Linear Equations of Proportional Relationships – Homework 2

Example: Kelly sold burgers over two days. Create a graph to determine if the quantities of burgers and number of days are proportional. Write an equation to describe this relationship.

<table>
<thead>
<tr>
<th>Number of Burgers</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>8</td>
<td>16</td>
<td>24</td>
<td>32</td>
</tr>
</tbody>
</table>

Step 1: Linear functions are written in the form y = mx + b.

Step 2: First find m. Look at the table and notice that every time the x terms go up by 1, the y terms go up by 8. This means that m is equal to 8.

<table>
<thead>
<tr>
<th>X</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>8</td>
<td>16</td>
<td>24</td>
<td>32</td>
</tr>
</tbody>
</table>

Answer: Y = 8x

Complete the following problems:

1. Kelly purchases some pencils over several days. Write an equation to express the relationship between days and number of pencils.

<table>
<thead>
<tr>
<th>Days</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Pencils</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
</tr>
</tbody>
</table>

2. The table below represents the number of pages written over time. Write an equation to express the relationship.

<table>
<thead>
<tr>
<th>Hours</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of pages</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
</tbody>
</table>

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Homework 2 Answer Key

1. Step 1: Linear functions are written in the form \( y = mx + b \).

   Step 2: First find \( m \). Look at the table and notice that every time the \( x \) terms go up by 5, the \( y \) terms go up by 1. This means that \( m \) is equal to 5.

   | \( x \) | 1 | 2 | 3 | 4 |
   | \( y \) | 5 | 10 | 15 | 20 |

   Step 3: Next find \( b \). Take the equation \( y = mx + b \) and plug in the \( m \) value (\( m = 5 \)) and a pair of \((x, y)\) coordinates from the table, such as \((1, 5)\). Then solve for \( b \).

   \[
   Y = mx + b \\
   5 = 5 (1) + b \\
   5 = 5 + b \\
   b = 0
   \]

   Plug in \( m = 5 \), \( x = 1 \), and \( y = 5 \)

   Step 4: Finally, use the \( m \) and \( b \) values you found (\( m = 5 \) and \( b = 0 \)) to write the equation.

   \[
   Y = mx + b \\
   Y = 5x + 0 \\
   Y = 5x
   \]

   So, the linear equation is \( y = 5x \).

2. Step 1: Linear functions are written in the form \( y = mx + b \).

   Step 2: First find \( m \). Look at the table and notice that every time the \( x \) terms go up by 2, the \( y \) terms go up by 4. This means that \( m \) is equal to 2.

   | \( x \) | 2 | 4 | 6 | 8 |
   | \( y \) | 4 | 8 | 12 | 16 |

   Step 3: Next find \( b \). Take the equation \( y = mx + b \) and plug in the \( m \) value (\( m = 2 \)) and a pair of \((x, y)\) coordinates from the table, such as \((2, 4)\). Then solve for \( b \).

   \[
   Y = mx + b \\
   4 = 2 (2) + b \\
   4 = 4 + b \\
   b = 0
   \]

   Plug in \( m = 2 \), \( x = 2 \), and \( y = 4 \)

   Step 4: Finally, use the \( m \) and \( b \) values you found (\( m = 4 \) and \( b = 0 \)) to write the equation.

   \[
   Y = mx + b \\
   Y = 2x + 0 \\
   Y = 2x
   \]

   So, the linear equation is \( y = 2x \).