1. In the figure at the right, consider each segment to be part of a line.
   a) Name all segments skew to $\overline{BG}$. $\overline{AC}, \overline{AD}, \overline{AE}, \overline{AF}, \overline{CD}, \overline{CE}, \overline{CH}, \overline{DF}, \overline{DH}, \overline{EF}, \overline{EH}, \overline{FH}$
   b) Name the plane parallel to plane BCF. Plane $ADE$
   c) Name all segments parallel to $\overline{FG}$ $\overline{EH}, \overline{DA}, \overline{CB}$

2. In the figure at the right $u \parallel w$.
   a) Given $m\angle 1 = 110^\circ$, find the measure of each marked angle and write the value on the diagram.

   State the angle relationship between each pair of angles. Determine if the angles are congruent, complementary, or supplementary.

<table>
<thead>
<tr>
<th>Angle Relationship:</th>
<th>Congruent, Supplementary, Complementary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternate Interior, Alternate Exterior,</td>
<td></td>
</tr>
<tr>
<td>Consecutive Interior, Corresponding,</td>
<td></td>
</tr>
<tr>
<td>Linear Pair, or Vertical</td>
<td></td>
</tr>
<tr>
<td>b) $\angle 1$ and $\angle 6$</td>
<td><strong>Corresponding</strong></td>
</tr>
<tr>
<td>c) $\angle 2$ and $\angle 3$</td>
<td><strong>Vertical</strong></td>
</tr>
<tr>
<td>d) $\angle 4$ and $\angle 7$</td>
<td><strong>Consecutive interior</strong></td>
</tr>
<tr>
<td>e) $\angle 3$ and $\angle 5$</td>
<td><strong>Alternate exterior</strong></td>
</tr>
<tr>
<td>f) $\angle 6$ and $\angle 4$</td>
<td><strong>Alternate interior</strong></td>
</tr>
<tr>
<td>g) $\angle 5$ and $\angle 8$</td>
<td><strong>Linear pair</strong></td>
</tr>
</tbody>
</table>

3. Use the angle relationships to write an equation and solve for $x, y,$ and $z$.

   $$\frac{144}{16} = \frac{16x}{16} \quad (\text{corresponding})$$
   $$\frac{152 + 15y + 2}{180} = 180 \quad (\text{consecutive interior})$$

   $$13z + 15y = 180$$
   $$13z = 26$$
   $$z = 2$$

   $$144 + 9y = 180 \quad (\text{linear pair})$$
   $$9y = 36$$
   $$y = 4$$

   $$x = _9 \quad y = _4 \quad z = _2$$
4. Determine the value for \(x\) and \(y\) that would make the lines parallel.

\[
\begin{align*}
4x + 2 + 3x + 2 &= 180 \quad &\text{(linear pair)} \\
4x + 4 &= 180 \\
4x &= 176 \\
x &= 44
\end{align*}
\]

\[
\begin{align*}
3(44) + 2 &= 134 \\
44 + 2 &= 46 \\
46 &= 2y \quad &\text{(alt. ext.)} \\
23 &= y
\end{align*}
\]

5. Determine whether each diagram could prove lines parallel or not. Explain why or why not.

a. Parallel: Yes or No Explain: Corresponding angles are \(\cong\)

b. Parallel: Yes or No Explain: Alt. int. angles are \(\cong\)

c. Parallel: No Explain: Nothing known about angles of top line

d. Parallel: Yes or No Explain: \(45^\circ + 135^\circ = 180^\circ\) Consec. int. angles are suppl.

6. Complete the proof.

Given: \(a \parallel b, \angle 10 \cong \angle 6\)
Prove: \(c \parallel d\)

\[
\begin{align*}
\angle 10 \cong \angle 2 \quad &\text{Given} \\
\angle 2 \cong \angle 6 \quad &\text{Transitive Property} \\
c \parallel d \quad &\text{Corresponding angles converse postulate}
\end{align*}
\]
7. Describe the translation using coordinate notation.
   a. \((x, y) \rightarrow (x+1, y-2)\) 
   b. \((x, y) \rightarrow (x-3, y+2)\)

8. Draw the reflection of \(\triangle ABC\) in the given line. List the coordinates of the vertices \(A', B',\) and \(C'.\)
   a. \(y\)-axis
   b. \(y = x\)
   c. \(x = 2\)

   \[
   \begin{align*}
   A' &= (-1, 3) \\
   B' &= (-2, 1) \\
   C' &= (-5, 2)
   \end{align*}
   \[
   \begin{align*}
   A' &= (2, -3) \\
   B' &= (-1, 0) \\
   C' &= (1, 2)
   \end{align*}
   \[
   \begin{align*}
   A' &= (5, 3) \\
   B' &= (3, -2) \\
   C' &= (2, 2)
   \end{align*}
   \]

9. Rotate the figure about the origin. List the coordinates of \(A', B',\) and \(C'.\)
   a. 90° clockwise
   b. 180°
   c. 90° counterclockwise

   \[
   \begin{align*}
   A' &= (1, 1) \\
   B' &= (3, 0) \\
   C' &= (4, 3)
   \end{align*}
   \[
   \begin{align*}
   A' &= (-1, 2) \\
   B' &= (-3, 1) \\
   C' &= (-4, 3)
   \end{align*}
   \[
   \begin{align*}
   A' &= (0, 0) \\
   B' &= (-1, 2) \\
   C' &= (2, 3)
   \end{align*}
   \]
10. Below is an example of a double reflection over parallel lines \( r \) and \( s \). The distance between lines \( r \) and \( s \) is 6 cm, what is the distance from point \( H \) to point \( H'' \)?

\[
\text{Distance} = 12 \text{ cm}
\]

11. Below is an example of a double reflection over intersecting lines \( w \) and \( z \). The angle between \( w \) and \( z \) is 68°. What is the angle of rotation between \( K \) and \( K'' \)?

\[
68^\circ \cdot 2 = 136^\circ
\]

12. Determine the type of that maps the unshaded figure (preimage) onto the shaded figure (image).
   a. rotation
   b. reflection
   c. translation

13. Determine the value of each variable given that the transformation is an isometry.

\[
\begin{align*}
4y &= 64 \\
x &= 9.7 \\
y &= 16
\end{align*}
\]

14. The vertices of \( \triangle ABC \) are \( A = (1, 4) \), \( B = (2, 1) \), and \( C = (5, 2) \). Graph the composition of \( \triangle ABC \) using the transformations listed below. Write the coordinates of the points \( A'' \), \( B'' \), and \( C'' \).

   Reflection in the \( y \)-axis maps \( \triangle ABC \) to \( \triangle A'B'C' \)

   Translation \((x, y) \rightarrow (x + 5, y - 4)\) maps \( \triangle A'B'C' \) to \( \triangle A''B''C'' \)

   Coordinates:

   \[
   \begin{align*}
   A'' &= (4, 0) \\
   B'' &= (3, -3) \\
   C'' &= (0, -2)
   \end{align*}
   \]