

Quantitative Aptitude

Geometry (Lines and Angles)

Topic	Concept / Theorem	Explanation / Formula
Basic Definitions	Line, Ray, Line Segment, Angle	Line: Infinite length; Ray: Starts at one point and extends; Line Segment: Fixed endpoints; Angle: \angle
Types of Angles	Acute, Right, Obtuse, Straight, Reflex	Acute: $<90^\circ$, Right: $=90^\circ$, Obtuse: $>90^\circ <180^\circ$, Straight: $=180^\circ$, Reflex: $>180^\circ <360^\circ$
Complementary Angles	Sum = 90°	If $\angle A + \angle B = 90^\circ$, then they are complementary.
Supplementary Angles	Sum = 180°	If $\angle A + \angle B = 180^\circ$, then they are supplementary.
Adjacent Angles	Angles sharing a common arm and vertex	No overlap, lie next to each other
Linear Pair	Sum = 180° , angles on a straight line	Formed when two adjacent angles lie on a straight line
Vertically Opposite Angles	Vertically opposite angles are equal	When two lines intersect, opposite angles are always equal
Angles on a Straight Line	Sum = 180°	Ex: $\angle 1 + \angle 2 = 180^\circ$ when on a straight line
Angles at a Point	Sum = 360°	All angles around a point sum up to 360°
Parallel Lines & Transversal	Alternate Interior Angles are equal	If two parallel lines are cut by a transversal, alternate interior angles are equal
	Corresponding Angles are equal	Angles in the same relative position at each intersection
	Co-Interior (Same Side Interior) Angles are supplementary	$\angle A + \angle B = 180^\circ$
Lines & Angles Axioms	1. Things equal to the same thing are equal to each other	Euclid's Axioms
	2. If equals are added to equals, the wholes are equal	
Angle Sum Property of Triangle	Sum of interior angles of a triangle = 180°	$\angle A + \angle B + \angle C = 180^\circ$
Exterior Angle Theorem	Exterior angle = Sum of two opposite interior angles	$\angle \text{Exterior} = \angle A + \angle B$ (if $\angle C$ is exterior, A & B are remote interior angles)
Linear Pair Axiom	If a ray stands on a line, the sum of adjacent angles is 180°	Used in linear pair questions
Angle Bisector Theorem	Divides angle into two equal parts	Also applies in triangle angle bisector questions
Triangle Properties	No side can be greater than the sum or less than the difference of other two sides	Triangle Inequality Theorem
Polygon Angle Sum	Sum = $(n - 2) \times 180^\circ$	Where n = number of sides
Each Interior Angle of Regular Polygon	$= [(n - 2) \times 180^\circ] / n$	For regular polygons (equal sides & angles)
Each Exterior Angle of Regular Polygon	$= 360^\circ / n$	Total of all exterior angles is always 360°
Angle Chasing Techniques	Use of alternate, vertical, linear pair, and triangle angle sum together	Critical in MCQs and diagram-based geometry problems

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