1. Using a ruler and protractor or angle ruler, draw and label the polygon with the following properties.

\[ \angle ABC = 90^\circ, \quad \angle BCA = 45^\circ, \] and side \( BC = 1 \text{ in.} \)

\[ \begin{array}{c}
\text{B} \\
\text{45°} \\
\text{1 in.} \\
\text{C}
\end{array} \]

2. Do the given angles and side lengths in #1 create a unique triangle? Explain.

Yes, angle-side-angle produces a unique triangle.

3. A triangle has sides of 4 and 6. The measurement of the longest side is missing.

Ted says that one possibility for the unknown side length is 11.
Do you agree with Ted? Why or why not?

No, any two sides of a triangle must sum to be greater than the third side. \( 4 + 6 \) is not greater than 11.

4. Is a triangle with angle measures 46°, 35°, and 100° possible? Explain why or why not.

No, the interior angle sum of any triangle will be 180°. \( 46 + 35 + 100 = 181 \circ \).

5. A triangle has a 45 degree angle, a 60 degree angle and a side 3 centimeters in length.
Select True or False for each statement about this type of triangle.

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>The triangle must be an isosceles triangle.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>The triangle must be an acute triangle.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>The triangle must contain an angle measuring 75 degrees.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
6. Using your understanding of supplementary, complimentary, vertical and adjacent angles, find the value of \( x \) and the measure of \( \angle ABC \)

\[ 4x + 3 + 49 = 180 \]
\[ 4x = 128 \]
\[ x = 32 \]

\[ 4(32) + 3 \]
\[ \angle ABC = 131^\circ \]

\[ 2x + 34 + 217 + 23 = 360 \]
\[ 2x + 274 = 360 \]
\[ 2x = 86 \]
\[ x = 43 \]

\[ 2(43) + 34 = 120^\circ \]

Enter the measure of angle ABC \[ 131^\circ \]

Enter the measure of angle ABC \[ 120^\circ \]

7. Find the value of \( x \). Show your work and explain your thinking in words.

\[ 180 - 106 = 74 \]
\[ 180 - 74 - 61 = 45 \]

The exterior angle is supplementary with the interior angle, making the interior angle 74°. The triangle interior angle sum is 180°. So

\[ 180 - 74 - 61 = 45^\circ \]

Therefore

\[ x = 45^\circ \]

8. The figure below shows lines that are parallel. The measure of \( \angle 2 \) is 45°. Find the measures of angles 1, 3, and 6. Explain how you found each measure.

a. measure of \( \angle 1 = 135^\circ \) because \( \angle 1 \) and \( \angle 2 \) are supplementary.

b. measure of \( \angle 3 = 45^\circ \) because \( \angle 2 \) and \( \angle 3 \) are vertical angles.

c. measure of \( \angle 6 = 45^\circ \) because \( \angle 3 \) and \( \angle 6 \) are alternate interior angles.