

UNIT ONE: Discovering Points, Lines, Planes and Angles

- Coordinate plane (Ordered Pairs (x,y))
- **Quadrants** (I, II, III, IV)
- **Collinear** and **Coplanar** points
- **Segment Addition Postulate** (Q is between P and R, then $PQ + QR = PR$)
- **Distance** between two points on a number line (count them or $|b - a|$)
- **Distance** between two ordered pairs (distance = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$)
- Difference between PR and \overline{PR}
- **Midpoint** of two numbers on a number line $(\frac{a + b}{2})$
- Midpoint of two ordered pairs $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$
- **Segment Bisector**
- Rays, line segments, lines, angles
- **Right, Obtuse,** and **Acute** angles
- **Perpendicular** lines
- **Adjacent, Vertical Angles,** and **Linear Pairs**
- **Supplementary** (180 degrees) and **Complementary** (90 degrees)

UNIT TWO: Connection Reasoning and Proof

- **Conjectures/Counterexamples**
- **Conjunction** (“and”, \wedge)
- **Disjunction** (“or”, \vee)
- If-then statements/**Conditionals** ($P \rightarrow Q$)
- **Hypothesis** (“If” part) P
- **Conclusion** (“then” part) Q
- **Negation** ($\sim P$)
- **Inverse** ($\sim P \rightarrow \sim Q$)
- **Converse** ($Q \rightarrow P$)
- **Contrapositive** ($\sim Q \rightarrow \sim P$)
- **Law of Detachment** (if $P \rightarrow Q$ is true, and P is true, then Q is true)
- **Law of Syllogism** (if $P \rightarrow Q$ and $Q \rightarrow R$, then $P \rightarrow R$)
- PROOFS (Algebra/Angles/Segments)
- Truth Quality / Truth Tables
- Venn Diagrams

UNIT THREE: Using Perpendicular and Parallel Lines

- **Parallel lines**
- **Skew lines**
- **Transversal**
- Angle relationships
 - o exterior/interior
 - o corresponding
 - o alternate interior/exterior
 - o consecutive interior
- **Slope** ($\frac{RISE}{RUN}$ or $m = \frac{y_2 - y_1}{x_2 - x_1}$)
- Parallel slopes are equal
- Perpendicular slopes are **Negative Reciprocals**
- Distance Between a Point and a Line
- Distance Between Parallel Lines

UNIT FOUR: Identifying Congruent Triangles

- **Triangles**
 - o **Acute, Obtuse, Right**
 - o **Equilateral, Scalene, Isosceles**
- **Angle Sum Theorem** (all triangles' angles total 180 degrees)
- **Exterior Angle Theorem**
- **Congruent Triangles** – all six parts are congruent
- Definition of Congruent Triangles (CPCTC)
- Postulates
 - o **SSS** Postulate
 - o **SAS** Postulate – MUST be included angle
 - o **ASA** Postulate – MUST be included side
 - o **AAS** Postulate – MUST be consecutive
- Angle and side relationships (Shortest Side → opposite Smallest Angle, etc.)
- **Triangle Side Inequality**