

COORDINATE GEOMETRY

APPLICATIONS

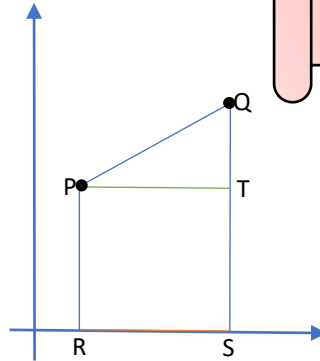
1. Distance Formula

$$RS = PT = (x_2 - x_1)$$

$$SQ = y_2; ST = y_1; QT = (y_2 - y_1)$$

Applying Pythagoras in ΔPTQ

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



Verifying Collinearity

A (x_1, y_1), B (x_2, y_2), C (x_3, y_3)

→ Find AB, BC, CA using distance formula

→ If $AB + BC = CA$

→ Or $BC + CA = AB$

→ Or $AB + CA = BC$

Then 3 points are collinear



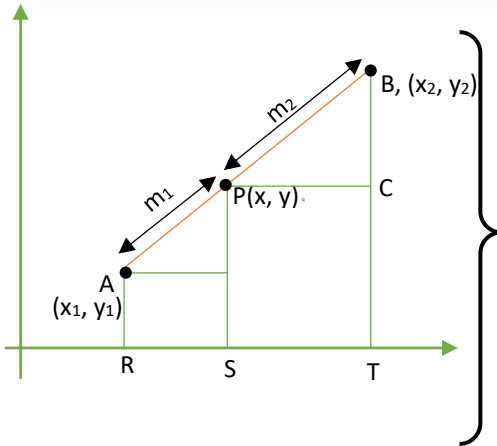
2. Section Formula

Coordinates of P (x, y) = ($m_1 : m_2$ Internally)

$$\left\{ \frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2} \right\}$$

Coordinates of P (x, y) = ($m_1 : m_2$ Externally)

$$\left\{ \frac{m_1 x_2 - m_2 x_1}{m_1 - m_2}, \frac{m_1 y_2 - m_2 y_1}{m_1 - m_2} \right\}$$



1) For an equilateral Δ - Prove three sides equal.

2) Right-angled Δ - Prove sum of sq. of two sides = to sq. of third side.

3) Square- prove 4 sides equal or 2 diagonals are equal.

4) Rhombus- Prove 4 sides are equal.

5) Rectangle- Prove opposite sides equal or diagonals are equal.

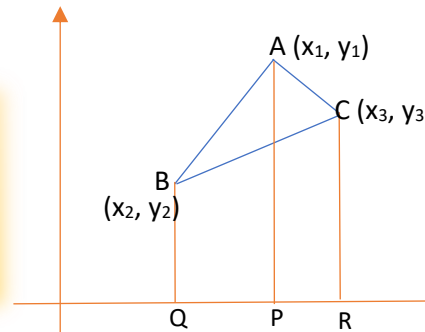
6) Parallelogram- Prove opposite sides equal.

3. Ar. of a Triangle

A (x_1, y_1), B (x_2, y_2), C (x_3, y_3)

$$\text{Area} = \frac{1}{2} |x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)|$$

If Ar. = 0 then, the points are collinear



Centroid of Triangle

Coordinates of the centroid of the triangles whose vertices are A (x_1, y_1), B (x_2, y_2), C (x_3, y_3) are

$$\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$$

