1) **Linear Relations (SECTION 1)**

Comparisons

Line segment AB has a slope of \( \frac{5}{8} \).

Determine the slope of line segments EF, GH, and JK below.

- **Slope of EF** = \( \frac{5}{8} \)
- **Slope of GH** = \( \frac{3}{8} \)
- **Slope of JK** = \( -\frac{8}{5} \)

Complete the chart by comparing the slope of each of line segments EF, GH, and JK to the slope of line segment AB if all the line segments were graphed on the same grid.

<table>
<thead>
<tr>
<th>Line segment EF</th>
<th>Line segment GH</th>
<th>Line segment JK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comparison to line segment AB</strong></td>
<td><strong>Circle one:</strong></td>
<td><strong>Circle one:</strong></td>
</tr>
<tr>
<td>neither</td>
<td>parallel</td>
<td>less steep</td>
</tr>
<tr>
<td></td>
<td>perpendicular</td>
<td>more steep</td>
</tr>
<tr>
<td></td>
<td></td>
<td>same steepness</td>
</tr>
</tbody>
</table>

\[
\frac{5}{8} = \frac{5}{8} \\
\frac{3}{8} = \frac{3}{8} \\
\frac{5}{8} & - \frac{8}{5} \\
\text{neg. reciprocals}
\]

The larger the slope, the steeper the slope.
2) **Number Sense and Algebra (SECTION 2)**

This rectangle has a square removed. There are algebraic expressions for the sides, in centimetres.

1. \( A = 5^2 \)  
   \[ A = (x)^2 \]  
   \[ A = x^2 \]  

2. \( A = 2w \)  
   \[ A = (5x)(3x) \]  
   \[ A = 15x^2 \]

The area of the rectangle without the square is 126 cm\(^2\).

Determine the side length of the square, \( x \), in centimetres.

Show your work.

\[ \text{area of the shaded} = (2) - (1) \]
\[ = 15x^2 - x^2 \]
\[ = 14x^2 \]

\[ A = 14x^2 \]
\[ A = 126 \]

\[ \frac{126}{14} = \frac{14}{x} \]

\[ \frac{14}{9} = \sqrt{x^2} \]

\[ 3 = x \]

The side length of the square, \( x \), is \( 3 \) cm.
3) **Measurement and Geometry (SECTION 3)**

**What Height?**

Two containers are pictured below. One container is a cone, and the other is a rectangular-based prism.

The cone is completely filled with water, and then the water is poured into the empty prism, without spilling.

Determine the height of the water in the prism.

Show your work.

**Cone**
\[
V = \frac{\pi r^2 h}{3}
\]
\[
V = \frac{(3.14)(6)^2(10)}{3}
\]
\[
V = \frac{3.14(36)(10)}{3}
\]
\[
V = 377 \text{ cm}^3
\]

**Prism**
\[
V = \ell \cdot w \cdot h
\]
\[
377 = (8)(9)h
\]
\[
\frac{377}{72} = \frac{72h}{72}
\]
\[
5.24 \text{ cm} = h
\]

\[\therefore \text{ the height of the water in the prism is } 5.24 \text{ cm}\]
The temperature outside at 6 a.m. is 4°C. The temperature rises by 1.5°C every hour.

Complete the table of values for this relationship.

<table>
<thead>
<tr>
<th>Number of hours since 6 a.m.</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>5.5</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># of hours</th>
<th>Temp (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>5.5</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>8.5</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>11.5</td>
</tr>
<tr>
<td>6</td>
<td>13</td>
</tr>
</tbody>
</table>

Graph the data on the grid below. Choose and label an appropriate scale for the T-axis.