2-1 Skills Practice

Relations and Functions

State the domain and range of each relation. Then determine whether each relation is a function. If it is a function, determine if it is one-to-one.

1. Domain | Range
   | 100 | 200 | 300 |
   | 50  | 100 | 150 |

   D: 100, 200, 300
   R: 50, 100, 150
   Function? Yes
   1-1? Yes

2. Domain | Range
   | 3   |
   | 1   |
   | 5   |

   D: 3
   R: 1, 5
   Function? No

3. | x | y |
   | 1 | 2 |
   | 2 | 4 |
   | 3 | 6 |

   D: 1, 2, 3
   R: 2, 4, 6
   Function? Yes
   1-1? Yes

Graph each relation or equation and determine the domain and range. Determine whether the equation is a function. Then state whether it is discrete or continuous.

5. Relation
   D: 2
   R: -3, -1, 4
   Not Function
   Discrete

6. \( y = 2x^2 \)
   D: ARN
   R: \( y \geq 0 \)
   Yes Function
   Continuous

7. \((-3, 4), (-2, 4), (-1, -1), (3, -1))

   D: -3, -2, -1, 3
   R: -1, 4
   Yes Function
   Discrete

8. \( x = -2 \)
   Equation - Generate Many Points

   D: x = -2
   R: ARN
   Not Function
   Continuous

Find each value if \( f(x) = 2x - 1 \) and \( g(x) = 2 - x^2 \).

10. \( f(12) \)
    \[ f(12) = 23 \]

11. \( g(4) \)
    \[ g(4) = -14 \]

12. \( f(-2) \)
    \[ f(-2) = -5 \]

13. \( g(-1) \)
    \[ g(-1) = 1 \]
2-1 Practice
Relations and Functions
State the domain and range of each relation. Then determine whether each relation is a function. If it is a function, determine if it is one-to-one.

D: 2, 8  
R: 21, 25, 30  
Function? No

D: 5, 10, 15  
R: 105, 110  
Function? Yes  
1-1? No

D: -3, -1, 0, 2, 3  
R: -2, -1, 0, 4  
Function? Yes  
1-1? No

Graph each equation and determine the domain and range. Determine whether the relation is a function, is one-to-one. Then state whether it is discrete or continuous.

5. \( y = -2x + 1 \)

D: ARN  
R: ARN  
Yes Function  
Yes 1-1  
Continuous

6. \( y = 2x - 1 \)

D: ARN  
R: ARN  
Yes Function  
Yes 1-1  
Continuous

Find each value if \( f(x) = \frac{-5}{x+2} \) and \( g(x) = -2x + 3 \).

7. \( f(3) = 1 \)
8. \( f(-4) = -\frac{5}{2} \)
9. \( g(\frac{1}{2}) = 2 \)
2-2 Skills Practice
Linear Relations and Functions
State whether each function is a linear function. If it is not linear, explain why.

1. \(y = 3x\)
   Yes

2. \(y = -2 + 5x\)
   Yes

3. \(2x + y = 10\)
   Yes

4. \(f(x) = 4x^2\)
   No, exponent > 1 on variable

5. \(-\frac{3}{x} + y = 15\)
   No, can't divide by variable

6. \(x = y + 8\)
   Yes

7. \(f(x) = 8\)
   Yes

8. \(f(x) = \sqrt{x} + 3\)
   No, can't have \(\sqrt{x}\)

Write each equation in standard form. Identify A, B, and C.

9. \(y = x\)
   \[x - y = 0\]
   A: 1
   B: -1
   C: 0

10. \(y = 5x + 1\)
    \[5x - y = -1\]
    A: 5
    B: -1
    C: -1

11. \(2x = 4 - 7y\)
    \[2x + 7y = 4\]
    A: 2
    B: 7
    C: 4

12. \(3x = -2y - 2\)
    \[3x + 2y = -2\]
    A: 3
    B: 2
    C: -2

13. \(6y + 14 = 8x\)
    \[4x + 3y = 7\]
    A: 4
    B: 3
    C: 7

a) Write the equation in Standard Form.

b) Find the x-intercept and the y-intercept. Graph the equation using the intercepts.

15. \(y = 3x - 6\)
   \(3x - y = 6\)
   \(x\) int (20), \(y\) int (0, -6)

16. \(y = -2x + \frac{1}{2}\)
   \(4x + 2y = 1\)
   \(x\) int (\(\frac{1}{4}, 0\)), \(y\) int (0, \(\frac{1}{2}\))

17. \(5x + 5y = 25\)
   \(x + y = 5\)
   \(x\) int (5, 0), \(y\) int (0, 5)

18. \(4x + 10y = 20\)
   \(2x + 5y = 10\)
   \(x\) int (5, 0), \(y\) int (0, 2)
2-2 Practice
Linear Relations and Functions
State whether each function is a linear function. If it is not linear, explain why.

3. \( y = \frac{5}{x} \)  No, can't divide by variable

4. \( 9 - 5xy = 2 \)  No, can't multiply variables together

Write each equation in standard form. Identify \( A \), \( B \), and \( C \).

5. \( y = 7x - 5 \)
   \[
   7x - y = 5
   \]
   \[
   A: 7
   B: -1
   C: 5
   \]

6. \( y = \frac{3}{8}x + 5 \)
   \[
   3x - 8y = -40
   \]
   \[
   A: 3
   B: -8
   C: -40
   \]

8. \( x = -\frac{2}{7}y + \frac{3}{4} \)
   \[
   28x + 8y = 21
   \]
   \[
   A: 28
   B: 8
   C: 21
   \]

a) Write the equation in Standard Form.

b) Find the \( x \)-intercept and the \( y \)-intercept. Graph the equation using the intercepts.

9. \( y = 2x + 4 \)
   \[
   2x - y = -4
   \]
   \[
   x \text{ int} (-2, 0)
   y \text{ int} (0, 4)
   \]

10. \( 4x + 14y = 28 \)
    \[
    2x + 7y = 14
    \]
    \[
    x \text{ int} (7, 0)
    y \text{ int} (0, 2)
    \]

11. \( y = -2x - 4 \)
    \[
    2x + y = -4
    \]
    \[
    x \text{ int} (-2, 0)
    y \text{ int} (0, -4)
    \]

12. \( 6x + 2y = 6 \)
    \[
    3x + y = 3
    \]
    \[
    x \text{ int} (1, 0)
    y \text{ int} (0, 3)
    \]
2-3 Study Guide and Intervention
Rate of Change and Slope

Find the rate of change between the first two data points of each table. Show work and units!

1. 

2. | Time (minutes) | Altitude of balloon (meters) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>520</td>
</tr>
<tr>
<td>8</td>
<td>1,220</td>
</tr>
<tr>
<td>11</td>
<td>1,640</td>
</tr>
<tr>
<td>15</td>
<td>2,200</td>
</tr>
<tr>
<td>23</td>
<td>3,320</td>
</tr>
</tbody>
</table>

   \[\text{140 m/min}\]

3. 

4. | Time (seconds) | Depth of sinking stone (meters) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3.51</td>
</tr>
<tr>
<td>7</td>
<td>4.77</td>
</tr>
<tr>
<td>11</td>
<td>5.49</td>
</tr>
<tr>
<td>21</td>
<td>7.29</td>
</tr>
<tr>
<td>29</td>
<td>8.73</td>
</tr>
</tbody>
</table>

5. | Time (seconds) | Water through Channel (liters) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>22,172</td>
</tr>
<tr>
<td>13</td>
<td>24,706</td>
</tr>
<tr>
<td>15</td>
<td>25,430</td>
</tr>
<tr>
<td>23</td>
<td>28,326</td>
</tr>
<tr>
<td>47</td>
<td>37,014</td>
</tr>
</tbody>
</table>

   \[362 \text{ L/s}\]

6. 

\[0.18 \text{ m/s}\]
2-3 Skills Practice

Rate of Change and Slope

Find the slope of the line that passes through each pair of points. Leave answers as Improper Fractions!

1. \((1, 5), (-1, -3)\) \[4\]
2. \((0, 2), (3, 0)\) \[\frac{-2}{3}\]
3. \((1, 9), (0, 6)\) \[3\]
4. \((8, -5), (4, -2)\) \[\frac{-3}{4}\]
5. \((-3, 5), (-3, -1)\) \(\text{undefined}\)
6. \((-2, -2), (10, -2)\) \[0\]
7. \((4, 5), (2, 7)\) \[-1\]
8. \((-2, -4), (3, 2)\) \[\frac{6}{5}\]
9. \((5, 2), (-3, 2)\) \[10\]

Determine the slope of each graph using rise over run or the slope formula.

10. \[\frac{2}{5}\]
11. \[-\frac{1}{2}\]
12. \[\frac{1}{5}\]
13. \[2\]
14. \[-\frac{3}{4}\]
15. \[\text{Graphs}^\text{10-15}\]

Chapter 2

19

Glencoe Algebra 2
2-3 Practice
Rate of Change and Slope
Find the slope of the line that passes through each pair of points. Express as an Improper Fraction.

1. \((3, -8), (-5, 2)\) \[\frac{-5}{4}\]
2. \((-10, -3), (7, 2)\) \[\frac{5}{7}\]
3. \((-7, -6), (3, -6)\)
   \[0\]
4. \((8, 2), (8, -1)\)
   \[\text{undefined}\]
5. \((4, 3), (7, -2)\) \[\frac{-5}{3}\]
6. \((-6, -3), (-8, 4)\) \[\frac{-7}{2}\]

Determine the rate of change of each graph.

7. \[\text{Graph}\] \[\frac{-1}{3}\]
8. \[\text{Graph}\] \[\frac{1}{5}\]
9. \[\text{Graph}\]
   \[1\]
10. \[\text{Graph}\]
    \[-1\]
11. \[\text{Graph}\]
    \[-5\]
12. \[\text{Graph}\]
    \[\frac{9}{2}\]
2-4 Skills Practice

Writing Linear Equations

Find the slope. Then use the slope and the y intercept to write the equation of the line in slope-intercept form.

1. \[ y = 3x - 1 \]
2. \[ y = -1 \]
3. \[ y = -2x + 3 \]

4. \[ y = 2 \]
5. \[ y = \frac{3}{2}x - 2 \]
6. \[ y = -\frac{2}{3}x + 1 \]

Find the slope. Then use the slope and a point from the line to write an equation in slope-intercept form.

7. slope \(-1\), passes through \((0, 0)\)
   \[ y = -x \]

8. slope \(0\), passes through \((0, -10)\)
   \[ y = -10 \]

9. slope \(-2\), passes through \((0, -5)\)
   \[ y = -2x - 5 \]

10. slope \(3\), passes through \((2, 0)\)
    \[ y = 3x - 6 \]

11. slope \(-5\), passes through \((-3, -8)\)
    \[ y = -5x - 2.3 \]

12. slope \(\frac{4}{5}\), passes through \((10, -3)\)
    \[ y = \frac{4}{5}x - 11 \]
13. slope $-\frac{2}{3}$, passes through (6, -8) 

$$y = -\frac{2}{3}x - 4$$

14. slope 3, passes through (1, -3) 

$$y = 3x - 6$$

15. parallel to $y = 4x - 5$, y-intercept at -6 

$$y = 4x - 6$$

16. slope $\frac{4}{5}$, x-intercept at -1 

$$y = \frac{1}{6}x + \frac{1}{6}$$

17. passes through (-1, -2) and (-3, 1) 

$$y = -\frac{3}{2}x - \frac{7}{2}$$

18. passes through (-2, -4) and (1, 8) 

$$y = 4x + 4$$

19. passes through (2, 0) and (0, -6) 

$$y = 3x - 6$$

20. passes through (2.5, 0) and (0, 5) 

$$y = -2x + 5$$
2-4 Study Guide and Intervention

Writing Linear Equations

Write an equation in slope-intercept form for the line that satisfies each set of conditions.

1. passes through \((-4, 2)\), parallel to \(y = \frac{1}{2}x + 5\)
   \[
y = \frac{1}{2}x + 4
   \]

2. passes through \((3, 1)\), perpendicular to \(y = -3x + 2\)
   \[
y = \frac{1}{3}x
   \]

3. passes through \((1, -1)\), parallel to the line that passes through \((4, 1)\) and \((2, -3)\)
   \[
y = 2x - 3
   \]

5. passes through \((8, -6)\), perpendicular to \(y = 2x - 4\)
   \[
y = -\frac{1}{2}x - 2
   \]

6. passes through \((2, -2)\), perpendicular to \(y = -\frac{1}{5}x + \frac{6}{5}\)
   \[
y = 5x - 12
   \]

8. passes through \((-2, 1)\), perpendicular to \(y = 4x - 11\)
   \[
y = -\frac{1}{4}x + \frac{1}{2}
   \]
2-6 Skills Practice

Special Functions

Graph each function. Identify the domain and range.

1. $f(x) = \begin{cases} -1 & \text{if } x \leq 0 \\ 2x & \text{if } 0 < x \leq 3 \\ 6 & \text{if } x > 3 \end{cases}$

2. $f(x) = \begin{cases} -x & \text{if } x < -1 \\ 0 & \text{if } -1 \leq x \leq 1 \\ x & \text{if } x > 1 \end{cases}$

3. $f(x) = \begin{cases} x & \text{if } x < 0 \\ 2 & \text{if } x \geq 0 \end{cases}$

4. $h(x) = \begin{cases} 3 & \text{if } x < -1 \\ x + 1 & \text{if } x > 1 \end{cases}$

5. $f(x) = \lfloor x + 1 \rfloor$

6. $f(x) = \lfloor x - 3 \rfloor$

7. $g(x) = \lfloor x \rfloor - 2$

8. $f(x) = \lfloor x \rfloor + 1$

Chapter 2
2-6 Study Guide and Intervention

Special Functions

Graph each function.

1. \( f(x) = \begin{cases} 
  x + 2 & \text{if } x < 0 \\
  2x + 1 & \text{if } 0 \leq x \leq 2 \\
  -x + 1 & \text{if } x > 2
\end{cases} \)

3. \( h(x) = \begin{cases} 
  \frac{x}{3} & \text{if } x \leq 0 \\
  2x - 6 & \text{if } 0 < x < 2 \\
  1 & \text{if } x \geq 2
\end{cases} \)
Graphing Absolute Value Functions

Graph each equation.

1) \( y = |x - 2| - 4 \)
   - Domain: ARN
   - Range: \( y \geq -4 \)
   - Vertex: \((2, -4)\)

2) \( y = |x + 1| \)
   - Domain: ARN
   - Range: \( y \geq 0 \)
   - Vertex: \((-1, 0)\)

3) \( y = |x| + 1 \)
   - Domain: ARN
   - Range: \( y \geq 1 \)
   - Vertex: \((0, 1)\)

4) \( y = |x| + 2 \)
   - Domain: ARN
   - Range: \( y \geq 2 \)
   - Vertex: \((0, 2)\)

5) \( y = |x + 2| \)
   - Domain: ARN
   - Range: \( y \geq 0 \)
   - Vertex: \((-2, 0)\)

6) \( y = |x + 1| + 3 \)
   - Domain: ARN
   - Range: \( y \geq 3 \)
   - Vertex: \((-1, 3)\)
7) \( y = -|x - 2| - 2 \)  
\[ D: \text{AR} \]
\[ R: y \leq -2 \]
\[ V(2, -2) \]

8) \( y = -|x + 1| + 4 \)  
\[ D: \text{AR} \]
\[ R: y \leq 4 \]
\[ V(-1, 4) \]

9) \( y = -|x + 4| + 2 \)  
\[ D: \text{AR} \]
\[ R: y \leq 2 \]
\[ V(-4, 2) \]

10) \( y = -|x - 1| + 1 \)  
\[ D: \text{AR} \]
\[ R: y \leq 1 \]
\[ V(1, 1) \]

11) \( y = -|x - 2| + 4 \)  
\[ D: \text{AR} \]
\[ R: y \leq 4 \]
\[ V(2, 4) \]

12) \( y = -|x - 1| - 1 \)  
\[ D: \text{AR} \]
\[ R: y \leq -1 \]
\[ V(1, -1) \]

Create your own worksheets like this one with Infinite Algebra 1. Free trial available at KutaSoftware.com
2-7 Transformations

State the type of function and State What Transforms the Function and How

Q 1) \( f(x) = -3(x-2)^2 - 4 \)
   \( \text{Reflect Narrow Right Down} \)

AV 2) \( f(x) = |x-2| + 3 \)
   \( \text{Right Up} \)

Q 3) \( f(x) = -\frac{1}{4}(x-1)^2 + 4 \)
   \( \text{Reflect Wider Right} \)

AV 4) \( f(x) = 3x + 4 \)
   \( \text{Narrow Up or Left} \)

S 5) \( f(x) = [x-2] + 1 \)
   \( \text{Right Up} \)

Q 6) \( f(x) = \frac{1}{2}x^2 - 1 \)
   \( \text{Wider Down} \)

AV 7) \( f(x) = -4|x-2| + 5 \)
   \( \text{Reflect Narrow Right} \)

S 8) \( f(x) = [x+2] \)
   \( \text{Left} \)

AV 9) \( f(x) = \frac{1}{2}|x+3| - 5 \)
   \( \text{Wider Left Down} \)

ID 10) \( f(x) = 2x + 4 \)
   \( \text{Narrow Up or Left} \)

AV 11) \( f(x) = -|x-2| - 3 \)
   \( \text{Reflect Right} \)

ID 12) \( f(x) = \frac{1}{4}x - 5 \)
   \( \text{Wider Down or Right} \)

Name: __________

Q 13) \( f(x) = \frac{1}{3}(x+5)^2 + 2 \)
   \( \text{Wider Left Up} \)

AV 14) \( f(x) = -\frac{1}{3}|x| + 5 \)
   \( \text{Reflect Wider} \)

S 15) \( f(x) = [x-3] \)
   \( \text{Right} \)

Q 16) \( f(x) = -2x^2 + 3 \)
   \( \text{Reflect Narrower} \)

AV 17) \( f(x) = 2|x+1| - 4 \)
   \( \text{Narrower Left Down} \)

Q 18) \( f(x) = -4x^2 - 3 \)
   \( \text{Reflect Narrower} \)

S 19) \( f(x) = [x+5] - 3 \)
   \( \text{Left Down} \)

ID 20) \( f(x) = -\frac{1}{2}x - 3 \)
   \( \text{Reflect Wider} \)

AV 21) \( f(x) = 2|x-3| \)
   \( \text{Narrower Left Right} \)

Q 22) \( f(x) = \frac{1}{4}(x+4)^2 + 3 \)
   \( \text{Wider Left Up} \)

S 23) \( f(x) = [x] - 4 \)
   \( \text{Down} \)
Graphing Linear and Absolute Value Inequalities

Graph each inequality.

1. \(y > 1\)

2. \(y \leq x + 2\)

3. \(x + y \leq 4\)

4. \(x - y < -3\)

5. \(x + y > 2\)

6. \(y \geq -x\)

7. \(x - y > -2\)

8. \(3x + y \leq 2\)

9. \(y \geq 2x - 1\)

10. \(y \leq -2\)

11. \(x > -5\)

12. \(y > |x|\)
2-8 Study Guide and Intervention (continued)

Graphing Linear and Absolute Value Inequalities

State Transformations, find the Vertex, and make a table to graph each inequality.

1. \( y \geq |x| + 1 \)
   
   ![Graph of \( y \geq |x| + 1 \)]

3. \( y > 2 |x| + 3 \)
   
   ![Graph of \( y > 2 |x| + 3 \)]

4. \( y < -|x| - 3 \)
   
   ![Graph of \( y < -|x| - 3 \)]

5. \( y \geq -|x| + 4 \)
   
   ![Graph of \( y \geq -|x| + 4 \)]

6. \( y < |x + 1| - 2 \)
   
   ![Graph of \( y < |x + 1| - 2 \)]

7. \( y > |x - 2| \)
   
   ![Graph of \( y > |x - 2| \)]

8. \( y < 3 |x| - 3 \)
   
   ![Graph of \( y < 3 |x| - 3 \)]

9. \( y \leq |x + 3| \)
   
   ![Graph of \( y \leq |x + 3| \)]