find the domain of the function.

$$g(x) = \frac{x+9}{x^2-4}$$

The domain is \_\_\_\_\_.  
 (Type your answer in interval notation.)

ID: 2.1.51

3. Find the domain of the function.

$$P(t) = \frac{\sqrt{t-6}}{4t-32}$$

Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice.

- A.** The domain is  $\{t \mid \underline{\hspace{2cm}}\}$ .  
 (Simplify your answer. Type an inequality.)
- B.** The domain is  $\{t \mid t \leq \underline{\hspace{2cm}}, t \neq \underline{\hspace{2cm}}\}$ .  
 (Simplify your answer. Use a comma to separate answers as needed.)
- C.** The domain is  $\{t \mid t \neq \underline{\hspace{2cm}}\}$ .  
 (Simplify your answer. Use a comma to separate answers as needed.)
- D.** The domain is  $\{t \mid t \geq \underline{\hspace{2cm}}, t \neq \underline{\hspace{2cm}}\}$ .  
 (Simplify your answer. Use a comma to separate answers as needed.)
- E.** The domain is all real numbers.

ID: 2.1.61

4. For the given functions  $f$  and  $g$ , complete parts (a)-(h). For parts (a)-(d), also find the domain.

$$f(x) = \sqrt{2x}; g(x) = 7x - 4$$

(a) Find  $(f + g)(x)$ .

$$(f + g)(x) = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

What is the domain of  $f + g$ ? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is  $\{x \mid \underline{\hspace{2cm}}\}$ .  
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- B. The domain is  $\{x \mid x \text{ is any real number}\}$ .

(b) Find  $(f - g)(x)$ .

$$(f - g)(x) = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

What is the domain of  $f - g$ ? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is  $\{x \mid \underline{\hspace{2cm}}\}$ .  
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- B. The domain is  $\{x \mid x \text{ is any real number}\}$ .

(c) Find  $(f \cdot g)(x)$ .

$$(f \cdot g)(x) = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

What is the domain of  $f \cdot g$ ? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is  $\{x \mid \underline{\hspace{2cm}}\}$ .  
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- B. The domain is  $\{x \mid x \text{ is any real number}\}$ .

(d) Find  $\left(\frac{f}{g}\right)(x)$ .

$$\left(\frac{f}{g}\right)(x) = \underline{\hspace{2cm}}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

What is the domain of  $\frac{f}{g}$ ? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is  $\{x \mid \underline{\hspace{2cm}}\}$ .  
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- B. The domain is  $\{x \mid x \text{ is any real number}\}$ .

(e) Find  $(f + g)(5)$ .

$$(f + g)(5) = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

(f) Find  $(f - g)(7)$ .

$$(f - g)(7) = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

(g) Find  $(f \cdot g)(2)$ .

$$(f \cdot g)(2) = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

(h) Find  $\left(\frac{f}{g}\right)(8)$ .

$$\left(\frac{f}{g}\right)(8) = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

ID: 2.1.67

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5. Find the difference quotient of  $f$ ; that is, find  $\frac{f(x+h) - f(x)}{h}$ ,  $h \neq 0$ , for the following function. Be sure to simplify.

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

$$\frac{f(x+h) - f(x)}{h} = \underline{\hspace{2cm}}$$

ID: 2.1.77

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6. If a rock falls from a height of 30 meters on Earth, the height  $H$  (in meters) after  $x$  seconds is approximately  $H(x) = 30 - 4.9x^2$ .

(a) What is the height of the rock when  $x = 1.3$  seconds?

The height of the rock when  $x = 1.3$  seconds is                      meters.

(Round to three decimal places as needed.)

(b) When is the height of the rock 5 meters?

The height of the rock is 5 meters when  $x \approx$                       seconds.

(Round to two decimal places as needed.)

(c) When does the rock strike the ground?

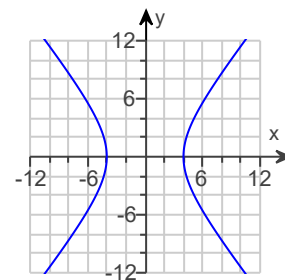
The rock strikes the ground when  $x \approx$                       seconds.

(Round to two decimal places as needed.)

ID: 2.1.95

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7. Determine whether the graph is that of a function by using the vertical-line test. If it is, use the graph to find
- its domain and range.
  - the intercepts, if any.
  - any symmetry with respect to the x-axis, y-axis, or the origin.



Is the graph that of a function?

- Yes  
 No

What are the domain and range of the function? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A.** The domain is \_\_\_\_\_. The range is \_\_\_\_\_.  
 (Type your answers in interval notation.)
- B.** The graph is not that of a function.

What are the intercepts of the function? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

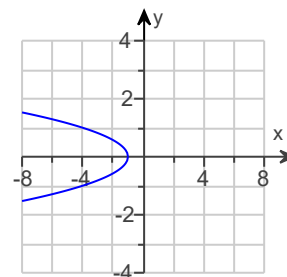
- A.** The intercept(s) is/are \_\_\_\_\_.  
 (Type an ordered pair. Use a comma to separate answers as needed.)
- B.** The graph is not that of a function.

If the graph is that of a function, determine what kinds of symmetry it has. Select all that apply.

- A.** The graph is symmetrical with respect to the origin.
- B.** The graph is symmetrical with respect to the y-axis.
- C.** The graph is symmetrical with respect to the x-axis.
- D.** The graph is not symmetrical.
- E.** The graph is not that of a function.

ID: 2.2.11

8. Determine whether the graph is that of a function by using the vertical-line test. If it is, use the graph to find
- its domain and range.
  - the intercepts, if any.
  - any symmetry with respect to the x-axis, y-axis, or the origin.



Is the graph that of a function?

- Yes  
 No

If the graph is that of a function, what are the domain and range of the function? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A.** The domain is \_\_\_\_\_. The range is \_\_\_\_\_.  
 (Type your answers in interval notation.)
- B.** The graph is not that of a function.

If the graph is that of a function, what are the intercepts of the function? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

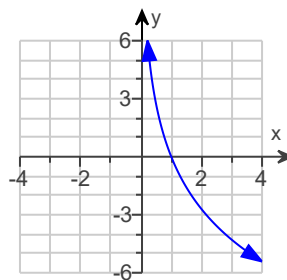
- A.** The intercept(s) is/are \_\_\_\_\_.  
 (Type an ordered pair. Use a comma to separate answers as needed.)
- B.** The graph is not that of a function.

If the graph is that of a function, determine what kinds of symmetry it has. Select all that apply.

- A.** The graph is a function and is symmetrical with respect to the origin.
- B.** The graph is a function and is symmetrical with respect to the y-axis.
- C.** The graph is a function and is symmetrical with respect to the x-axis.
- D.** The graph is a function and is not symmetrical.
- E.** The graph is not that of a function.

ID: 2.2.15

9. Determine whether the graph below is that of a function by using the vertical-line test. If it is, use the graph to find
- its domain and range.
  - the intercepts, if any.
  - any symmetry with respect to the x-axis, y-axis, or the origin.



Is the graph that of a function?

- Yes  
 No

If the graph is that of a function, what are the domain and range of the function? Select the correct choice below and fill in any answer boxes within your choice.

- A. The domain is \_\_\_\_\_. The range is \_\_\_\_\_.  
(Type your answers in interval notation.)
- B. The graph is not a function.

What are the intercepts? Select the correct choice below and fill in any answer boxes within your choice.

- A. The intercepts are \_\_\_\_\_.  
(Type an ordered pair. Use a comma to separate answers as needed.)
- B. There are no intercepts.
- C. The graph is not a function.

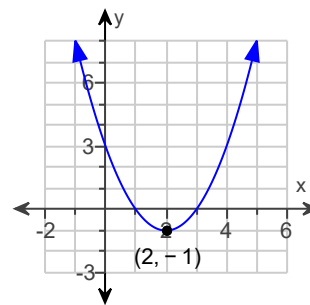
Determine if the graph is symmetrical.

- A. It is symmetrical with respect to the x-axis.
- B. It is symmetrical with respect to the y-axis.
- C. It is symmetrical with respect to the origin.
- D. The graph is not symmetrical.
- E. The graph is not a function.

ID: 2.2.17

10. Determine whether the graph is that of a function by using the vertical-line test. If it is, use the graph to find:

- (a) The domain and range
- (b) The intercepts, if any
- (c) Any symmetry with respect to the x-axis, the y-axis, or the origin



Is the graph that of a function?

- Yes
- No

(a) If the graph is that of a function, what are its domain and range? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is \_\_\_\_\_. The range is \_\_\_\_\_.  
(Type your answers in interval notation.)
- B. The graph is not a function.

(b) If the graph is that of a function, what are its intercepts? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

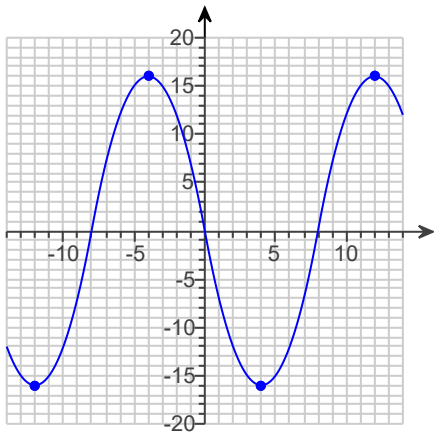
- A. The intercepts are \_\_\_\_\_.  
(Type an ordered pair. Use a comma to separate answers as needed.)
- B. There are no intercepts.
- C. The graph is not a function.

(c) If the graph is that of a function, determine what kinds of symmetry it has. Select all that apply.

- A. It is symmetric with respect to the origin.
- B. It is symmetric with respect to the x-axis.
- C. It is symmetric with respect to the y-axis.
- D. The graph is not symmetric with respect to the x-axis, y-axis, or the origin.
- E. The graph is not a function.

ID: 2.2.21

11. Use the graph of the function  $f$  given below to answer the questions.



List the values of  $x$  at which  $f$  has a local maximum. Select the correct choice below and fill in any answer boxes within your choice.

- A.  $x =$  \_\_\_\_\_  
(Type an integer. Use a comma to separate answers as needed.)
- B. There are no local maxima.

What are these local maxima, if they exist? Select the correct choice below and fill in any answer boxes within your choice.

- A. The local maxima are \_\_\_\_\_.  
(Type an integer. Use a comma to separate answers as needed.)
- B. There are no local maxima.

ID: 2.3.19

12. Determine algebraically whether the given function is even, odd, or neither.

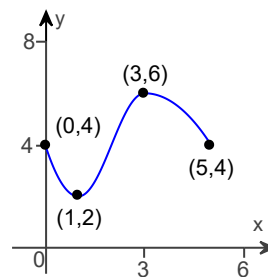
$$g(x) = -7x^3 + 6$$

- Odd
- Even
- Neither

ID: 2.3.35



13. For the graph of a function  $y = f(x)$  shown to the right, find the absolute maximum and the absolute minimum, if it exists.



Select the correct answer below and, if necessary, fill in the answer box within your choice.

- A. The absolute maximum of  $y = f(x)$  is \_\_\_\_\_.  
(Type an integer or a simplified fraction.)
- B. There is no absolute maximum for  $y = f(x)$ .

Select the correct answer below and, if necessary, fill in the answer box within your choice.

- A. The absolute minimum of  $y = f(x)$  is \_\_\_\_\_.  
(Type an integer or a simplified fraction.)
- B. There is no absolute minimum for  $y = f(x)$ .

ID: 2.3.47

14. Let  $f(x) = 9x - 6$ .

- (a) Find the average rate of change from 3 to 8.  
(b) Find an equation of the secant line containing  $(3, f(3))$  and  $(8, f(8))$ .

(a) The average rate of change from 3 to 8 is \_\_\_\_\_. (Simplify your answer.)

(b) An equation of the secant line containing  $(3, f(3))$  and  $(8, f(8))$  is \_\_\_\_\_.  
(Type your answer in slope-intercept form.)

ID: 2.3.65

15. Let  $g(x) = 2x^2 - 3$ .

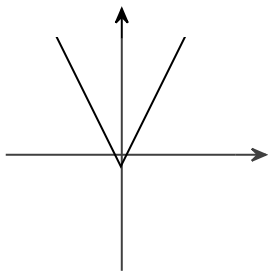
- (a) Find the average rate of change from  $-7$  to  $8$ .  
(b) Find an equation of the secant line containing  $(-7, g(-7))$  and  $(8, g(8))$ .

(a) The average rate of change from  $-7$  to  $8$  is \_\_\_\_\_. (Simplify your answer.)

(b) An equation of the secant line containing  $(-7, g(-7))$  and  $(8, g(8))$  is \_\_\_\_\_.  
(Type your answer in slope-intercept form.)

ID: 2.3.67

16. Choose whether the graph below most resembles the graph of a square root function, a cube root function, a reciprocal function, or an absolute value function.



- Reciprocal function  
 Absolute value function  
 Cube root function  
 Square root function

ID: 2.4.15

17.

$$f(x) = \begin{cases} x^2 & \text{if } x < 0 \\ 0 & \text{if } x = 0 \\ 2x + 2 & \text{if } x > 0 \end{cases}$$

Find: (a)  $f(-4)$  (b)  $f(0)$  (c)  $f(2)$

(a)  $f(-4) =$  \_\_\_\_\_ (Simplify your answer.)

(b)  $f(0) =$  \_\_\_\_\_ (Simplify your answer.)

(c)  $f(2) =$  \_\_\_\_\_ (Simplify your answer.)

ID: 2.4.25

18.

$$\text{If } f(x) = \begin{cases} 4x - 5 & \text{if } -4 \leq x \leq 4 \\ x^3 - 4 & \text{if } 4 < x \leq 5 \end{cases}, \text{ find: (a) } f(0), \text{ (b) } f(1), \text{ (c) } f(4), \text{ and (d) } f(5).$$

(a)  $f(0) =$  \_\_\_\_\_

(b)  $f(1) =$  \_\_\_\_\_

(c)  $f(4) =$  \_\_\_\_\_

(d)  $f(5) =$  \_\_\_\_\_

ID: 2.4.27

19. The function  $f$  is defined as follows.

$$f(x) = \begin{cases} x & \text{if } x \neq 0 \\ 4 & \text{if } x = 0 \end{cases}$$

- (a) Find the domain of the function.  
 (b) Locate any intercepts.  
 (c) Graph the function.  
 (d) Based on the graph, find the range.  
 (e) Is  $f$  continuous on its domain?

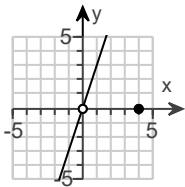
(a) The domain of the function  $f$  is \_\_\_\_\_.  
 (Type your answer in interval notation.)

(b) Locate any intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

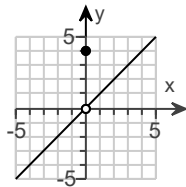
- A. The intercept(s) is/are \_\_\_\_\_.  
 (Type an ordered pair. Use a comma to separate answers as needed.)
- B. There are no intercepts.

(c) Choose the correct graph below.

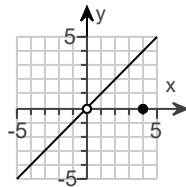
A.



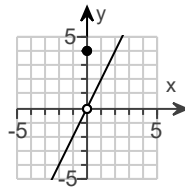
B.



C.



D.



(d) The range of the function  $f$  is \_\_\_\_\_.  
 (Type your answer in interval notation.)

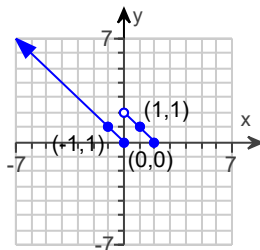
(e) Is  $f$  continuous on its domain? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. Yes,  $f$  is continuous on its domain.
- B. No,  $f$  is discontinuous at  $x =$  \_\_\_\_\_.  
 (Use a comma to separate answers as needed.)

ID: 2.4.29

20.

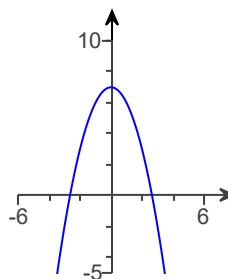
The graph of a piecewise-defined function is given. Write a definition for the function that best describes this graph.



$$f(x) = \begin{cases} \underline{\hspace{2cm}} & \text{if } x \leq \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} & \text{if } 0 < x \leq \underline{\hspace{2cm}} \end{cases}$$

ID: 2.4.43

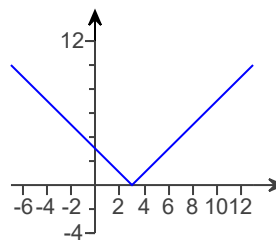
21. Choose the function that matches the given graph.



- $y = x^2 - 7$   
  $y = -|x| + 7$   
  $y = -(x - 7)^2$   
  $y = -x^2 + 7$

ID: 2.5.7

22. Choose the function that matches the given graph.



- $y = (x - 3)^2$   
  $y = |x + 3|$   
  $y = |x - 3|$   
  $y = |x| + 3$

ID: 2.5.17

23. Write the function whose graph is the graph of  $y = \sqrt{x}$ , but is shifted to the left 9 units.
- 

$y =$  \_\_\_\_\_  
(Simplify your answer.)

ID: 2.5.19

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24. Find the function that is finally graphed after the following transformations are applied to the graph of  $y = \sqrt{x}$  in the order listed.

- (1) Shift up 7 units
  - (2) Reflect about the x-axis
  - (3) Reflect about the y-axis
- 

$y =$  \_\_\_\_\_

ID: 2.5.27

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25. Find the function that is finally graphed after the following transformations are applied to the graph of  $y = \sqrt{x}$  in the order listed.

- (1) Reflect about the x - axis
  - (2) Shift down 3 units
  - (3) Shift right 8 units
- 

$y =$  \_\_\_\_\_

ID: 2.5.29

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26. Consider the functions  $f(x) = -4x + 6$  and  $g(x) = -\frac{1}{4}(x - 6)$ .

- (a) Find  $f(g(x))$ .  
(b) Find  $g(f(x))$ .  
(c) Determine whether the functions  $f$  and  $g$  are inverses of each other.
- 

(a) What is  $f(g(x))$ ?

$f(g(x)) =$  \_\_\_\_\_ (Simplify your answer.)

Give any values of  $x$  that need to be excluded from  $f(g(x))$ . Select the correct choice below and fill in any answer boxes within your choice.

- A.  $x \neq$  \_\_\_\_\_  
(Use a comma to separate answers as needed.)  
 B. No values should be excluded from the domain.

(b) What is  $g(f(x))$ ?

$g(f(x)) =$  \_\_\_\_\_ (Simplify your answer.)

Give any values of  $x$  that need to be excluded from  $g(f(x))$ . Select the correct choice below and fill in any answer boxes within your choice.

- A.  $x \neq$  \_\_\_\_\_  
(Use a comma to separate answers as needed.)  
 B. No values should be excluded from the domain.

(c) Are the functions  $f$  and  $g$  inverses of each other? Choose the correct answer below.

- No  
 Yes

ID: 5.2.33

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27. The function  $f(x) = \frac{8}{5+x}$  is one-to-one. Find its inverse and check your answer.

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$f^{-1}(x) =$  \_\_\_\_\_ (Simplify your answer.)

ID: 5.2.61

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28. The inverse notation  $f^{-1}$  used in a pure mathematics problem is not always used when finding inverses of applied problems. Rather, the inverse of a function such as  $C = C(q)$  will be  $q = q(C)$ . The following problem illustrates this idea.

The ideal body weight  $W$  for men (in kilograms) as a function of height  $h$  (in inches) is given by the following function.

$$W(h) = 49 + 2.3(h - 59)$$

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- (a) What is the ideal weight of a 6-foot male?

The ideal weight,  $W$ , of a 6-foot male is \_\_\_\_\_ kilograms.

(Round to the nearest tenth as needed.)

- (b) Express the height  $h$  as a function of weight  $W$ . Verify your answer by checking that  $W(h(W)) = W$  and  $h(W(h)) = h$ .

$h(W) =$  \_\_\_\_\_

(Use integers or decimals for any numbers in the expression. Round to the nearest tenth as needed.)

- (c) What is the height of a male who is at his ideal weight of 80 kilograms?

The height of a male who is at his ideal weight of 80 kilograms is approximately \_\_\_\_\_ inches.

(Round to the nearest whole number as needed.)

ID: 5.2.91

1.  $-\frac{35}{31}$

$$\frac{-7x}{x^2 + 6}$$

$$\frac{-7x}{x^2 + 6}$$

$$\frac{7x + 7h}{x^2 + 2xh + h^2 + 6}$$

---

2.  $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$ 

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3. D. The domain is  $\{t \mid t \geq \underline{6}, t \neq \underline{8}\}$ .  
 (Simplify your answer. Use a comma to separate answers as needed.)

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4.  $\sqrt{2x} + 7x - 4$

A. The domain is  $\{x \mid \underline{x \geq 0}\}$ .

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

$$\sqrt{2x} - 7x + 4$$

A. The domain is  $\{x \mid \underline{x \geq 0}\}$ .

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

$$7x\sqrt{2x} - 4\sqrt{2x}$$

A. The domain is  $\{x \mid \underline{x \geq 0}\}$ .

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

$$\frac{\sqrt{2x}}{7x - 4}$$

A. The domain is  $\{x \mid \underline{x \geq 0, x \neq \frac{4}{7}}\}$ .

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

$$\sqrt{10} + 31$$

$$\sqrt{14} - 45$$

$$20$$

$$\frac{1}{13}$$

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5.  $2x + h - 4$ 

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6. 21.719

2.26

2.47



7. No

B. The graph is not that of a function.

B. The graph is not that of a function.

E. The graph is not that of a function.

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8. No

B. The graph is not that of a function.

B. The graph is not that of a function.

E. The graph is not that of a function.

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9. Yes

A. The domain is (0,∞). The range is (-∞,∞).(Type your answers in interval notation.)

A. The intercepts are (1,0).(Type an ordered pair. Use a comma to separate answers as needed.)

D. The graph is not symmetrical.

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10. Yes

A. The domain is (-∞,∞). The range is [-1,∞).(Type your answers in interval notation.)

A. The intercepts are (3,0),(1,0),(0,3)(Type an ordered pair. Use a comma to separate answers as needed.)

D. The graph is not symmetric with respect to the x-axis, y-axis, or the origin.

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11. A. x = -4, 12 (Type an integer. Use a comma to separate answers as needed.)

A. The local maxima are 16, 16.(Type an integer. Use a comma to separate answers as needed.)

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12. Neither

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13. A. The absolute maximum of  $y = f(x)$  is 6.(Type an integer or a simplified fraction.)

A. The absolute minimum of  $y = f(x)$  is 2.(Type an integer or a simplified fraction.)

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14. 9

$$y = 9x - 6$$

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15. 2

$$y = 2x + 109$$

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16. Absolute value function

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17. 16

0

6

18. -5

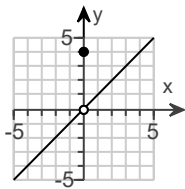
-1

11

121

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

A. The intercept(s) is/are **(0,4)**. (Type an ordered pair. Use a comma to separate answers as needed.)



B.

$(-\infty, 0) \cup (0, \infty)$

B. No,  $f$  is discontinuous at  $x =$  **0**. (Use a comma to separate answers as needed.)

20.  $-x$

0

$-x + 2$

2

21.  $y = -x^2 + 7$

22.  $y = |x - 3|$

23.  $\sqrt{x+9}$

24.  $-\sqrt{-x} - 7$

25.  $-\sqrt{x-8} - 3$

26. x

B. No values should be excluded from the domain.

x

B. No values should be excluded from the domain.

Yes

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27.  $\frac{8 - 5x}{x}$ 

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28. 78.9

$$\frac{W - 49}{2.3} + 59$$

72

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