Interior Angles
MPM1D - Angle Properties: Homework

Name: ___________________________ Date: ___________________________

1. \(110^\circ \quad 70^\circ\)
   - Corresponding (F)

2. \(85^\circ \quad 95^\circ\)
   - Supplementary (add to 180°)

3. \(120^\circ \quad 60^\circ\)
   - Corresponding (F)

4. \(45^\circ \quad 135^\circ\)
   - Supplementary (add to 180°)

5. \(? \quad 140^\circ\)
   - Corresponding (F)

6. \(? \quad 75^\circ \quad 105^\circ\)
   - Corresponding (F)
Day 3 - Interior Angles

- **Supplementary angles**: Opposite angles formed by intersecting lines are supplementary. For example, if one angle is 62°, its supplementary angle is 118°.

- **Adjacent angles**: Angles that share a common side and vertex are adjacent. For example, if one angle is 135°, its adjacent angle is 45°.

- **Complementary angles**: Adjacent angles that add up to 90°. For example, if one angle is 45°, its complementary angle is 45°.

- **Vertical angles**: Opposite angles formed by intersecting lines. They are equal. For example, if one angle is 146°, its vertical angle is also 146°.

- **Adjacent angles**: Angles that share a common side and vertex are adjacent. For example, if one angle is 168°, its adjacent angle is 12°.

- **Linear pair**: Adjacent angles that form a straight line. They add up to 180°. For example, if one angle is 168°, its linear pair is 12°.

- **Complete rotation**: A full rotation is 360°. If one angle is 168°, then the remaining angle to complete the rotation is 192°.
Warm Up:
Determine the measure of the missing angles.

Supplementary
\[40^\circ + y + 50^\circ = 180^\circ\]
\[y + 90^\circ = 180^\circ\]
\[y = 180^\circ - 90^\circ\]
\[y = 90^\circ\]

\[x = 40^\circ\]
alternate (2)

\[z = 50^\circ\]
alternate (2)
Definitions
Use your textbook to define the following terms:

Diagonal: In a polygon, a line segment joining two vertices that are not next to each other.
Interior Angle: The angle formed inside a vertex of a polygon.

\[ \angle BAC \quad \hat{BAC} \]
\[ \angle ABC \quad \hat{ABC} \]
\[ \angle ACB \quad \hat{ACB} \]
Fill in the Chart below

<table>
<thead>
<tr>
<th>Shape</th>
<th># of Sides</th>
<th># of Triangles</th>
<th>Sum of Interior Angles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangle</td>
<td>3</td>
<td>1</td>
<td>180°</td>
</tr>
<tr>
<td>Quadrilateral</td>
<td>4</td>
<td>2</td>
<td>360°</td>
</tr>
<tr>
<td>Pentagon</td>
<td>5</td>
<td>3</td>
<td>540°</td>
</tr>
<tr>
<td>Hexagon</td>
<td>6</td>
<td>4</td>
<td>720°</td>
</tr>
<tr>
<td>Heptagon</td>
<td>7</td>
<td>5</td>
<td>900°</td>
</tr>
<tr>
<td>Octagon</td>
<td>8</td>
<td>6</td>
<td>1080°</td>
</tr>
<tr>
<td>Nonagon</td>
<td>9</td>
<td>7</td>
<td>1260°</td>
</tr>
</tbody>
</table>
Number of Triangles

How many non-overlapping triangles can we draw inside a polygon? What rule can we use to determine the number of triangles?

\[ \# \text{ triangles} = \# \text{ sides} - 2 \]
Sum of Interior Angles

How can we use the number of triangles to determine the sum of the interior angles of any polygon?

\[(n - 2) \times 180\]

where \(n = \#\) of sides
Example
Determine the sum of the interior angles of a 22-gon.

\[
\text{Sum of interior angles} = (22-2) \times 180 \\
= 20 \times 180 \\
= 3600^\circ
\]
Example
Determine the number of sides in a polygon that has a sum of interior angles equal to $2880^\circ$.

\[
\text{Sum} = (n-2) \times 180
\]

\[
\frac{2880}{180} = (n-2) \times \frac{180}{180}
\]

\[
16 = (n-2)
\]

\[
16 + 2 = n \Rightarrow n = 18
\]
Regular vs. Irregular Polygon

Regular Polygon - a polygon that is equilateral and equiangular.

Irregular Polygon - any polygon that is not equilateral.
Interior Angles and Regular Polygons

Since a regular polygon is equiangular, all angles have the same measure.

Therefore, if we find the sum of the interior angles we can divide that value by the number of sides and we will get the measure of one interior angle.
Determine the measure of one interior angle of a stop sign.

\[
\text{Sum} = (n-2) \times 180 \\
= (8-2) \times 180 \\
= 6 \times 180 \\
= 1080
\]

8 equal angles totaling 1080°

\[\Rightarrow 1 \text{ angle} = \frac{1080}{8} \]
\[= 135°\]
Determine the measure of the missing angles.

Angles in a quadrilateral:
\[ 85 + 85 + a + b = 360 \]

Supplementary:
\[ a + 115 = 180 \]
\[ a = 180 - 115 \]
\[ a = 65^\circ \]

\[ 85 + 85 + 65 + b = 360 \]
\[ 235 + b = 360 \]
\[ b = 360 - 235 \]
\[ b = 125^\circ \]
Homework

Handout "390" #s 1 - 5