Euclidean Geometry

Line and Angle Relationships

Undefined Geometric Terms

A point, line, ray

Examples

Defined Terms

Collinear: Three or more points that lie on the same line.

Non-Collinear; Three or more points that do not lie on the same line

Angle: The union of two rays that meet at a common endpoint called the vertex.

Representations of rays, lines, and segments
<table>
<thead>
<tr>
<th>Object</th>
<th>Drawing</th>
<th>Representation</th>
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<tbody>
<tr>
<td>Point</td>
<td><img src="image" alt="Point" /></td>
<td>A</td>
</tr>
<tr>
<td>Line Segment</td>
<td><img src="image" alt="Line Segment" /></td>
<td>$\overline{AB}$</td>
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<tr>
<td>Line</td>
<td><img src="image" alt="Line" /></td>
<td>$\overline{AB}$</td>
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<tr>
<td>Ray</td>
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<td>$\overline{AB}$</td>
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<tr>
<td>Angle</td>
<td><img src="image" alt="Angle" /></td>
<td>$\angle ABC$</td>
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Types of Angles

Obtuse Angle: An angle whose measure is greater than 90 degrees.

Right Angle: An angle whose measure is 90 degrees.

Straight Angle: An angle whose measure is 180 degrees.

Acute Angle: An angle whose measure is less than 90 degrees.
**Parallel Lines** are lines that do not intersect and lie in the same plane.

**Euclid Postulates**

1. A straight line segment can be drawn joining any two points.

   ![Diagram](image)

   A \[\rightarrow\] B

2. Any straight line segment can be extended indefinitely in a straight line.

   ![Diagram](image)

   A \[\leftarrow\rightarrow\] B

3. A circle can be described with any center and any radius.

   ![Diagram](image)

   C \[\rightarrow\] B

4. All right angles are congruent.

   ![Diagram](image)

   D \[\rightarrow\rightarrow\] F
5. Given a line and a point not on that line, there is one and only one line through the point that is parallel to given line

Definition: **Perpendicular lines** meet to form a right angle.

**Theorem:** From a point not on a given line, there is exactly one line perpendicular to the given line.

Example: line \( m \) through \( P \) perpendicular to \( l \)

Examples

1) Draw A-X-B (Segment AB with X lying between A and B)
2) List the all ways to name $\triangle ABC$

$\triangle ABC, \triangle BAC, \triangle CBA, \triangle ACB, \triangle BCA, and \triangle CAB$

3) Draw line a and line b, where c is perpendicular to both a and b.
4) Draw $\overline{AB} \perp \overline{AC}$ and $y \parallel \overline{AB}$

5) Right angle $\angle ABC$ with $\overline{AE} \perp \overline{BC}$