1. Solve the inequality. Write the solution set in interval notation.

\[
\frac{1}{2}x + \frac{1}{3}x - \frac{1}{5}(x + 3) \leq \frac{1}{10}
\]

Write the solution set in interval notation.

2. Solve the quadratic inequality. Write the solution set in interval notation.

\[-x^2 - 6x - 10 \leq -2\]

3. Solve the inequality. Write the solution set in interval notation.

\[49x - x^3 \geq 0\]

4. Solve the rational inequality.

\[\frac{28}{x + 4} \leq 7\]

5. Solve the rational inequality. Write the solution set in interval notation.

\[\frac{(2x - 3)(2x + 9)}{(x - 5)^3} \geq 0\]
6. Solve the equation.

\[ \left| \frac{2x - 2}{3} \right| = 8 \]

7. Solve the inequality.

\[ |1 - 4x| > 8 \]

8. Solve the inequality.

\[ |4x + 32| \leq 0 \]

9. Find the distance between the points (12,2) and (19,7). Also find the midpoint of the segment that joins the points.
10. For the equation $y = x^3 - 1$, (a) create a table with at least three ordered pairs that are solutions of the equation, and (b) graph the equation.

(a) Complete the following table of ordered pairs that are solutions of the equation.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

11. Find the center-radius form of the circle graphed on the right.

12. Decide whether or not the equation has a circle as its graph. If it does, give the center and the radius. If it does not, describe the graph.

$$4x^2 + 4x + 4y^2 + 8y - 139 = 0$$
13. Find all points \((x, y)\) with \(x = y\) that are 8 units from \((1, -5)\).

Choose the correct answer.

\[ \text{A. } (2 + \sqrt{23}, 2 + \sqrt{23}), (2 - \sqrt{23}, 2 - \sqrt{23}) \]

\[ \text{B. } (-2 + \sqrt{23}, -2 + \sqrt{23}), (-2 - \sqrt{23}, -2 - \sqrt{23}) \]

\[ \text{C. } (9, -5), (-7, -5), (1,3), (1, -13) \]

14. Determine whether the relation is a function, and give the domain and range.

Is this relation a function?

\[ \text{A. No} \]

\[ \text{B. Yes} \]

The domain is \{ \}

The range is \{ \}

15. Decide whether the relation defined by the graph to the right defines a function, and give the domain and range.

Does the graphed relation define a function?

\[ \text{A. No} \]

\[ \text{B. Yes} \]

What is the domain of the graphed relation?

(Type your answer in interval notation.)

What is the range of the graphed relation?

(Type your answer in interval notation.)
16. Decide whether the given equation defines \( y \) as a function of \( x \). Then give the domain and range.

\[ x = y^7 \]

Is \( y \) defined as a function of \( x \)?

- No
- Yes

What is the domain?

☐ (Type your answer in interval notation.)

What is the range?

☐ (Type your answer in interval notation.)

17. Decide whether the relation defines \( y \) as a function of \( x \). Give the domain and range.

\[ x + y < 12 \]

Does the relation define \( y \) as a function of \( x \)?

- Yes
- No

What is the domain?

☐ (Type your answer in interval notation.)

What is the range?

☐ (Type your answer in interval notation.)

18. Let \( g(x) = -x^2 + 6x + 2 \). Find and simplify \( g(-4) \).

\( g(-4) = \)

19. Let \( f = \{(3,4),(0,9),(9,1)\} \).

Find \( f(9) \).
20. Use the graph to find $f(2)$.

$$f(2) = \square$$

21. Graph the line $5y - 4x = 0$. Give the domain and range.

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

- A. The domain is (Use a comma to separate answers as needed.)
- B. The domain is (Type your answer in interval notation.)

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

- A. The range is (Use a comma to separate answers as needed.)
- B. The range is (Type your answer in interval notation.)
22. Using the slope formula, find the slope of the line through the given points.

\[(7, 6) \text{ and } (9, 4)\]

What is the slope of the line? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

☐ A. The slope of the line is \_\_. (Type an integer or a simplified fraction.)

☐ B. The slope of the line is undefined.

23. Graph the line that passes through \(\left(\frac{5}{2}, 3\right)\) and has an undefined slope. Plot two points on the line.

Use the graphing tool to graph the line.
24. Find and interpret the average rate of change illustrated in the following graph.

Find the average rate of change. Select the correct choice below and fill in the answer box to complete your choice.

(Type a whole number.)

- [ ] A. The average rate of change is $\square$ per year.
- [ ] B. The average rate of change is $\square$ per year.

Interpret the average rate of change. Select the correct choice below and fill in the answer box to complete your choice.

(Type a whole number.)

- [ ] A. The value of the machine is constant.
- [ ] B. The value of the machine is increasing $\square$ each year during these years.
- [ ] C. The value of the machine is decreasing $\square$ each year during these years.

25. Write an equation for the vertical line through $(-4,0)$. Give the answer in slope-intercept form (if possible).

26. Write an equation (a) in slope-intercept form and (b) in standard form for the line passing through $(1,6)$ and perpendicular to $3x + 7y = 1$. 
27. The chart shows the cost of tuition at a certain state university. Model the data in the chart with a linear function, using the points (1, 9907) and (3, 11179). Predict the cost of college tuition in 2010-2011.

<table>
<thead>
<tr>
<th>College Year, x</th>
<th>Estimated Tuition, y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997 – 1998, 0</td>
<td>$9405</td>
</tr>
<tr>
<td>1998 – 1999, 1</td>
<td>$9907</td>
</tr>
<tr>
<td>1999 – 2000, 2</td>
<td>$10505</td>
</tr>
<tr>
<td>2000 – 2001, 3</td>
<td>$11179</td>
</tr>
<tr>
<td>2001 – 2002, 4</td>
<td>$11902</td>
</tr>
</tbody>
</table>

What is the linear model for the data?

\[ y = \quad \]  
(Type your answer in slope-intercept form. Use integers or decimals for any numbers in the expression. Round to the nearest tenth as needed.)

What will college tuition cost in 2010 – 2011?

\$  
(Round to the nearest dollar.)

28. Determine the intervals of the domain over which function is continuous.

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

- A. The function is continuous on \([\quad]\).
  (Type your answer in interval notation.)

- B. The function is not continuous.
29. Use the piecewise-defined function to find the following values for f(x).

\[ f(x) = \begin{cases} 
3 - 4x & \text{if } x \leq 4 \\
2x & \text{if } 4 < x < 8 \\
4x + 1 & \text{if } x \geq 8
\end{cases} \]

\[ f(0) = \square \]

\[ f(2) = \square \]

\[ f(5) = \square \]

\[ f(7) = \square \]

\[ f(9) = \square \]

30. Graph the piecewise-defined function.

\[ f(x) = \begin{cases} 
4 + 2x & \text{if } x < -4 \\
-2x & \text{if } -4 \leq x \leq 5 \\
2x & \text{if } x > 5
\end{cases} \]

Choose the correct graph.

\[ \text{A.} \]

\[ \text{B.} \]

\[ \text{C.} \]

\[ \text{D.} \]
31. Give a rule of the piecewise-defined function. Give the domain and the range.

What is the rule? Select the correct choice below and fill in the answer boxes within your choice.

- **A.** \( f(x) = \begin{cases} \text{□} & \text{if } x \leq \text{□} \\ \text{□} & \text{if } x > \text{□} \end{cases} \)
- **B.** \( f(x) = \begin{cases} \text{□} & \text{if } x < \text{□} \\ \text{□} & \text{if } x \geq \text{□} \end{cases} \)

What is the domain? Select the correct choice below and fill in the answer box within your choice.

- **A.** The domain is \( \text{□} \).
  
  (Use a comma to separate answers as needed.)
- **B.** The domain is \( \text{□} \).
  
  (Type your answer in interval notation.)

What is the range? Select the correct choice below and fill in the answer box within your choice.

- **A.** The range is \( \text{□} \).
  
  (Use a comma to separate answers as needed.)
- **B.** The range is \( \text{□} \cup \text{□} \).
  
  (Type your answer in interval notation in the first answer box. Use a comma to separate answers as needed in the second answer box.)
32. Graph the function. Give the domain and range.

\[ f(x) = \left\lfloor \frac{3}{4}x \right\rfloor \]

Choose the correct graph below.

[Graph options A, B, C, D]

The domain of the function is \( \square \). (Type your answer in interval notation.)

What is the range?

- A. \((-\infty, 0) \cup (0, \infty)\)
- B. \((-\infty, 0]\)
- C. \([0, \infty)\)
- D. \(\{\ldots -2, -1, 0, 1, 2\ldots\}\)

33. Graph the following function.

\[ y = 6|x| \]
34. Graph the following function.

\[ y = x^2 + 2 \]

35. Graph the following function.

\[ y = (x + 3)^2 \]
36. Graph the following function.

\[ y = -7|x| \]

37. Graph the following function.

\[ g(x) = 4(x - 2)^2 - 4 \]

38. Assume that \( f(3) = 2 \). Also assume that the graph of \( y = f(x) \) is symmetric with respect to the origin. Find \( f(-3) \).
39. Decide whether $f$ is even, odd, or neither.

$$f(x) = x^4 - 2x^2 + 8$$

Choose the correct statement.

○ A. The function is odd.
○ B. The function is even.
○ C. The function is neither even nor odd.

40. The adjacent graph is obtained from the graph of \( f(x) = |x| \) or \( g(x) = \sqrt{x} \) by applying several transformations. Describe the transformations and give the equation for the graph.

![Graph](image)

It is the graph of \( g(x) = \sqrt{x} \) translated \( \ldots \) unit(s) to the left, reflected across the \( y \)-axis, \( x \)-axis, and translated \( \ldots \) unit(s) up.

The equation is \( y = \ldots \).

(Simplify your answer.)

41. Let \( f(x) = x^2 - 2 \) and \( g(x) = 6 - x \). Perform the composition or operation indicated.

\((fg)(-5)\)
42. Use the given graph to evaluate the following expressions.

(a) \( (f + g)(-2) \)

(b) \( (f - g)(-1) \)

(c) \( (fg)(0) \)

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

(a) \( (f + g)(-2) = \) □

(b) \( (f - g)(-1) = \) □

(c) \( (fg)(0) = \) □

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

☐ A. \( \left( \frac{f}{g} \right)(-1) = \) □

☐ B. \( \left( \frac{f}{g} \right)(-1) \) is undefined.

43. Using the function, \( f(x) = 2 - x \), find the following:

(a) \( f(x + h) \)

(b) \( f(x + h) - f(x) \)

(c) \( \frac{f(x + h) - f(x)}{h} \)

\( f(x + h) = \) □

\( f(x + h) - f(x) = \) □

(Simplify your answer.)

\( \frac{f(x + h) - f(x)}{h} = \) □

(Simplify your answer.)
44. For the function defined as follows, find (a) $f(x + h)$, (b) $f(x + h) - f(x)$, and (c) $\frac{f(x + h) - f(x)}{h}$.

$f(x) = \frac{9}{x}$

(a) $f(x + h) =$  

(Simplify your answer.)

(b) $f(x + h) - f(x) =$  

(Simplify your answer.)

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

(Simplify your answer.)

45. Let $f(x) = 3x - 1$, $h(x) = -x + 3$.

Find $(f \circ h)(-7)$.

$(f \circ h)(-7) =$  

46. For the functions $f(x) = \sqrt{x}$ and $g(x) = \frac{1}{x + 2}$ find the following.

(a) $(f \circ g)(x)$ and its domain
(b) $(g \circ f)(x)$ and its domain

(a) $(f \circ g)(x) =$  

(Do not rationalize the denominator.)

Its domain is  

(Type your answer in interval notation.)

(b) $(g \circ f)(x) =$  

(Do not rationalize the denominator.)

Its domain is  

(Type your answer in interval notation.)
Fill in the missing entries in the table.

<table>
<thead>
<tr>
<th>x</th>
<th>f(x)</th>
<th>g(x)</th>
<th>g(f(x))</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>5</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td></td>
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</tr>
</tbody>
</table>

Complete the table.

<table>
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<td>4</td>
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<td>6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

48. A local gas station decided to survey the number of pick-up trucks and SUV's that they served during a one-day period. The graph shows the numbers of pick-ups and SUV's served during five one-hour periods on one day.

P(3 PM) = □
(Type a whole number.)

S(3 PM) = □
(Type a whole number.)

T(3 PM) = □
(Type a whole number.)

(a) Use the graph to determine P(3 PM) and S(3 PM), the number of pick-up trucks and SUV's during the one-hour period starting at 3 PM.
(b) Use results from part (a) to determine T(3 PM), the total number of pick-up trucks and SUV's during the one-hour period starting at 3 PM. Use the graph to verify your results.
1. $\left( -\infty, \frac{21}{19} \right]$

2. A, $(-\infty, -4] \cup [-2, \infty)$

3. $(-\infty, -7] \cup [0,7]$

4. $(-\infty, -4) \cup [0,\infty)$

5. $\left[ -\frac{9}{2}, \frac{3}{2} \right) \cup (5, \infty)$

6. A, 13, -11

7. A, $(-\infty, -\frac{7}{4}) \cup (\frac{9}{4}, \infty)$

8. -8

9. $\sqrt{74}$

\[ \begin{pmatrix} 31 & 9 \\ 2 & 2 \end{pmatrix} \]

10. -2
    -1
    0
    7

![Graph of a function](image)
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>((x - 5)^2 + (y - 7)^2 = 5)</td>
</tr>
<tr>
<td>12.</td>
<td>A. (\left(-\frac{1}{2}, -1\right), 6)</td>
</tr>
<tr>
<td>13.</td>
<td>B</td>
</tr>
<tr>
<td>14.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>20, 10, 13</td>
</tr>
<tr>
<td></td>
<td>16, 18</td>
</tr>
<tr>
<td>15.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>([-2, \infty))</td>
</tr>
<tr>
<td></td>
<td>((-\infty, \infty))</td>
</tr>
<tr>
<td>16.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>((-\infty, \infty))</td>
</tr>
<tr>
<td></td>
<td>((-\infty, \infty))</td>
</tr>
<tr>
<td>17.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>((-\infty, \infty))</td>
</tr>
<tr>
<td></td>
<td>((-\infty, \infty))</td>
</tr>
<tr>
<td>18.</td>
<td>-38</td>
</tr>
<tr>
<td>19.</td>
<td>1</td>
</tr>
<tr>
<td>20.</td>
<td>2</td>
</tr>
</tbody>
</table>
21. \[ B, (-\infty, \infty) \]
\[ B, (-\infty, \infty) \]
22. \[ A, -1 \]
23. \[ A, 2000 \]
\[ C, 2000 \]
24. \[ C \]
25. \[ y = \frac{7}{3}x + \frac{11}{3} \]
\[ 7x - 3y = -11 \]
26. \[ 636.0x + 9271.0 \]
\[ 17539 \]
28. A, $[4,\infty)$

29. 
- 3
- 5
10
14
37

30. C

31. A, x, 1, 3, 1
B, $(-\infty, \infty)$
B, $(-\infty, 1]$, 3

32. D
$(-\infty, \infty)$
D

33. 

34. 

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35.

36.

37.

38.  $-2$

39.  B
40. \( f(x) = |x| \)
   1
   x-axis,
   4
   \(-|x + 1| + 4\)

41. 253

42. 
   6
   -2
   0
   A, \( \frac{1}{3} \)

43. \( 2 - x - h \)
   -h
   -1

44. \( \frac{9}{x + h} \)
   \(-\frac{9h}{x(x + h)}\)
   \(-\frac{9}{x(x + h)}\)

45. 29

46. \( \sqrt{\frac{1}{x + 2}} \)
   \((-2, \infty)\)
   \(1\)
   \(\sqrt{x + 2}\)
   \([0, \infty)\)

47. 4
   7
   6

48. 6
   10
   16