1. Find the equation of the line through the points (4, 3), (6, -1).

The slope is: 
\[ m = \frac{3 - (-1)}{4 - 6} = \frac{4}{-2} = -2 \]

Equation is: 
\[ y - 3 = -2(x - 4) \]
\[ y = -2x + 11 \]

Check: 
\[ y(4) = -2(4) + 11 = 3 \]
\[ y(6) = -2(6) + 11 = 1 \]

Solve for \( y \): 
\[ y = -2(x - 4) + 3 = -2x + 11 \]

2. (a) Is the relation between \( p \) and \( q \) in the following table linear? Explain why. (This will involve both some calculations and at least one English sentence explaining why the calculations are relevant.)

<table>
<thead>
<tr>
<th>( p )</th>
<th>1.0</th>
<th>1.2</th>
<th>1.4</th>
<th>1.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>( q )</td>
<td>3.0</td>
<td>3.4</td>
<td>3.8</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Is in linear: \( y \neq 0 \)

Why:

\[ \text{slope } a + 1 = \frac{\Delta p}{\Delta q} = \frac{1.2 - 1.0}{3.4 - 3.0} = \frac{0.2}{0.4} = \frac{1}{2} \]

\[ \text{slope } a + 2 = \frac{\Delta p}{\Delta q} = \frac{1.4 - 1.2}{3.8 - 3.4} = \frac{0.2}{0.4} = \frac{1}{2} \]

\[ \text{slope } a + 3 = \frac{\Delta p}{\Delta q} = \frac{1.6 - 1.4}{4.2 - 3.8} = \frac{0.2}{0.4} = \frac{1}{2} \]

The slopes are constant so it is linear.

(b) Find \( q \) as a function of \( p \).

\[ \frac{\Delta q}{\Delta p} = \frac{p - 1.0}{q - 3} = \frac{1}{2} \]

Solve for \( q \):
\[ q - 3 = 2(p - 1) \]
\[ q = 3 + 2(p - 1) = 2p + 1 \]