Date 28-03-24
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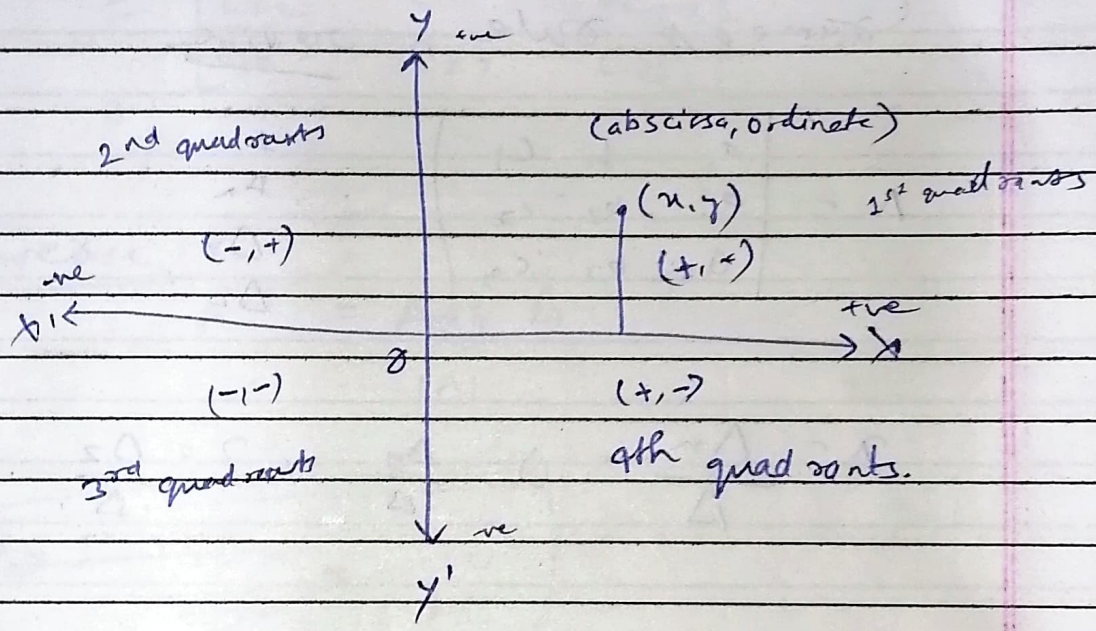
Matrix
Determinant
Cramer's rule
Stastistics

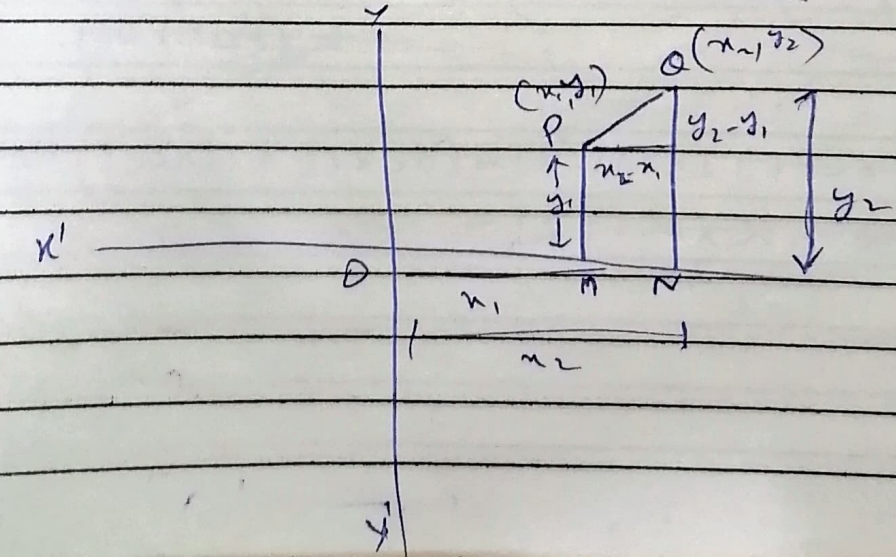
St line
Trigo
Calculus.

Co-ordinate Geometry



There are four ~~co~~ coordinate quadrants in plane figure

Distance between two points



$$h^2 = b^2 + p^2$$

$$(PQ)^2 = (PR)^2 + (QR)^2$$

$$PQ = \sqrt{(PR)^2 + (QR)^2}$$

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

Example

If the points of AB

$A = (-5, 10)$

$B = (-8, 18)$

$$AB = \sqrt{(-8-(-5))^2 + (18-10)^2}$$

$$= \sqrt{(-3)^2 + (8)^2}$$

$$= \sqrt{9 + 64}$$

$$= \sqrt{73}$$

$$= \sqrt{73}$$

Ans.

Area of triangle:

$$\text{Area of } \Delta = \frac{1}{2}\left[x_1(y_2-y_3) + x_2(y_3-y_1) + x_3(y_1-y_2)\right]$$

Q Find the area of Δ, if points are $(5,6), (3,5), (-7,5)$

$$\text{Ar. of } \Delta = \frac{1}{2}\left[5(5-5) + 3(5-6) + (-7)(6-5)\right]$$

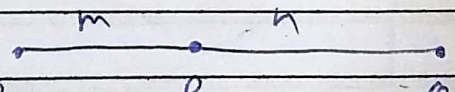
$$= \frac{1}{2}\left(5\times 4 + 3(-1) - 7(-3)\right]$$

$$= \frac{1}{2}(20 - 3 + 21)$$

$$= \frac{38}{2} = 19 \text{ sq. units}$$

Section Formula:

1. Internal Divide



$$\frac{PR}{RQ} = \frac{m}{n}$$

Then x coordinate of point R equal to $\frac{mx_2 + nx_1}{m+n}$.

Then Y coordinate of point R = $\frac{my_2 + ny_1}{m+n}$.

Example:

Find the coordinate of the point which divide the line segment joining the points (4, -3), (8, 5) in the ratio 3:1.

$$x = \frac{mx_2 + nx_1}{m+n}$$

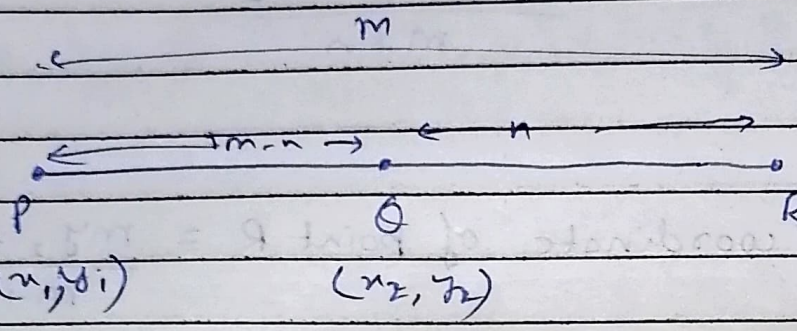
$$= \frac{3(8) + 1(4)}{3+1} = \frac{24+4}{4} = \frac{28}{4} = 7$$

$x = 7$ Ans

$$y = \frac{3(5) + 1(-3)}{4} = \frac{15-3}{4} = \frac{12}{4} = 3$$

$y = 3$. Ans

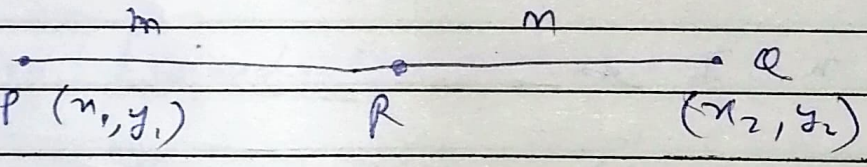
(ii) External Divide:



$$x = \frac{mx_2 - nx_1}{m-n}$$

$$y = \frac{my_2 - ny_1}{m-n}$$

(iii) Mid-point OR Equal Divide.



$$x \to \frac{mx_2 + nx_1}{m+n} \Rightarrow \frac{mx_2 + mx_1}{m+m} = \frac{m(x_2+x_1)}{2m}$$

$$x = \frac{x_1 + x_2}{2}$$

$$y = \frac{my_2 + my_1}{m+m} = \frac{m(y_2+y_1)}{2m} = \frac{y_2+y_1}{2}$$

$$y = \frac{y_1+y_2}{2}$$