Honors Geometry

Chapter 1 Essentials of Geometry

1.1 Points, Lines, Planes

- Point: dot ·A
- Line: 2 points, extends infinitely in both directions, 
- Plane: 2D shape, extends without end
  - 3 points
- Collinear: points on same line
- Coplanar: points on same plane

- Segment: part of line, 2 endpoints $\overline{AB}$
- Ray: part of line, 1 endpoint $\overrightarrow{AB}$
- Opposite rays: collinear
- Intersections: 2 lines intersect at 1 point
  2 planes intersect at 1 line

1.2 Use Segments and Congruence

- Postulate: rule
- Theorem: needs proof

- **Postulate 1: Ruler Postulate**
  - On a number line the distance or length from one coordinate to another coordinate $|x_2 - x_1|$
- **Postulate 2: Segment Addition**
  - Collinear Points
  - If one point B is between the other two points, A and C, on a line then AB + BC = AC

- Congruent: same length
- $\overline{AB} = \overline{CD}$ or $\overline{AB} \cong \overline{CD}$
- $\cong$ means congruent

1.3 Distance and Midpoint

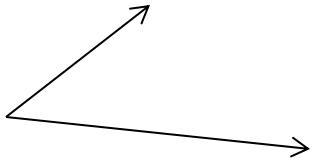
- Segment:
  - **Midpoint**: a point that divides a segment into 2 congruent segments
  - **Bisector**: a point, line, segment, or plane that intersects the midpoint

- To find the Midpoint: $\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$

- Distance Formula:
  - comes from Pythagorean Theorem
- Distance between 2 points
- $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

1.4 Measure and Classify Angles

- Angle: 2 rays with the same endpoint



Name: Use 3 letters on order. Vertex in middle

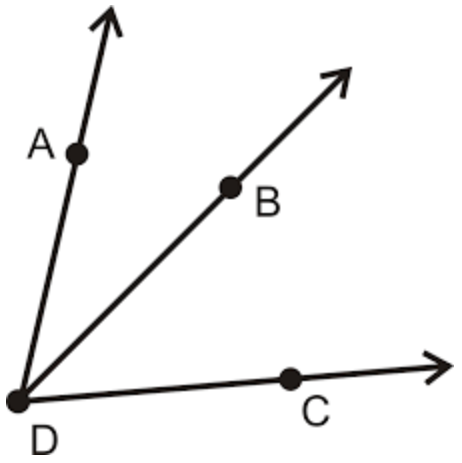
Postulate 3: Protractor Postulate

The measure of an angle is the distance between the two rays

Classify Angles

- 1. **Acute**: less than 90°
- 2. **Right**: 90°
- 3. **Obtuse**: more than 90°
- 4. **Straight**: 180°

- **Postulate 4: Angle Addition**
- If a point is inside the angle then
  - m∠ADC = m∠ ADB + m∠ BDC



- **Congruent Angles**:
  - 2 angles with the same measure
  - Marked with same curve
- **Angle Bisector**: a ray that cuts an angle in half

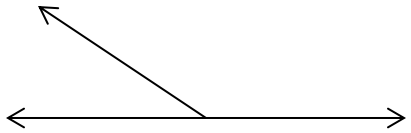
1.5 Angle Pair Relationships

- Pair: two angles

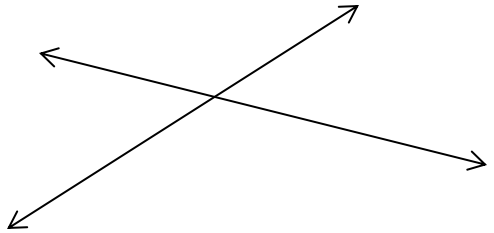
- Relationships:
  - 1. Complementary Angles: 2 angles sum 90
  - 2. Supplementary Angles: 2 angles sum 180
  - 3. Adjacent Angles: 2 angles that share one side

Complementary/Supplementary can either be adjacent or nonadjacent

- Angle Pairs:
  - 4. Linear Pair: adjacent



  - 5. Vertical: across



1.6 Polygons

- **Polygon**: closed shape
  - 3 or more sides
  - Sides are segments
  - Corners are vertices
  - Concave or convex
- Classify by number of sides
- Look at chart in section

- **Equilateral**: all sides congruent
- **Equiangular**: all angles congruent

- **Regular Polygon**: Both equilateral AND equiangular