1. Are the lines $h$ and $k$ graphed below parallel? Explain.

\[ m_h = \frac{9}{6} = \frac{3}{2} \]
\[ m_k = \frac{12}{8} = \frac{3}{2} \]
Slopes the same so lines \( \parallel \).

2. Are the lines $l$ and $p$ graphed below perpendicular? Explain.

\[ m_l = \frac{-12}{9} = -\frac{4}{3} \]
\[ m_p = \frac{12}{14} = \frac{6}{7} \]

The line \( \perp \) to \( l \) would have a slope of \( -\frac{4}{3} \perp \frac{3}{4} \)

Since \( \frac{6}{7} \neq \frac{3}{4} \) the lines aren't \( \perp \).

Since \( -\frac{4}{3} \times \frac{6}{7} = -\frac{24}{21} \neq -1 \rightarrow \text{not} \ \perp \)

3. Are the lines $r$ and $s$ graphed below perpendicular? Explain.

\[ m_r = \frac{-9}{3} = -3 \]
\[ m_s = \frac{4}{12} = \frac{1}{3} \]

Since \( -\frac{3}{1} \) and \( \frac{1}{3} \) are opposite and reciprocal, \( r \) and \( s \) are \( \perp \).

\[ -\frac{3}{1} \times \frac{1}{3} = -1 \text{ so } s \perp r \text{ are } \perp \]

4. Suppose line $f$ has the table below.

<table>
<thead>
<tr>
<th>x</th>
<th>-5</th>
<th>-2</th>
<th>1</th>
<th>4</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>11</td>
<td>4</td>
<td>-3</td>
<td>-10</td>
<td>-17</td>
</tr>
</tbody>
</table>

\[ m_f = -\frac{7}{3} \]

If line $g$ is perpendicular to $f$, complete the table below for $g$.

<table>
<thead>
<tr>
<th>x</th>
<th>-16</th>
<th>-9</th>
<th>-2</th>
<th>5</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>-1</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>
5. Use the graph shown on the right to do the following.

(a) Graph the line that passes through the points \((-9, -4)\) and \((2, 6)\).
\[ m = \frac{6 - (-4)}{2 - (-9)} = \frac{10}{11} \]
(b) Graph the line that passes through the points \((-1, 5)\) and \((4, -1)\).
\[ m = \frac{-1 - 5}{4 - (-1)} = -\frac{6}{5} \]
(c) Are the lines in (a) and (b) perpendicular? Explain.

The line \(\ell\) to \((a)\) would have slope \(\frac{10}{11}\) \(\Rightarrow\) \((-\frac{10}{11})\)
Since \(-\frac{10}{11} \neq -\frac{6}{5}\) the lines are not \(\perp\).

6. Use the graph shown on the right to do the following.

(a) Plot the point \((-5, 7)\).

(b) Graph the line that passes through the point \((-5, 7)\) and is perpendicular to the line \(n\).

(c) How did you guarantee the line you graphed was perpendicular to \(n\)?
\[ m_n = \frac{8}{10} = \frac{4}{5} \]
\[ m_\perp = -\frac{5}{4} \]

7. (a) Sketch and label a line \(q\) parallel to the line, \(\ell\) graphed to the right.

(b) Then sketch and label a line \(w\) perpendicular to \(\ell\).

(c) Give possible equations for your graphs of \(q\) and \(w\).
\[ q: x = -5 \]
\[ w: y = -4 \]

8. Jerome leaves his house at 10:00 AM and checks the odometer on his car which reads 42,655 miles. He gets in the car and drives until 1:00 PM. When he checks the odometer again it now reads 42,847 miles. What was Jerome’s average speed?
\[ \frac{42,847 - 42,655}{3 \text{ hr}} = \frac{192 \text{ mi}}{3 \text{ hr}} = 64 \text{ mph}. \]

9. Alice gets in a cab and tells the cab driver where to take her. She notices the meter in front and sees that after they have driven 3 miles, she owes $8.10. Later she sees that after they have driven 7 miles, she owes $15.30. How much is Alice getting charged per mile?
\[ \frac{15.30 - 8.10}{7 - 3} = \frac{7.20}{4} = $\,1.80/\text{mi}. \]