~ SIMILARITY

$$\frac{A(\Delta ABC)}{A(\Delta PQR)} = \frac{b_1}{b_2}$$

$$\frac{A(\Delta XYZ)}{A(\Delta XLZ)} = \frac{h_1}{h_2}$$

B.P.T

$$\frac{AP}{PB} = \frac{AQ}{QC}$$

Three ||el Lines & transversal.

$$\frac{AB}{BC} = \frac{PQ}{QR}$$

Angle Bisector thm.

$$\frac{AE}{EB} = \frac{AC}{BC}$$

Tests of Similarity.

- AAA test
- AA test
- SAS test
- SSS test

sides are in proportion & angles ≅.

Thm of Areas of sim. Δs.

If ΔABC ~ ΔXYZ,

$$\frac{A(\Delta ABC)}{A(XYZ)} = \frac{AB^2}{XY^2} = \frac{AC^2}{XZ^2} = \frac{BC^2}{YZ^2}$$

PYTHAGORAS THEOREM

$$AB^2 + BC^2 = AC^2$$

30°-60°-90°

$YZ = \frac{1}{2} \times XZ$ $XY = \frac{\sqrt{3}}{2} \times XZ$

45°-45°-90°

$AB = BC = \frac{1}{\sqrt{2}} AC$

similarity in right angled Δ.

ΔABC ~ ΔBDC ~ ΔADB

Thm of geometric mean

$QS^2 = PS \times SR$

Appollonius thm.

$AB^2 + AC^2 = 2AM^2 + 2BM^2$

$AB^2 = BC^2 + AC^2 + 2BC \times CD$

Obtuse Δ.

$AB^2 = BC^2 + AC^2 - 2BC \times DC$

Acute Δ.

MATHS - 2

FORMULA SHEET

CIRCLE

Congruent, Intersectⁿ, Concentric, Secant, Tangent

Tangent thm.

radius ⊥ tangent

major arc, minor arc

Tangent segment thm.

seg PD ≅ seg DQ.

Externally touching.

$d_{centres} = r_1 + r_2$

Internally touching

$d_{centre} = r_1 - r_2$

m(complete circle) = 360°

measure of arc = m(central angle)

- Two arcs are congruent if their measures and radii are equal.
- Chords corresponding to congruent arcs of circle are congruent. (& vice versa)

Inscribed angle = $\frac{1}{2}$ × arc intercepted by it.

Inscribed angle, Intercepted arc

opposite angles of cyclic quadrilateral are SUPPLEMENTARY

- angles inscribed in same arc are congruent
- Angles inscribed in semicircle are right.

$\angle AEC = \frac{1}{2}[m(\text{arc } AC) + m(\text{arc } DB)]$

$m\angle CEB = \frac{1}{2}[m(\text{arc } AD) + m(\text{arc } CB)]$

Thm. of ∠ betⁿ tangent & secant

$\angle ABC = \frac{1}{2} m(\text{arc } ADB)$

Internal divisⁿ of chord.

$AE \times EB = CE \times ED$

External divⁿ of chords

$AE \times EB = CE \times ED$

$\angle BED = \frac{1}{2}[m(\text{arc } BD) - m(\text{arc } AC)]$

Tangent secant seg. thm

$EA \times EB = ET^2$

NOW YOU'RE ONE STEP CLOSER

COORDINATE GEOM.

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

Distance formula

$d = \sqrt{x^2 + y^2}$

distance from origin

$(x,y) = \left[\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n}\right]$

Section formula.

$(x,y) = \left[\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right]$

Midpoint formula.

$(x,y) = \left[\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right]$

Centroid Formula

$\text{Slope} = \frac{y_2-y_1}{x_2-x_1}$

Slope = tan θ

- Slope(X axis) = 0
- Slope(Y axis) = ∞
- Slopes of parallel lines are same.

TRIGONOMETRY

$\sin\theta = \frac{opp.}{hyp.}$ $\text{cosec}\,\theta = \frac{hyp.}{opp.}$

$\cos\theta = \frac{adj.}{opp.}$ $\sec\theta = \frac{hyp.}{adj.}$

$\tan\theta = \frac{opp.}{adj.}$ $\cot\theta = \frac{adj.}{opp.}$

$\sin\theta \times \text{cosec}\,\theta = 1$

$\cos\theta \times \sec\theta = 1$

$\tan\theta \times \cot\theta = 1$

$\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$

$\sin\theta = \cos(90-\theta)$

$\cos\theta = \sin(90-\theta)$

$\sin^2\theta + \cos^2\theta = 1$

$1 + \cot^2\theta = \text{cosec}^2\theta$

$1 + \tan^2\theta = \sec^2\theta$

angle of elevatⁿ

angle of deprⁿ

MENSURATION

$l = \sqrt{h^2 + (r_1 - r_2)^2}$

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

$TSA = CSA + \pi(r_1^2 + r_2^2)$

$V = \frac{1}{3}\pi h (r_1^2 + r_2^2 + r_1 r_2)$

$A = \frac{\theta}{360} \times \pi r^2$

Cuboid: $LSA = 2h(l+b)$, $TSA = 2(lb + bh + lh)$, $V = lbh$.

Cube: $LSA = 4l^2$, $TSA = 6l^2$, $V = l^3$

Cylinder: $CSA = 2\pi rh$, $TSA = 2\pi r(r+h)$, $V = \pi r^2 h$

Cone: $l = \sqrt{h^2 + r^2}$, $CSA = \pi r l$, $TSA = \pi r(r+l)$, $V = \frac{1}{3}\pi r^2 h$

Sphere: $TSA = 4\pi r^2$, $V = \frac{4}{3}\pi r^3$

Hemisphere: $CSA = 2\pi r^2$, $TSA = 3\pi r^2$, $V = \frac{2}{3}\pi r^3$

$\text{Area(sector)} = \frac{l \times r}{2}$

Segment: $A = r^2\left[\frac{\pi\theta}{360} - \frac{\sin\theta}{2}\right]$

$l = \frac{\theta}{360} \times 2\pi r$