

### 3.6 Functions

### Solutions

Decide if the mapping represents a function or not a function.	
<p><b>1.</b></p> $1 \longrightarrow 3$ $2 \longrightarrow 4$ $3 \longrightarrow 5$ $4 \longrightarrow 6$ <p>function</p>	<p><b>2.</b></p> $2 \longrightarrow 1$ $1 \longrightarrow \frac{1}{2}$ $0 \longrightarrow 0$ $-1 \longrightarrow -\frac{1}{2}$ $-2 \longrightarrow -1$
<p><b>3.</b></p> $0 \longrightarrow 1$ $1 \longrightarrow 3$ $-1 \begin{cases} \longrightarrow -1 \\ \longrightarrow 1 \end{cases}$ <p>not a function</p>	<p><b>4.</b></p> $0 \longrightarrow 0$ $1 \begin{cases} \longrightarrow 1 \\ \longrightarrow -1 \end{cases}$ $4 \begin{cases} \longrightarrow 2 \\ \longrightarrow -2 \end{cases}$
<p><b>5.</b></p> $x \longrightarrow y$ $1 \longrightarrow 8$ $4 \begin{cases} \longrightarrow 6 \\ \longrightarrow 6 \end{cases}$ $8 \begin{cases} \longrightarrow 6 \\ \longrightarrow 6 \end{cases}$ <p>function</p>	<p><b>6.</b></p> $x \longrightarrow y$ $1 \longrightarrow -5$ $4 \begin{cases} \longrightarrow -3 \\ \longrightarrow -3 \end{cases}$ $8 \begin{cases} \longrightarrow -3 \\ \longrightarrow -3 \end{cases}$
<p><b>7.</b> <math>\{(0, 3), (1, 4), (2, 5), (1, 2), (2, 0)\}</math></p> <p>not a function</p>	<p><b>8.</b> <math>\{(-2, -7), (-1, 4), (0, 1), (-2, 2), (2, 3)\}</math></p>
<p><b>9.</b> <math>\{(-3, 3), (-2, 2), (-1, 1), (0, 0), (1, 1)\}</math></p> <p>function</p>	<p><b>10.</b> <math>\{(-2, -7), (-1, -4), (0, -1), (1, 2), (2, 5)\}</math></p>
<p>Answers: <b>1.</b> function; <b>3.</b> not a function; <b>5.</b> function; <b>7.</b> not a function; <b>9.</b> function</p>	

Thinking of $x$ as the input value to the function, describe what the function does to the input.	
<p><b>11.</b> <math>f(x) = 3x</math></p> <p>The function multiplies the input value by 3.</p>	<p><b>12.</b> <math>f(x) = x + 8</math></p>
<p><b>13.</b> <math>f(x) = -5(x+2)</math></p> <p>The function adds 2 to the input value and multiplies the sum by <math>-5</math>.</p>	<p><b>14.</b> <math>f(x) = 4x - 1</math></p>
Using $x$ to represent the input value, write an algebraic expression for the function	
<p><b>15.</b> This function multiplies the input value by negative four.</p> <p><math>f(x) = -4x</math></p>	<p><b>16.</b> This function subtracts eight from the input value.</p>
<p><b>17.</b> This function cubes the input value and then subtracts four from the result.</p> <p><math>f(x) = x^3 - 4</math></p>	<p><b>18.</b> This function subtracts two from the input value and then multiplies the result by nine.</p>
Answers: <b>11.</b> This function multiplies the input by 3; <b>13.</b> This function adds 2 to the input and multiplies the result by $-5$ ; <b>15.</b> $f(x) = -4x$ ; <b>17.</b> $f(x) = x^3 - 4$	

Using the given functions, evaluate the functions at the given values.

$$f(x) = 2x - 3$$

$$g(x) = x^2 + 2x$$

$$h(x) = \frac{x+1}{3}$$

19.  $f(7)$

$$f(x) = 2x - 3$$

$$f(7) = 2 \cdot 7 - 3$$

$$f(7) = 14 - 3$$

$$f(7) = 11$$

20.  $f(4)$

21.  $g(0)$

$$g(x) = x^2 + 2x$$

$$g(0) = 0^2 + 2 \cdot 0$$

$$g(0) = 0 + 0$$

$$g(0) = 0$$

22.  $g(-3)$

23.  $h(-7)$

$$h(x) = \frac{x+1}{3}$$

$$h(-7) = \frac{-7+1}{3} = \frac{-6}{3} = -2$$

24.  $h(0)$

25.  $f(1.5)$

$$f(x) = 2x - 3$$

$$f(1.5) = 2 \cdot 1.5 - 3$$

$$f(1.5) = 3 - 3$$

$$f(1.5) = 0$$

26.  $f(-1.2)$

Answers: 19.  $f(7) = 11$ ; 21.  $g(0) = 0$ ; 23.  $h(-7) = -2$ ; 25.  $f(1.5) = 0$