1. ARITHMETIC PROGRESSION

The $\boldsymbol{n}$th term a_n of the AP with first term a and common difference $\boldsymbol{d}$ is given by

$$a_n = a + (n-1)d$$

2. NTH TERM FROM THE END OF AN AP

Let the last term of an AP be ' l ' and the common difference of an AP is ' d ' then the nth term from the end of an AP is given by

$$I_n = I - (n-1)d$$

3. SUM OF FIRST TERMS OF AN AP

The sum of the first n terms of an AP is given by

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

Where:
a = first term,
d = common difference and
n = number of terms.
Also, it can be written as

$$S_n = \frac{n}{2}[a + a_n]$$

where a_n = nth terms
or

$$S_n = \frac{n}{2}[a + l]$$

where l = last term

Sum of first $\boldsymbol{n}$ positive integers is given by $S_n = \frac{n(n+1)}{2}$

4. ARITHMETIC MEAN

If **a**, **b** and **c** are in AP, then ' b ' is known as arithmetic mean between ' a ' and ' c ' $b = \frac{a+c}{2}$ i.e. AM between ' a ' and ' c ' is $\frac{a+c}{2}$.

5. POINTS TO REMEMBER

The distance of a point from the y-axis is called its $\boldsymbol{x}$-coordinate, or abscissa.
The distance of a point from the x-axis is called its y-coordinate, or ordinate.
The coordinates of a point on the x-axis are of the form $(x, 0)$.
The coordinates of a point on the y-axis are of the form $(0, y)$.

6. DISTANCE FORMULA

The distance between any two points $A(x_1, y_1)$ and $B(x_2, y_2)$ is given by

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\text{or } AB = \sqrt{(\text{ difference of abscissae })^2 + (\text{ difference of ordinates })^2}$$

5. DISTANCE OF A POINT FROM ORIGIN

The distance of a point $P(x, y)$ from origin O is given by $OP = \sqrt{x^2 + y^2}$

6. SECTION FORMULA

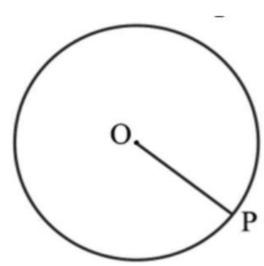
The coordinates of the point $P(x, y)$ which divides the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$, internally, in the ratio $m_1 : m_2$ are $\left(\frac{m_1X_2+m_2X_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right)$ This is known as the section formula.

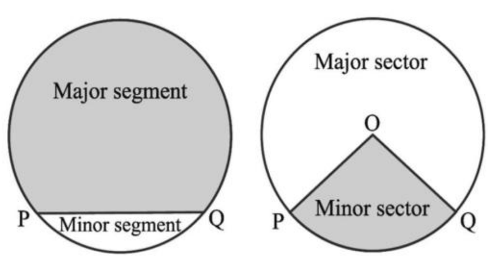
7. MID-POINT FORMULA

The coordinates of the point $P(x, y)$ which is the midpoint of the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$, are $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

8. CIRCLE

a) The collection of all the points in a plane, which are at a fixed distance from a fixed point in the plane, is called a circle.
b) The fixed point is called the centre of the circle and the fixed distance is called the radius of the circle. In the below figure, O is the centre and the length OP is the radius of the circle.





10. SECANT TO A CIRCLE

A secant to a circle is a line that intersects the circle at exactly two points.

11. TANGENT TO A CIRCLE

A tangent to a circle is a line that intersects the circle at only one point.

- The tangent to a circle is perpendicular to the radius through the point of contact.
- The lengths of tangents drawn from an external point to a circle are equal.
- The centre lies on the bisector of the angle between the two tangents.
- If a line in the plane of a circle is perpendicular to the radius at its endpoint on the circle, then the line is tangent to the circle.

12. PERIMETER AND AREA OF A CIRCLE

Perimeter/circumference of a circle

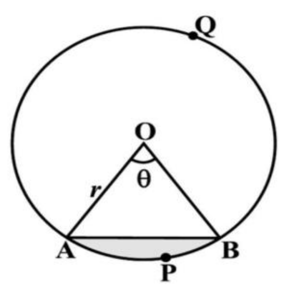
$$P = \pi \times \text{ diameter}$$
$$P = \pi \times 2r \text{ (where } r \text{ is the radius of the circle)}$$
$$p = 2\pi r$$

Area of a circle = πr^2, where $\pi = \frac{22}{7}$

13. AREAS OF SECTOR AND SEGMENT OF A CIRCLE

Area of the sector of angle $\theta = \frac{\theta}{360^\circ} \times \pi r^2$, where r is the radius of the circle and θ the angle of the sector in degrees

length of an arc of a sector of angle $\theta = \frac{\theta}{360^\circ} \times 2\pi r$, where r is the radius of the circle and θ the angle of the sector in degrees

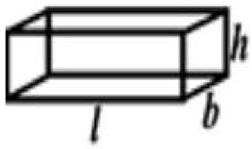
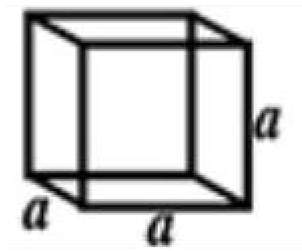
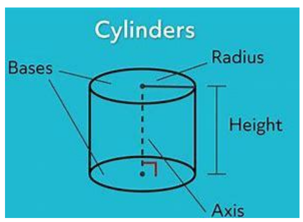
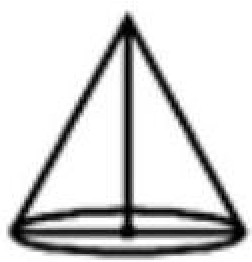
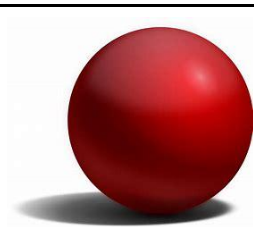
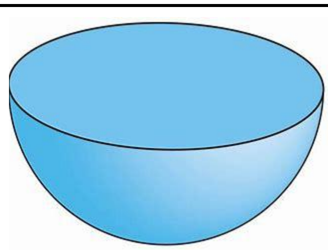


Area of the segment APB = Area of the sector OAPB − Area of △ OAB

$$= \frac{\theta}{360^0} \times \pi r^2 - \text{ area of } \Delta\text{OAB}$$

Area of the major sector OAQB = πr^2 − Area of the minor sector OAPB
Area of major segment AQB = πr^2 − Area of the minor segment APB

Area of segment of a circle = Area of the corresponding sector - Area of the corresponding triangle

S. No.	Name of the solid	Figure	Lateral/Curved surface area	Total surface area	Volume
1.	Cuboid		$2h(l+b)$	$2(lb+bh+hl)$	lbh
2.	Cube		$4a^2$	$6a^2$	a^3
4.	Regular circular Cylinder		$2\pi rh$	$2\pi r(r+h)$	$\pi r^2 h$
6.	Right circular cone		πrl	$\pi r(l+r)$	$\frac{1}{3}\pi r^2 h$
7.	Sphere		$4\pi r^2$	$4\pi r^2$	$\frac{4}{3}\pi r^3$
8.	Hemisphere		$2\pi r^2$	$3\pi r^2$	$\frac{2}{3}\pi r^3$