

1. Let $f(x) = x^2 - 2x + 17$, $g(x) = \frac{3}{\sqrt{x}}$, and $h(x) = \sqrt{7-x}$. Find $f(0)$, $g(0)$, $h(0)$, $f(a)$, and $f(-x)$.

Find $f(0)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ☒ A. $f(0) =$
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)
- ☐ B. $f(0)$ is not defined.

Find $g(0)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ☐ A. $g(0) =$
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)
- ☒ B. $g(0)$ is not defined.

Find $h(0)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ☒ A. $h(0) =$
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)
- ☐ B. $h(0)$ is not defined.

Find $f(a)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ☒ A. $f(a) =$
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)
- ☐ B. $f(a)$ is not defined.

Find $f(-x)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ☒ A. $f(-x) =$
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)
- ☐ B. $f(-x)$ is not defined.

2. Let $f(x) = x^2 - 2x + 5$, $g(x) = \frac{5}{\sqrt{x}}$, and $h(x) = \sqrt{1-x}$. Find $f(-6)$, $g(-6)$, $h(-6)$, $h(b)$, and $h(-x)$.
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Select the correct choice below and, if necessary, fill in the answer box to complete your answer.

- ☒ A. $f(-6) =$ (Simplify your answer.)
- ☐ B. The solution is not a real number.

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

- ☐ A. $g(-6) =$ (Simplify your answer. Type an exact answer, using radicals as needed.)
- ☒ B. The solution is not a real number.

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

- ☒ A. $h(-6) =$ (Simplify your answer. Type an exact answer, using radicals as needed.)
- ☐ B. The solution is not a real number.

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

- ☒ A. $h(b) =$ (Simplify your answer. Type an exact answer, using radicals as needed.)
- ☐ B. The solution is not a real number.

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

- ☒ A. $h(-x) =$ (Simplify your answer. Type an exact answer, using radicals as needed.)
- ☐ B. The solution is not a real number.
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3. Let $f(x) = \frac{2x}{\sqrt{25-x^2}}$. Find each function value.

a. $f(0)$ b. $f(1)$ c. $f(5)$ d. $f(-5)$ e. $f(-x)$

a. Find $f(0)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

☒ A. $f(0) =$
(Simplify your answer. Type an exact answer, using radicals as needed.
Type an integer or a fraction.)

☐ B. The value $f(0)$ is not defined.

☐ C. The value $f(0)$ is not a real number.

b. Find $f(1)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

☒ A. $f(1) =$
(Simplify your answer. Type an exact answer, using radicals as needed.
Type an integer or a fraction.)

☐ B. The value $f(1)$ is not defined.

☐ C. The value $f(1)$ is not a real number.

c. Find $f(5)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

☐ A. $f(5) =$
(Simplify your answer. Type an exact answer, using radicals as needed.
Type an integer or a fraction.)

☒ B. The value $f(5)$ is not defined.

☐ C. The value $f(5)$ is not a real number.

d. Find $f(-5)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

☐ A. $f(-5) =$
(Simplify your answer. Type an exact answer, using radicals as needed.
Type an integer or a fraction.)

☒ B. The value $f(-5)$ is not defined.

☐ C. The value $f(-5)$ is not a real number.

e. Find $f(-x)$. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

☒ A. $f(-x) =$
(Simplify your answer. Type an exact answer, using radicals as needed.
Type an integer or a fraction.)

☐ B. The value $f(-x)$ is not defined.

☐ C. The value $f(-x)$ is not a real number.

4. Find the domain of the function.

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

The domain of the function $f(x)$ is .

(Type your answer in interval notation.)

5. Find the domain of the function.

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

The domain of the function $f(x)$ is $(-\infty, 2) \cup (2, \infty)$.

(Type your answer in interval notation.)

6. Find the domain of the following function.

$$G(x) = \frac{\sqrt{x-9}}{x+4}$$

The domain of the function is $[9, \infty)$.

(Type your answer in interval notation.)

7. Find the domain of the function.

$$f(x) = \frac{4}{\sqrt{x+7}}$$

The domain is $(-7, \infty)$.

(Type your answer in interval notation.)

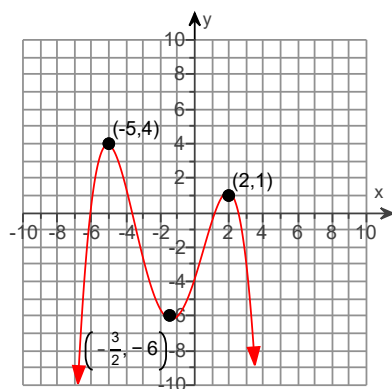
8. Find the domain of the function.

$$F(x) = \frac{x+7}{x^2+4x+3}$$

The domain of the function $F(x)$ is $(-\infty, -3) \cup (-3, -1) \cup (-1, \infty)$.

(Type your answer in interval notation.)

9. Locate relative maximum and relative minimum points on the graph. State whether each relative extremum point is a turning point.



Where are the relative maximum points on the graph? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ☒ A.
(Type an ordered pair. Use a comma to separate answers as needed.)
- ☐ B. There are no relative maximum points.

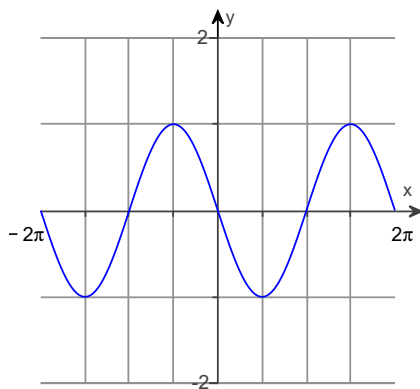
Where are the relative minimum points on the graph? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ☒ A.
(Type an ordered pair. Use a comma to separate answers as needed.)
- ☐ B. There are no relative minimum points.

Which of the relative extremum points are turning points?

- ☐ A. $\left(-\frac{3}{2}, -6\right)$
- ☐ B. $(-5, 4), (2, 1)$
- ☒ C. $(-5, 4), (2, 1), \text{ and } \left(-\frac{3}{2}, -6\right)$
- ☐ D. There are no turning points.

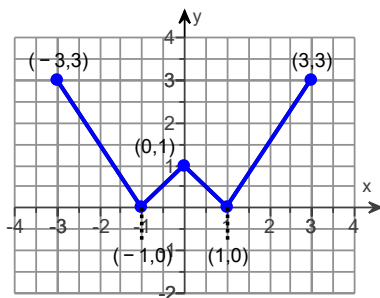
10. Determine visually whether the function is even, odd, or neither even nor odd.



Is the function odd, even, or neither?

- ☒ A. Odd
☐ B. Even
☐ C. Neither

11. Using the given graph of the function f , find whether the function is even, odd, or neither.



Determine whether the function is even, odd, or neither.

- ☒ Even
☐ Odd
☐ Neither

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

$$f(x) = 4x^2 + 6$$

Which of the following is correct for the given function?

- ☒ A. The function $f(x)$ is an even function.
☐ B. The function $f(x)$ is neither even nor odd.
☐ C. The function $f(x)$ is an odd function.

13. Determine if the function is even, odd, or neither.

$$f(x) = x^7 + x^5$$

The function f is:

- ☐ A. neither
☐ B. even
☒ C. odd

14. Determine if the function is even, odd, or neither.

$$f(x) = 5x + 2$$

Choose the correct answer below.

- ☒ A. Neither
☐ B. Odd
☐ C. Even

15. Find the average rate of change of the function $f(x) = 2x + c$ from $a = 1$ to $b = 5$.

The average rate of change from $a = 1$ to $b = 5$ is .
(Type an integer or a simplified fraction.)

16. Find the average rate of change of the function $g(x) = 6x^2 - 6$ as x changes from -2 to 7 .

The average rate of the function g as x changes from -2 to 7 is .
(Type an integer or a simplified fraction.)

17. Find the average rate of change of the function as x changes from a to b .

$$f(x) = (4 - x)^2; a = 1, b = 4$$

What is the average rate of change?

(Type an integer or a simplified fraction.)

- 18.

Find the average rate of change of the function $f(x) = \frac{1}{x-1}$ as x changes from $x = -6$ to $x = 0$.

The average rate of change is .
(Type an integer or a simplified fraction.)

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

$$f(x) = 3x^2 - 6x + 9$$

$$\frac{f(x+h) - f(x)}{h} = \text{ }$$

(Simplify your answer.)

20. Find the difference quotient $\frac{s(x+h) - s(x)}{h}$ for the following function and simplify it.

$$s(x) = \frac{11}{x}$$

$$\frac{s(x+h) - s(x)}{h} = \text{ } \text{ (Simplify your answer.)}$$

21. Find each of the following values given that $f(x) = \frac{1}{\sqrt{x+5}}$ and $g(x) = 3x + 4$.

a. $(f + g)(-1)$

b. $(f - g)(0)$

c. $(f \cdot g)(-4)$

d. $\left(\frac{f}{g}\right)(1)$

a. $(f + g)(-1) = \frac{3}{2}$

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

b. $(f - g)(0) = \frac{\sqrt{5} - 20}{5}$

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

c. $(f \cdot g)(-4) = -8$

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

d. $\left(\frac{f}{g}\right)(1) = \frac{\sqrt{6}}{42}$

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

22. The functions $f(x) = \sqrt{x}$ and $g(x) = x - 20$ are given. Find each of the following functions and state its domain.

$f + g$, $f - g$, fg , and $\frac{f}{g}$

$(f + g)(x) = \sqrt{x} + x - 20$ (Simplify your answer.)

What is the domain of $f + g$?

$[0, \infty)$

(Type your answer in interval notation.)

$(f - g)(x) = \sqrt{x} - x + 20$ (Simplify your answer.)

What is the domain of $f - g$?

$[0, \infty)$

(Type your answer in interval notation.)

$(fg)(x) = (x - 20)\sqrt{x}$ (Simplify your answer.)

What is the domain of fg ?

$[0, \infty)$

(Type your answer in interval notation.)

$\left(\frac{f}{g}\right)(x) = \frac{\sqrt{x}}{x - 20}$ (Simplify your answer.)

What is the domain of $\frac{f}{g}$?

$[0, 20) \cup (20, \infty)$

(Type your answer in interval notation.)

23. Functions f and g are given as follows.

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

$$g(x) = \frac{x}{x+2}$$

Find each of the following functions and state its domain.

(a) $f + g$

(b) $f - g$

(c) $f \cdot g$

(d) $\frac{f}{g}$

(e) $\frac{g}{f}$

(a) $(f + g)(x) = \frac{x+4}{x+2}$ (Simplify your answer.)

What is the domain of $f + g$? Choose the correct answer below.

- ☒ A. $(-\infty, -2) \cup (-2, \infty)$ ☐ B. $(-\infty, -4) \cup (-4, \infty)$
☐ C. $(-\infty, 2) \cup (2, 4) \cup (4, \infty)$ ☐ D. $(-\infty, 2) \cup (4, \infty)$

(b) $(f - g)(x) = \frac{4-x}{x+2}$ (Simplify your answer.)

What is the domain of $f - g$? Choose the correct answer below.

- ☒ A. $(-\infty, -2) \cup (-2, \infty)$ ☐ B. $(-\infty, 2) \cup (4, \infty)$
☐ C. $(-\infty, 2) \cup (2, 4) \cup (4, \infty)$ ☐ D. $(-\infty, -4) \cup (-4, \infty)$

(c) $(f \cdot g)(x) = \frac{4x}{(x+2)^2}$ (Simplify your answer.)

What is the domain of $f \cdot g$? Choose the correct answer below.

- ☐ A. $(-\infty, 2) \cup (2, \infty)$ ☐ B. $(2, \infty)$
☐ C. $(-\infty, 0) \cup (0, \infty)$ ☒ D. $(-\infty, -2) \cup (-2, \infty)$

(d) $\frac{f}{g}(x) = \frac{4}{x}$ (Simplify your answer.)

What is the domain of $\frac{f}{g}$? Choose the correct answer below.

- ☐ A. $(0, 2)$ ☒ B. $(-\infty, -2) \cup (-2, 0) \cup (0, \infty)$
☐ C. $(-\infty, 0) \cup (0, \infty)$ ☐ D. $(-\infty, -2) \cup (-2, \infty)$

(e) $\frac{g}{f}(x) = \frac{x}{4}$ (Simplify your answer.)

What is the domain of $\frac{g}{f}$? Choose the correct answer below.

- ☒ A. $(-\infty, -2) \cup (-2, \infty)$ ☐ B. $(-\infty, \infty)$
☐ C. $(-\infty, 2) \cup (2, \infty)$ ☐ D. $(-\infty, 0) \cup (0, \infty)$

24. Let $f(x) = 5x + 5$ and $g(x) = 2x^2 - 1$. Evaluate $(f \circ g)(0)$.

$(f \circ g)(0) = 0$ (Simplify your answer.)

25. Let $f(x) = 4x + 1$ and $g(x) = 2x^2 - 3$. Evaluate the expression shown below.

$$(f \circ g)(-b)$$

What is the value of $(f \circ g)(-b)$?

$$8b^2 - 11 \quad (\text{Simplify your answer. Do not factor.})$$

26. The functions f and g are given. Evaluate $f \circ g$ and find the domain of the composite function $f \circ g$.

$$f(x) = \frac{5}{x+1}; g(x) = \frac{1}{x}$$

$$(f \circ g)(x) = \frac{5x}{x+1} \quad (\text{Simplify your answer.})$$

The domain of $f \circ g$ is $(-\infty, -1) \cup (-1, 0) \cup (0, \infty)$.
(Type your answer in interval notation.)

27. The functions f and g are given. Evaluate $f \circ g$ and find the domain of the composite function $f \circ g$.

$$f(x) = \sqrt{x-5}; g(x) = 3-5x$$

$$(f \circ g)(x) = \sqrt{-5x-2} \quad (\text{Simplify your answer. Type an exact answer, using radicals as needed.})$$

The domain of $f \circ g$ is $\left[-\infty, -\frac{2}{5}\right]$.
(Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

28. Let $f(x) = 4 - 4x$ and $g(x) = 3 + x^2$. Find each composite function and describe the domain of the resulting function.

a. $f \circ g$

b. $g \circ f$

c. $f \circ f$

d. $g \circ g$

a. $(f \circ g)(x) = -4x^2 - 8$ (Simplify your answer.)

The domain of $f \circ g$ is $(-\infty, \infty)$. (Type your answer in interval notation.)

b. $(g \circ f)(x) = 16x^2 - 32x + 19$ (Simplify your answer.)

The domain of $g \circ f$ is $(-\infty, \infty)$. (Type your answer in interval notation.)

c. $(f \circ f)(x) = 16x - 12$ (Simplify your answer.)

The domain of $f \circ f$ is $(-\infty, \infty)$. (Type your answer in interval notation.)

d. $(g \circ g)(x) = x^4 + 6x^2 + 12$ (Simplify your answer.)

The domain of $g \circ g$ is $(-\infty, \infty)$. (Type your answer in interval notation.)

29. Express the given function H as a composition of two functions f and g such that $H(x) = (f \circ g)(x)$.

$$H(x) = \sqrt{x+6}$$

What are two possible functions for f and g ?

- ☐ A. $f(x) = \sqrt{x+6}$; $g(x) = \sqrt{x}$
- ☒ B. $f(x) = \sqrt{x}$; $g(x) = x+6$
- ☐ C. $f(x) = \sqrt{x}$; $g(x) = \sqrt{x+6}$
- ☐ D. $f(x) = x+6$; $g(x) = \sqrt{x}$

30. Find functions f and g so that $f \circ g = H$.

$$H(x) = |9x+9|$$

Choose the correct pair of functions.

- ☐ A. $f(x) = |-x|$, $g(x) = \frac{x-9}{9}$
- ☐ B. $f(x) = \frac{x-9}{9}$, $g(x) = |-x|$
- ☒ C. $f(x) = |x|$, $g(x) = 9x+9$
- ☐ D. $f(x) = 9x+9$, $g(x) = |x|$