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Quadratic Equation

General form = ax^2+bx+c

[where a, b, c are real numbers

$a \neq 0$]

Discriminant = b^2-4ac

Quadratic Formula = $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$b^2-4ac < 0$ - Roots are imaginary

$b^2-4ac > 0$ - Roots are real and unequal

$b^2-4ac = 0$ - Roots are real and equal.

Arithmetic Progression

$an = a+[n-1]d$

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

$Sn = \frac{n}{2}[2a+[n-1]d]$

l, an - last Term

n - no of terms

Sn - Sum of terms

a - First Term

d - common difference

Co-ordinate Geometry

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

Distance Formula when one point is origin = $\sqrt{x^2+y^2}$

area of $\Delta le = \frac{1}{2}\left|x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)\right|$

Section Formula = $\left[\frac{mx_2+nx_1}{m+n}, \frac{my_2+ny_1}{m+n}\right]$ Ratio : m : n Internally

Midpoint Formula = $\left[\frac{x_2+x_1}{2}, \frac{y_2+y_1}{2}\right]$

Centroid = $\left[\frac{x_3+x_2+x_1}{3}, \frac{y_3+y_2+y_1}{3}\right]$

Probability

Probability of event = $\frac{\text{Favourable outcomes}}{\text{Total no. of outcomes}}$

P (Event happening) + P (Event not happening) = 1

Areas related to circles

Length of arc - $\frac{\theta}{360^\circ} \times 2\pi r$

area of sector = $\frac{\theta^\circ}{360^\circ} \times \pi r^2$

area of circle = πr^2

Perimeter of circle = $2\pi r$

area of semicircle = $\frac{\pi r^2}{2}$

area of Quadrant = $\frac{\pi r^2}{4}$

area of segment = area of sector - area of Δ le

Circles

Theorem - 1 The tangent at any point of a circle is perpendicular to radius through point of contact.

Theorem - 2

The length of tangents drawn from an external point to a circle are equal

Surface areas and Volumes

Cube

LSA - $4a^2$

TSA - $6a^2$

Volume - a^3

Diagonal - $\sqrt{3}a$

cuboid

LSA - $2(l+b)h$

TSA - $2[lb+bh+hl]$

Volume = $l \times b \times h$

Diagonal = $\sqrt{l^2+b^2+h^2}$

cylinder

CSA - $2\pi rh$

TSA - $2\pi r(h+r)$

Volume - $\pi r^2 h$

cone

CSA - πrl

TSA - $\pi r(l+r)$

Volume - $\frac{1}{3}\pi r^2 h$

$l = \sqrt{h^2+r^2}$

hemisphere

CSA - $2\pi r^2$

TSA - $3\pi r^2$

Volume - $\frac{2}{3}\pi r^3$

sphere

CSA - $4\pi r^2$

TSA - $4\pi r^2$

Volume - $\frac{4}{3}\pi r^3$

Frustum

Volume - $\frac{1}{3}\pi h[R_1^2 + R_2^2 + R_1R_2]$

CSA - $\pi l(r_1+r_2)$

TSA - $\pi(r_1+r_2)l + \pi r_1^2 + \pi r_2^2$