9.1

Points, Lines, Planes, and Angles
Basic Terms

- A line segment is part of a line between two points, including the endpoints.

<table>
<thead>
<tr>
<th>Description</th>
<th>Diagram</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line $AB$</td>
<td>$\overline{AB}$</td>
<td>$AB$</td>
</tr>
<tr>
<td>Ray $AB$</td>
<td>$\overline{AB}$</td>
<td>$AB$</td>
</tr>
<tr>
<td>Ray $BA$</td>
<td>$\overline{BA}$</td>
<td>$BA$</td>
</tr>
<tr>
<td>Line segment $AB$</td>
<td>$\overline{AB}$</td>
<td>$AB$</td>
</tr>
</tbody>
</table>
Plane

- Any three points that are not on the same line (noncollinear points) determine a unique plane.
- A line in a plane divides the plane into three parts, the line and two half planes.
- Any line and a point not on the line determine a unique plane.
- The intersection of two planes is a line.
Angles

- The measure of an angle is the amount of rotation from its initial to its terminal side.
- Angles can be measured in degrees, radians, or gradients.
- Angles are classified by their degree measurement.
  - Right Angle is 90°
  - Acute Angle is less than 90°
  - Obtuse Angles is greater than 90° but less than 180°
  - Straight Angle is 180°
Types of Angles

- **Adjacent Angles** - angles that have a common vertex and a common side but no common interior points.
- **Complementary Angles** - two angles whose sum is 90 degrees.
- **Supplementary Angles** - two angles whose sum is 180 degrees.
Example

If \( \angle ABC \) and \( \angle ABD \) are supplementary and the measure of \( ABC \) is 6 times larger than \( CBD \), determine the measure of each angle.

\[
\begin{align*}
m\angle ABC + m\angle CBD &= 180^\circ \\
6x + x &= 180^\circ \\
7x &= 180^\circ \\
x &= 25.7^\circ
\end{align*}
\]

\[m\angle ABC = 154.2^\circ \]
\[m\angle ABD = 25.7^\circ \]
More definitions

- Vertical angles have the same measure.
- A line that intersects two different lines, at two different points is called a transversal.

- Special angles are given to the angles formed by a transversal crossing two parallel lines.
# Special Names

<table>
<thead>
<tr>
<th>Alternate interior angles</th>
<th>Interior angles on the opposite side of the transversal—have the same measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternate exterior angles</td>
<td>Exterior angles on the opposite sides of the transversal—have the same measure</td>
</tr>
<tr>
<td>Corresponding angles</td>
<td>One interior and one exterior angles on the same side of the transversal—have the same measure</td>
</tr>
</tbody>
</table>

![Diagram showing angle relationships](attachment:image.png)