

## Quantitative Aptitude

### Geometry (Quadrilateral)

#### Quadrilaterals and Their Properties:

Quadrilateral	Sides	Angles	Diagonals	Special Properties
Square	All 4 sides equal	All 90°	Equal & bisect each other at 90°	Both rectangle & rhombus
Rectangle	Opposite sides equal	All 90°	Equal & bisect each other	Not all sides equal
Rhombus	All 4 sides equal	Opposite angles equal	Bisect at 90°, not equal	Diagonals bisect angles
Parallelogram	Opposite sides equal	Opposite angles equal	Bisect each other	No right angles by default
Trapezium	Only 1 pair of opposite sides parallel	No specific property	No specific property	Isosceles trapezium has equal non-parallel sides
Kite	Two pairs of adjacent sides equal	One pair of equal opposite angles	One diagonal bisects the other at 90°	Diagonals intersect at right angle

#### Formulas of Angle of Sector:

Quantity	Formula
Arc Length (l)	$l = (\theta / 360^\circ) \times 2\pi r$
Area of Sector (A)	$A = (\theta / 360^\circ) \times \pi r^2$
Angle of Sector ( $\theta$ in degrees)	$\theta = (360^\circ \times \text{Arc Length}) / (2\pi r)$
Angle of Sector ( $\theta$ in radians)	$\theta = \text{Arc Length} / r$
Area of Sector (using radians)	$A = (1/2) \times r^2 \times \theta$
Arc Length (using radians)	$l = r \times \theta$
Perimeter of Sector	$\text{Perimeter} = 2r + l = 2r + (\theta / 360^\circ) \times 2\pi r$

### Polygons:

Definition: A polygon is a closed two-dimensional figure with three or more straight sides and angles. Examples include triangle, square, pentagon, etc.

#### 2. Types of Polygons

- Regular Polygon – All sides and angles are equal (e.g., equilateral triangle, square).
- Irregular Polygon – Sides and/or angles are not equal.
- Convex Polygon – All interior angles are less than 180°.
- Concave Polygon – At least one interior angle is more than 180°.

#### 3. Basic Formulas

- Sum of interior angles =  $(n - 2) \times 180^\circ$ , where n is the number of sides.
- Each interior angle of a regular polygon =  $[(n - 2) \times 180^\circ] / n$
- Sum of all exterior angle = 360° (constant)
- Number of sides in regular polygon =  $\frac{360^\circ}{\text{exterior angle}}$

- Number of diagonals =  ${}^nC_2 - n = \frac{n(n-3)}{2}$
- Perimeter =  $n \cdot a$  where  $a$  = length of side
- Area of regular polygon =  $\frac{na^2}{4} \times \cot\left(\frac{180}{n}\right)^\circ$

#### 4. Common Polygons

Polygon Name	Number of Sides
Triangle	3
Quadrilateral	4
Pentagon	5
Hexagon	6
Heptagon	7
Octagon	8
Nonagon	9
Decagon	10

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