Practice Set 2.1
Introduction to Functions

Determine whether each relation is a function. Give the domain and range for each relation.

1. \{ (3,0), (4,2), (5,4), (6,10) \}  
   1. _______________  _______________

2. \{ (2,1), (2,2), (2,3), (2,4) \}  
   2. _______________  _______________

3. \{ (1,5), (2,5), (3,5), (4,5) \}  
   3. _______________  _______________

Find the indicated function values.

4. \( f(x) = 3x + 2 \)
   a. \( f(1) \)  
      4a. ______________
   b. \( f(-2) \)  
      4b. ______________
   c. \( f(0) \)  
      4c. ______________
   d. \( f(2a) \)  
      4d. ______________
   e. \( f(a + 2) \)  
      4e. ______________

5. \( f(x) = x^2 - 2x - 1 \)
   a. \( f(2) \)  
      5a. ______________
   b. \( f(-3) \)  
      5b. ______________
   c. \( f(0) \)  
      5c. ______________
   d. \( f(2a) \)  
      5d. ______________
   e. \( f(a + 2) \)  
      5e. ______________
6. \( f(x) = 2x^2 - x + 3 \)
   
a. \( f(2) \)  
   \[ \text{6a. } \quad \]  
b. \( f(-2) \)  
   \[ \text{6b. } \quad \]  
c. \( f(0) \)  
   \[ \text{6c. } \quad \]  
d. \( f(b) \)  
   \[ \text{6d. } \quad \]  
e. \( f(5a) \)  
   \[ \text{6e. } \quad \]  

7. \( h(x) = 3x^2 - 4 \)
   
a. \( f(2) \)  
   \[ \text{7a. } \quad \]  
b. \( f(-1) \)  
   \[ \text{7b. } \quad \]  
c. \( f(0) \)  
   \[ \text{7c. } \quad \]  
d. \( f(2a) \)  
   \[ \text{7d. } \quad \]  
e. \( f(a + 2) \)  
   \[ \text{7e. } \quad \]  

8. \( \frac{2x - 3}{x + 6} \)
   
a. \( f(1) \)  
   \[ \text{8a. } \quad \]  
b. \( f(-2) \)  
   \[ \text{8b. } \quad \]  
c. \( f(0) \)  
   \[ \text{8c. } \quad \]  
d. \( f(a + h) \)  
   \[ \text{8d. } \quad \]  
e. Why must \(-6\) be excluded from the domain of \( f \)?  
   \[ \text{8e. } \quad \]
Practice Set 2.2
Graphs of Functions

Graph the given functions \( f \) and \( g \) in the same rectangular coordinate system. Describe how the graph of \( g \) is related to the graph of \( f \).

1. \( f(x) = x \) and \( g(x) = x - 3 \)

2. \( f(x) = x^2 \) and \( g(x) = x^2 + 2 \)

3. \( f(x) = -2x^2 \) and \( g(x) = -2x^2 - 2 \)

4. \( f(x) = |x|, \ g(x) = |x| + 1 \)
Use the vertical line test to identify graphs in which $y$ is a function of $x$.

5.

Use the graph of each function to identify its domain and range.

7.

8.

9.
Write a function for each domain.

1. \( \{x \mid x \text{ is a real number and } x \neq 0\} \)
   1. _______________

2. \( \{x \mid x \text{ is a real number } \geq 8\} \)
   2. _______________

3. \( \{x \mid x \text{ is a real number and } x \neq 5\} \)
   3. _______________

4. \( \{x \mid x \text{ is a real number and } x \neq 0 \text{ and } x \neq -2\} \)
   4. _______________

In problems 5-20 let \( f(x) = x + 5 \) and \( g(x) = x^2 - 4x \).

5. \( g(-3) \)
   5. _______________

6. \( f(-3) \)
   6. _______________

7. \( (f + g)(0) \)
   7. _______________

8. \( (f + g)(4) \)
   8. _______________

9. \( f(-2) + g(-2) \)
   9. _______________

10. \( f(1) + g(1) \)
    10. _______________

11. \( (g - f)(x) \)
    11. _______________

12. \( \left( \frac{g}{f} \right)(x) \)
    12. _______________

13. \( \left( \frac{g}{f} \right)(1) \)
    13. _______________

14. \( (fg)(-2) \)
    14. _______________

15. \( (fg)(1) \)
    15. _______________

16. \( (fg)(0) \)
    16. _______________

17. The domain of \( f + g \)
    17. _______________
### Practice Set 2.4
Linear Functions and Slope

(a) Find the slope of the line passing through each pair of points or state that the slope is zero or undefined. (b) Then indicate whether the line through the points rises, falls, is horizontal or is vertical.

<table>
<thead>
<tr>
<th></th>
<th>Point 1</th>
<th>Point 2</th>
<th>Slope</th>
<th>Rise/Fall/Horizontal/Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(1, 4)</td>
<td>(2, 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>(3, 4)</td>
<td>(5, -2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>(-1, 0)</td>
<td>(-3, 0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>(4, -6)</td>
<td>(5, -2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>(-3, -5)</td>
<td>(-2, -4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>(1, 8)</td>
<td>(-3, 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>(5, 1)</td>
<td>(5, -6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>(-3, 1)</td>
<td>(-6, 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>(2, 5)</td>
<td>(-8, 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>(1, 4)</td>
<td>(5, 5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use the slope and y-intercept to graph each linear function.

11. \( y = -2 \)
12. \( y = \frac{1}{5}x - 2 \)

13. \( y = -\frac{1}{3}x - 3 \)

14. \( y = -\frac{2}{3}x + 2 \)

15. \( x = 3 \)

16. \( y = 3x - 3 \)
**Practice Set 2.5**  
The Point Slope Form of a Linear Equation

Using the given information, fill in the table.

<table>
<thead>
<tr>
<th>Given:</th>
<th>Point-Slope Form</th>
<th>Slope-Intercept Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( m = 3 ) passing through (6, 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. ( m = -\frac{1}{2} ) passing through (8, 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Parallel to ( y = 3x - 2 ) passing through (1, 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Perpendicular to ( 5x + 2y = 10 ) passing through (5, 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Passing through (–4, –2) and (1, 3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Passing through (4, 2) and (5, –2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fill in the blanks.

7. The slopes of lines that are parallel are _____.  
   7. _______________

8. The slopes of perpendicular lines are _____.  
   8. _______________

Identify whether each pair of lines, is parallel, perpendicular or neither without graphing.

9. \( x + y = 2 \)  
   \( 2x + y = -1 \)  
   9. _______________

10. \( 4x + 2y = 6 \)  
    \( 3x - 6y = 12 \)  
    10. _______________

11. \( 4x + 2y = 5 \)  
    \( 3x - y = -2 \)  
    11. _______________