

GST

- 1) **Input tax = $r\%$ of C.P**
 - 2) **Output tax = $r\%$ of S.P**
 - 3) **net tax = Output tax - input tax**
 - 4) **Amount = S.P + Output tax**
- r = rate of GST**

Banking

1) Interest earned = $\frac{PRn(n+1)}{2400}$ where
n = number of month
P = monthly deposit

Maturity value = $nP + I$
or
n = number of month
P = monthly deposit
nP = total deposited money
R = rate of interest

$$nP + \frac{nPR(n+1)}{2400}$$

Linear inequation

$$-x > -y = x < y$$

Graphical representation

$$-2 < x \leq 7/2, x \in \mathbb{R}$$



$$-2 < x \leq 7/2, x \in \mathbb{N}$$



Quadratic equation

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \text{where } a \neq 0$$

$$\text{standard form} \Rightarrow ax^2 \pm bx \pm c = 0$$

Discriminant $ax^2+bx+c=0$	Nature of roots	value of roots
$b^2-4ac>0$	real and unequal	$\frac{-b+\sqrt{b^2-4ac}}{2a}$
$b^2-4ac<0$	no real	no real value
$b^2-4ac=0$	real and equal	$\frac{-b}{2a}$, $\frac{-b}{2a}$

Factorisation

if $f(x)$ is divided by $ax+b$

then remainder = $f(-b/a)$, $ax+b=0$

eg. if $7x^2-2x+3$ is divided by $2x+1$
then remainder

$$f(-1/2) = R$$

in factor theorem $f(x)=0$

Ratio and proportion

1) if a, b, c, d, e are in
Continued proportion

then, $\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = \frac{d}{e}$;

2) Duplicate ratio = $\frac{a^2}{b^2}$

3) Sub duplicate ratio = $\sqrt{a/b}$

4) Triplicate ratio = $\frac{a^3}{b^3}$

5) Sub triplicate ratio = $\sqrt[3]{\frac{a}{b}}$

6) Componendo and dividendo

$$\text{if } \frac{a}{b} = \frac{c}{d} \text{ then, } \frac{a+b}{a-b} = \frac{c+d}{c-d}$$

7) mean proportion

**if a, b, c are in continued proportion
then b is called mean proportion**

$$b = \sqrt{a \times c}$$

8) Third proportion

if a, b, c are in continued proportion

then, c is called third proportion

and $c = b^2/a$
or

**apply the same formula of mean
proportional to find c**

Matrices

addition & Subtraction of 2 matrices

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}_{2 \times 2} \pm \begin{bmatrix} e & f \\ g & h \end{bmatrix}_{2 \times 2} = \begin{bmatrix} a \pm e & b \pm f \\ c \pm g & d \pm h \end{bmatrix}_{2 \times 2}$$

Multiplication of matrix by number

$$k \times \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} ka & kb \\ kc & kd \end{bmatrix}$$

null matrix

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

identity or unit matrix

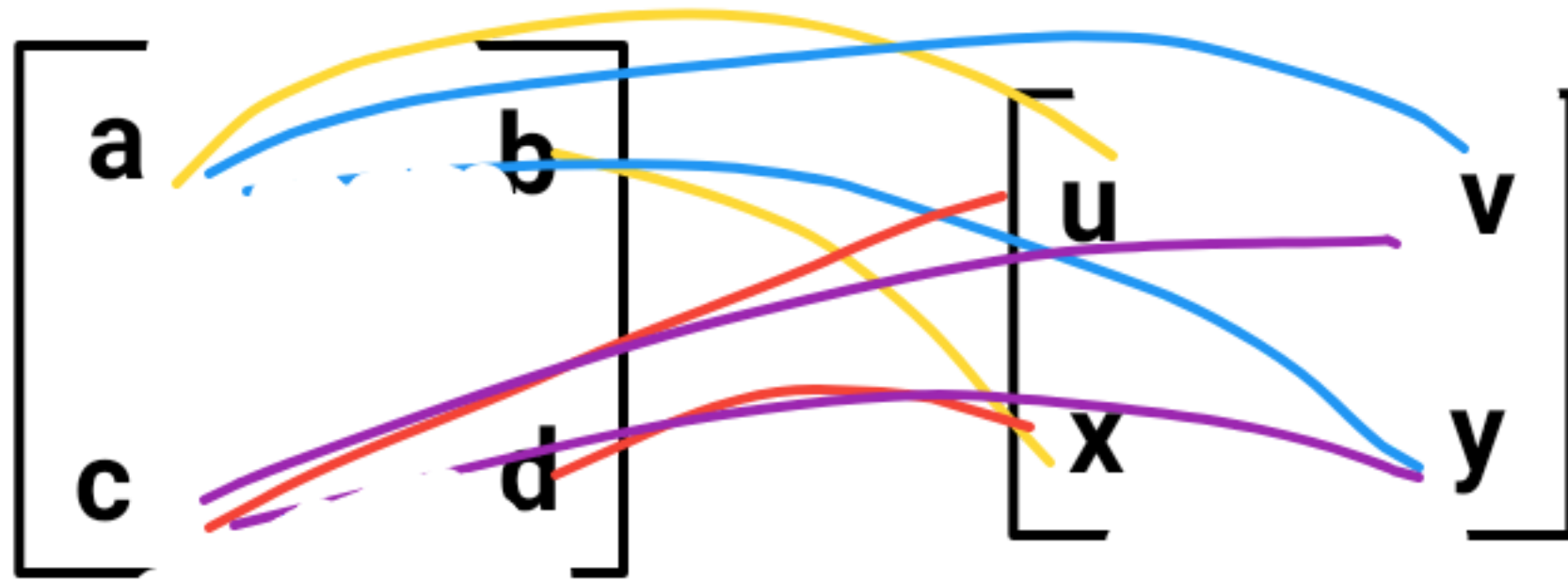
$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

multiplication of two matrices

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}_{2 \times 2} \begin{bmatrix} x \\ y \end{bmatrix}_{2 \times 1} = \begin{bmatrix} ax+by \\ cx+dy \end{bmatrix}_{2 \times 1}$$

$$\begin{bmatrix} \text{1st row 1st column} + \text{1st row 2nd column} \\ \text{2nd row 1st column} + \text{2nd row 2nd column} \end{bmatrix}_{2 \times 1}$$

multiplication of two matrices



$$\begin{bmatrix} au+bx & av+by \\ cu+dx & cv+dy \end{bmatrix}$$

$\begin{bmatrix} \text{1st row 1st column} \\ \text{nd row 1st column} \end{bmatrix}$

$\begin{bmatrix} \text{1st row 2nd column} \\ \text{nd row 2nd column} \end{bmatrix}$

AP

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

a = 1st term

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

**d = common
difference**

$$3) S_n = \frac{n}{2} [2a + (n-1)d]$$

t = last term

n = no. of terms

Refecction

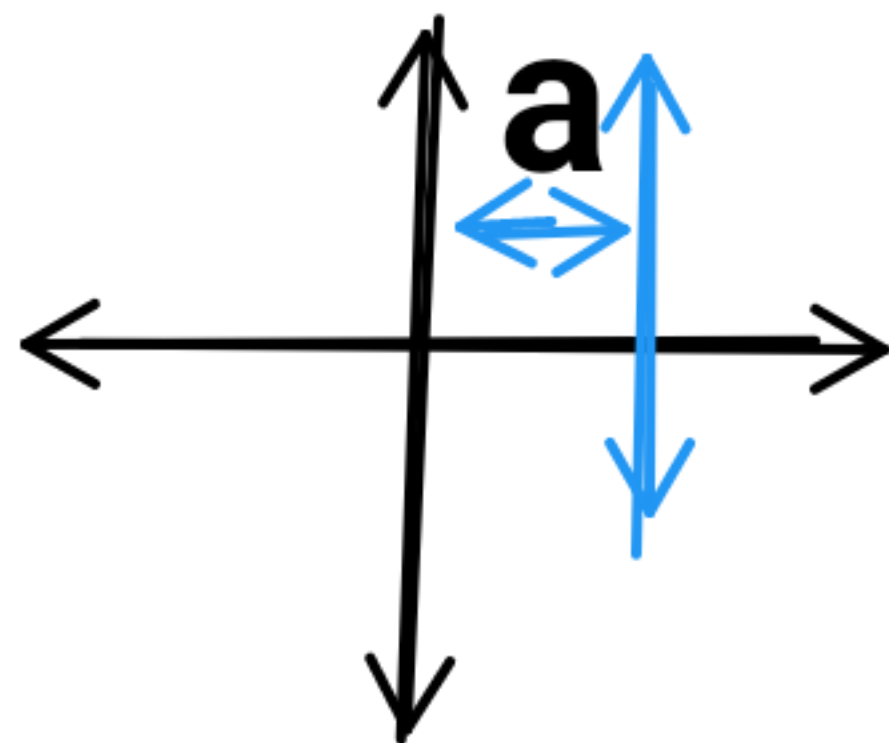
$$P(x,y) \xrightarrow{\text{in y axis}} P'(-x,y)$$

$$P(x,y) \xrightarrow{\text{in x axis}} P'(x,-y)$$

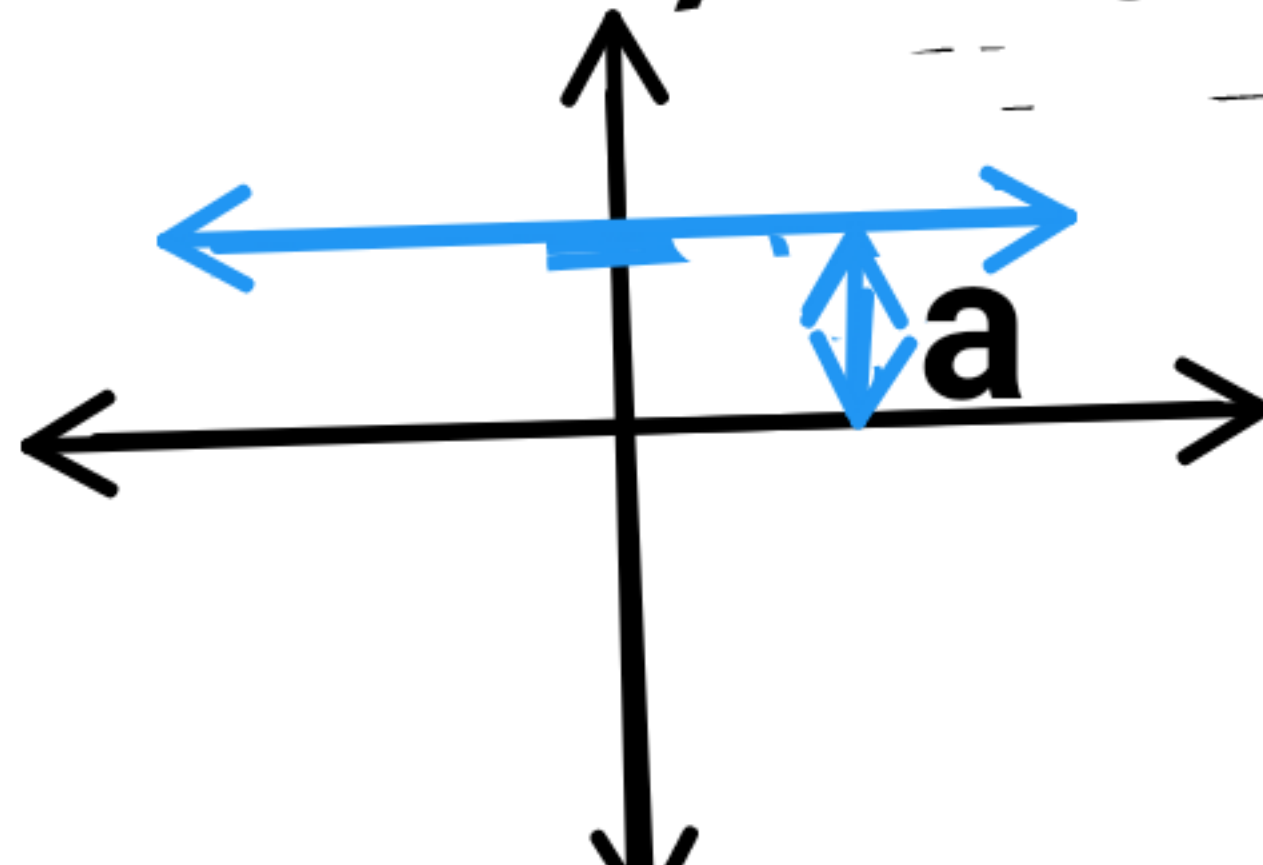
$$P(x,y) \xrightarrow{\text{in origin}} P'(-x,-y)$$

$$P(x,y) \xrightarrow{\text{parallel to y axis}} P'(-x+2a,y)$$

$P(x,y)$ parallel to x axis $P'(x,-y+2a)$

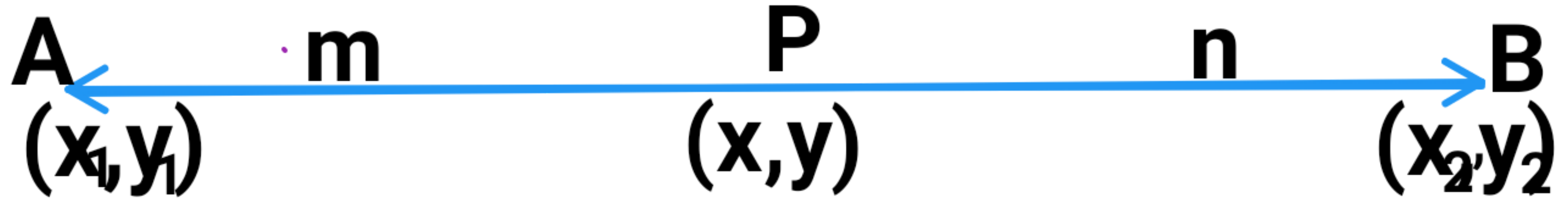


parallel to y axis



parallel to x axis

Section formula



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

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

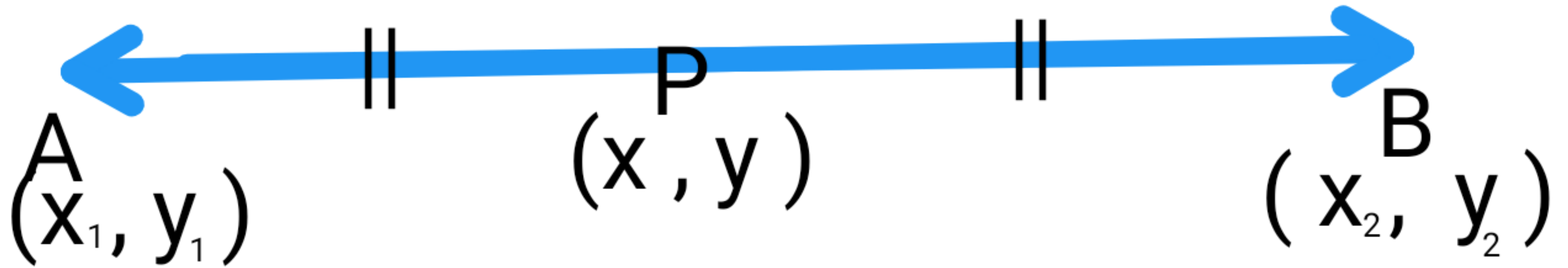
Distance formula

P
(x_1, y_1)

Q
(x_2, y_2)

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

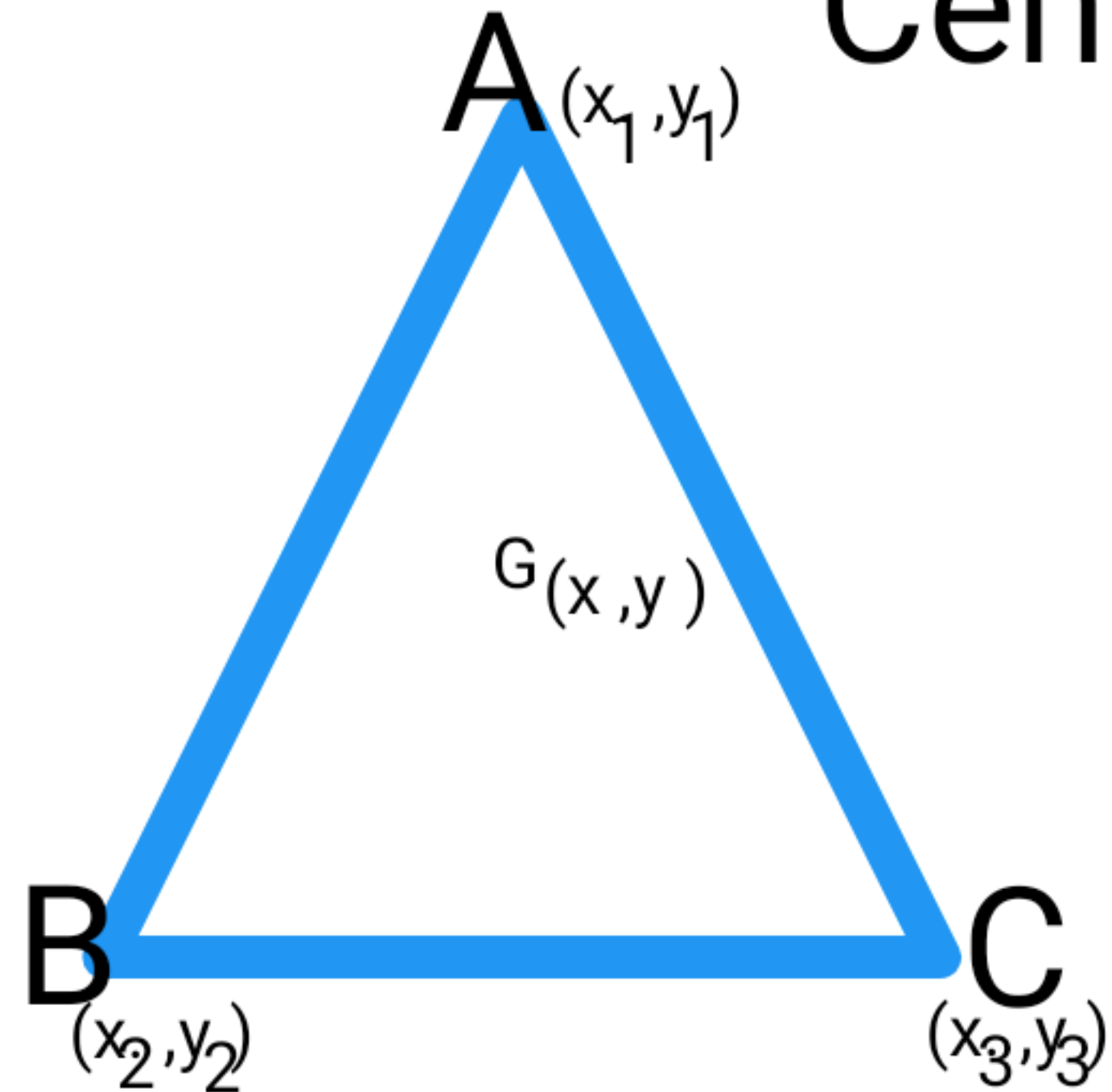
Mid point formula



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

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

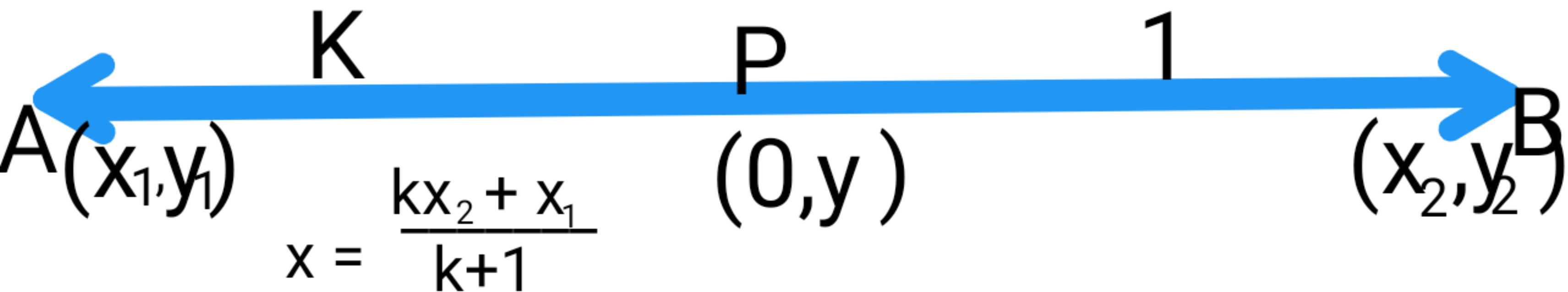
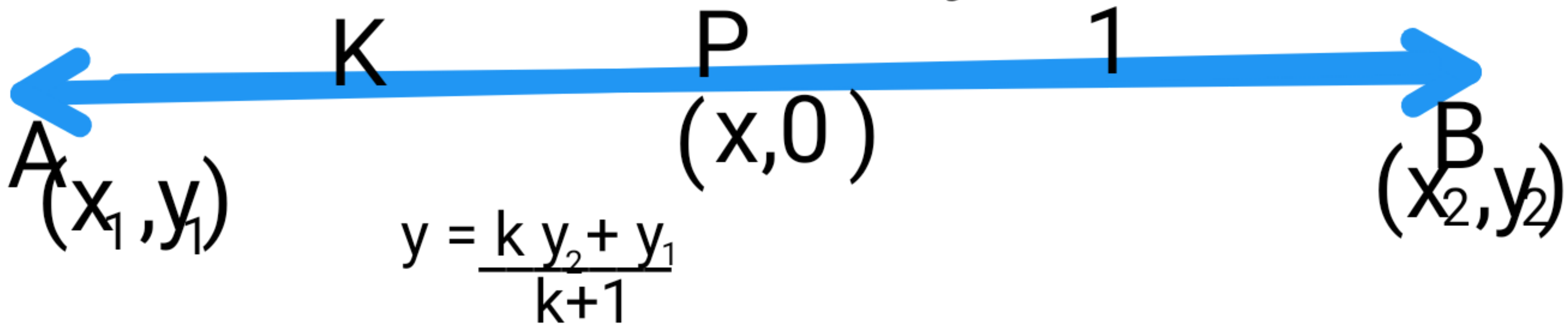
Centriod



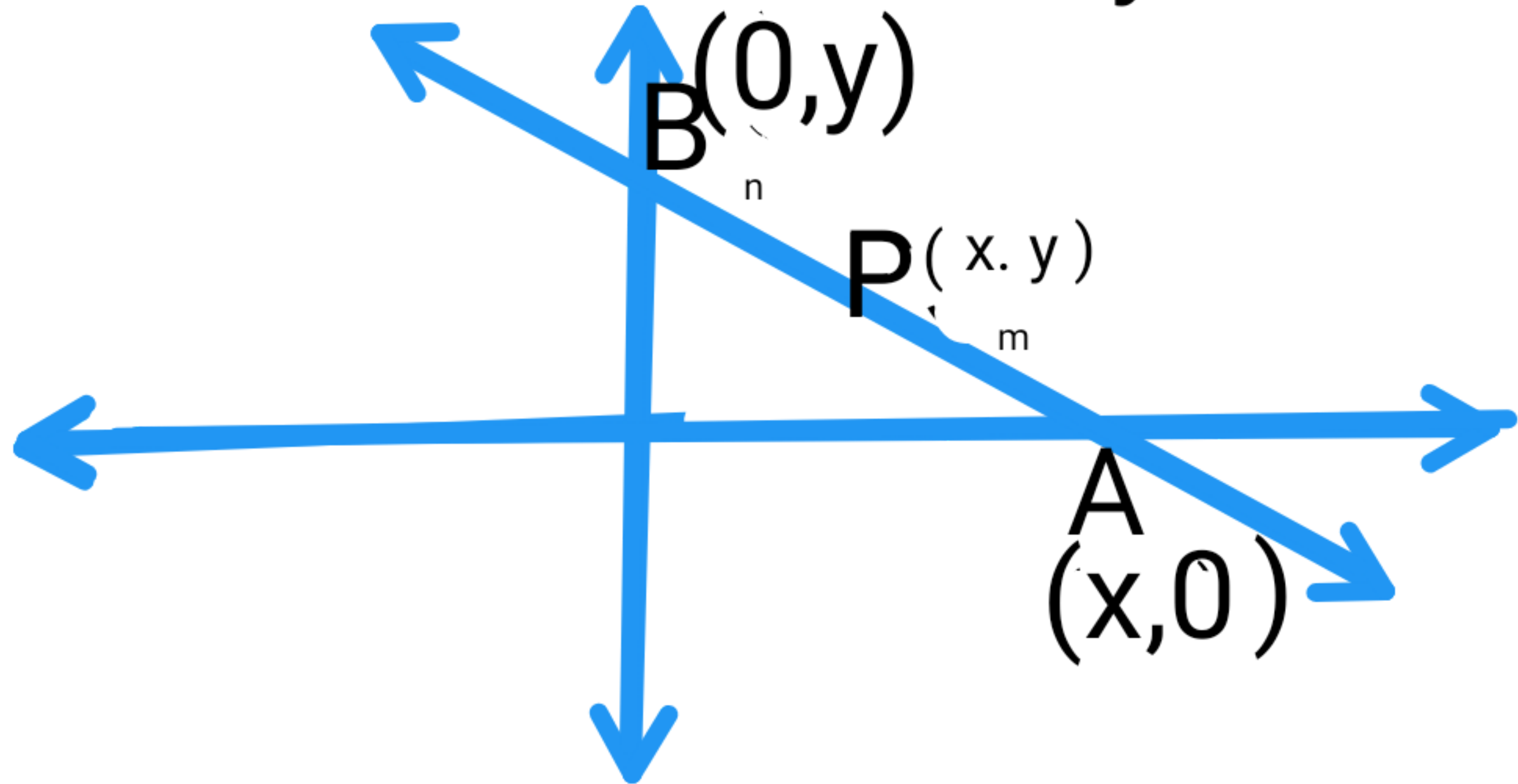
$$X = \frac{x_1 + x_2 + x_3}{3}$$

$$Y = \frac{y_1 + y_2 + y_3}{3}$$

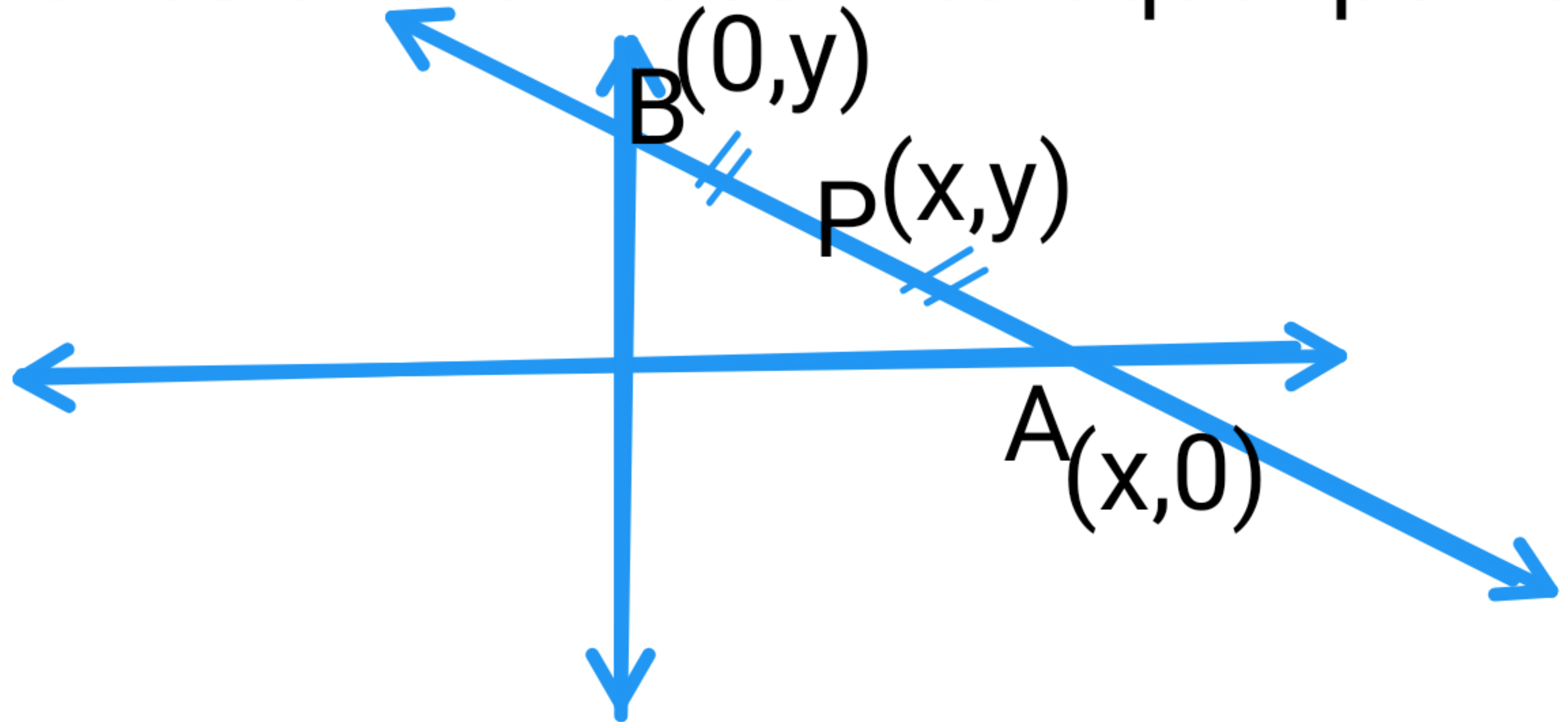
Ratio when divided by axis



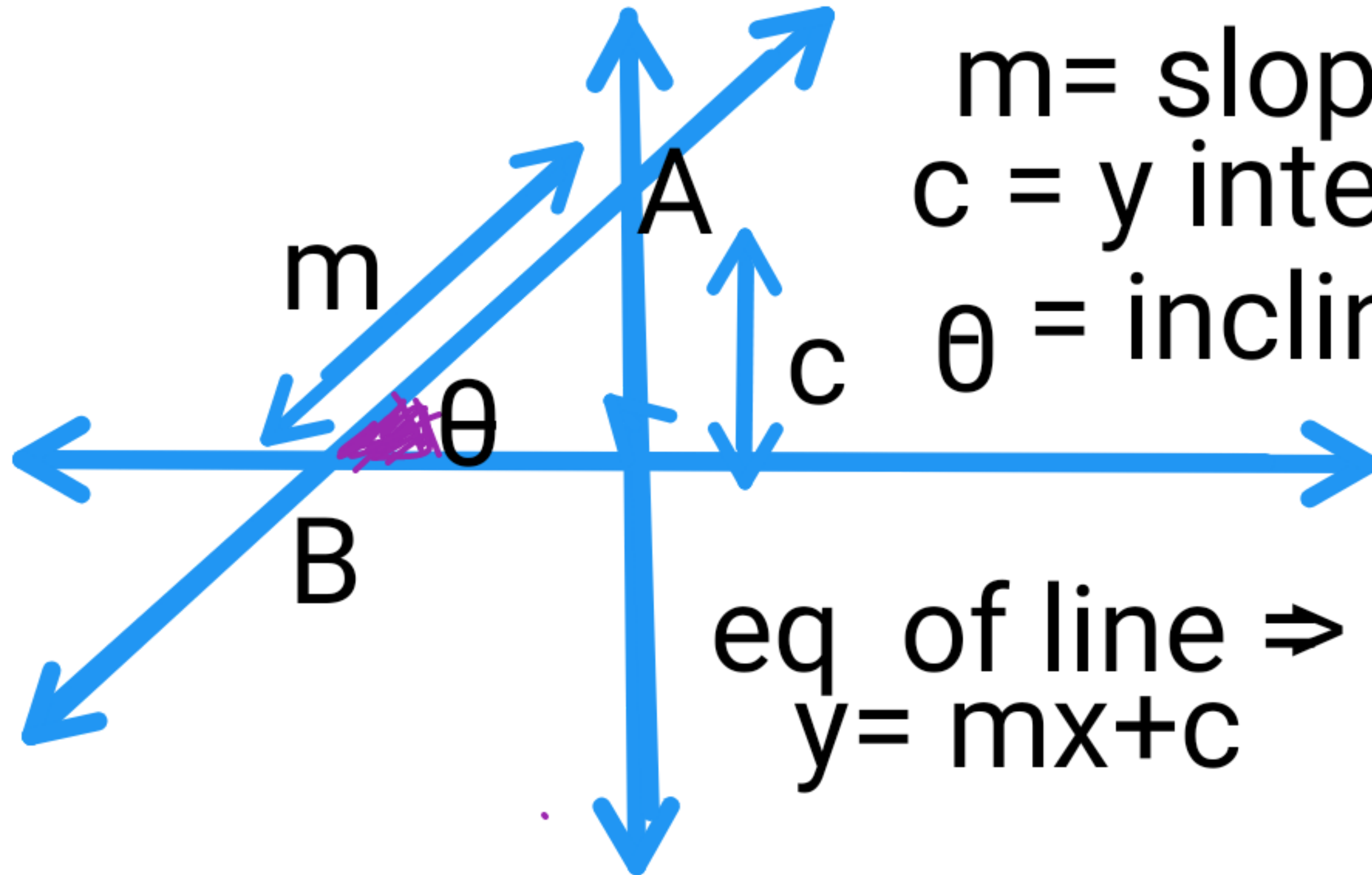
line when passes through point
and cut axes , divided by ratio



line when passes through point
cut axes and divided into equal points



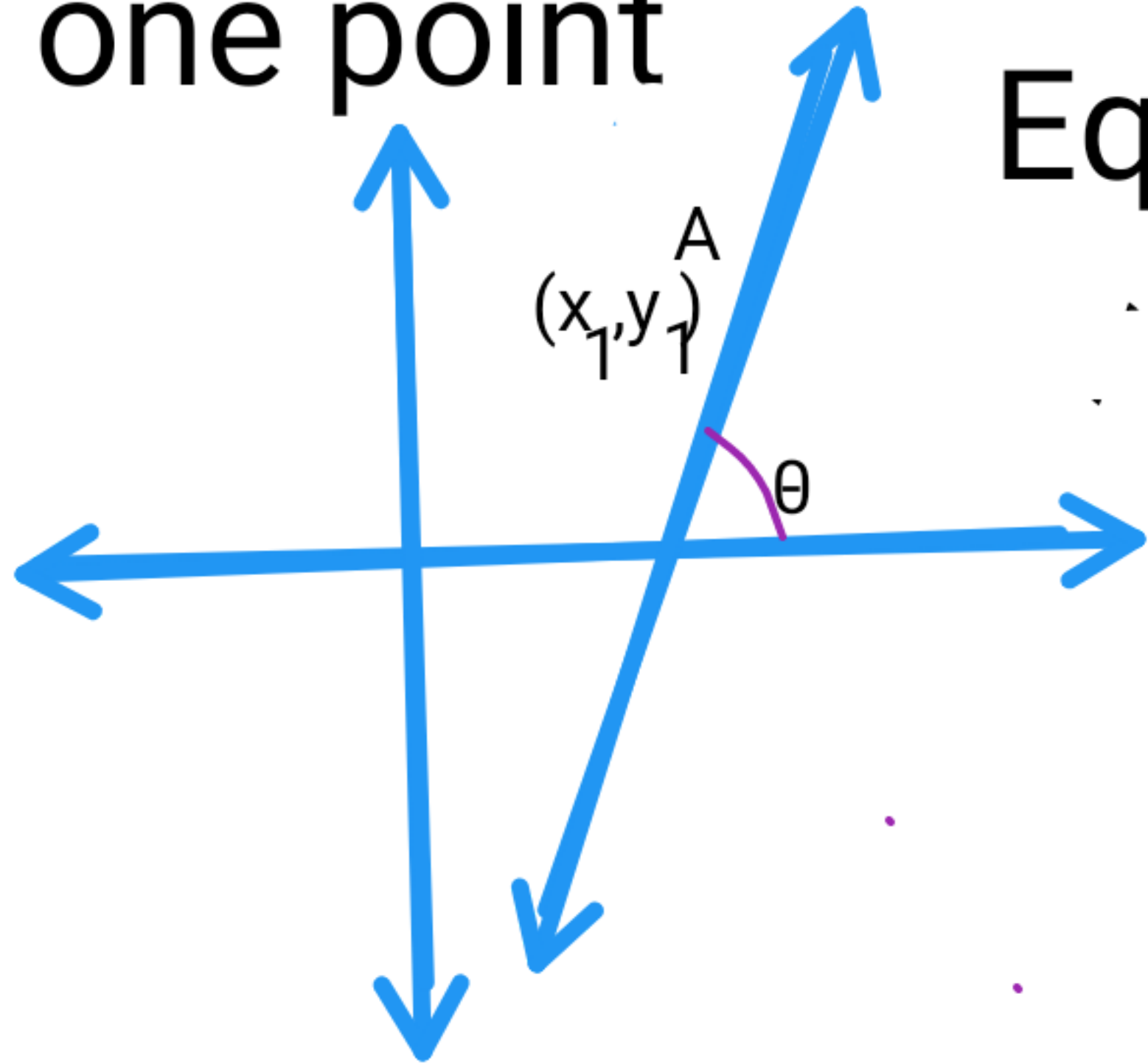
Equation of line



$m = \text{slope}$
 $c = y \text{ intercept}$
 $\theta = \text{inclination}$

eq of line \Rightarrow
 $y = mx + c$

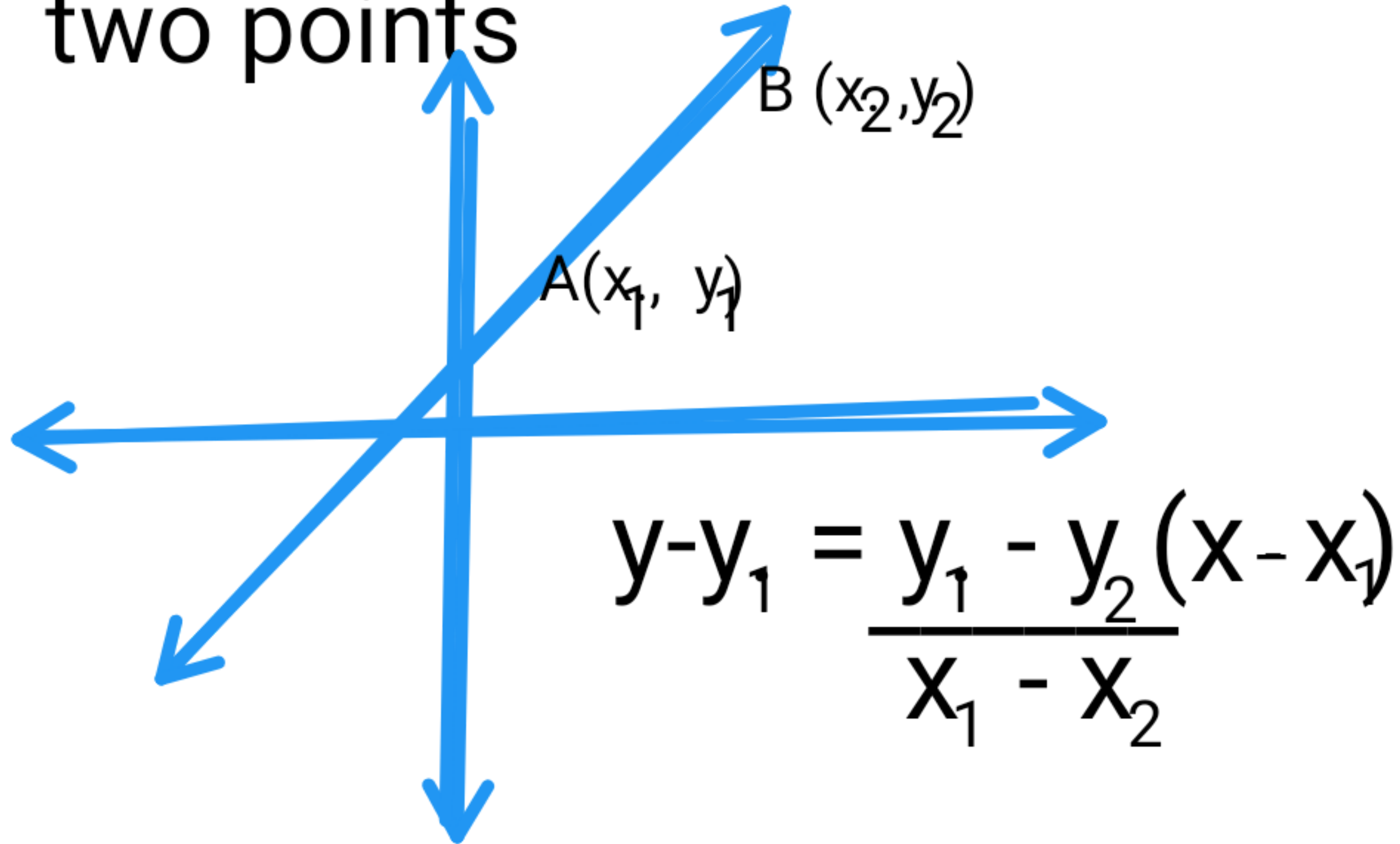
Equation of line, passes through
one point



Eq of line = >

$$y - y_1 = m (x - x_1)$$

Equation of line passes through
two points



Formula for finding Slope

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

if eq of line is $ax+by=c$
then

$$m = \tan\theta \quad (\theta < 90^\circ) \quad m = -a/b$$

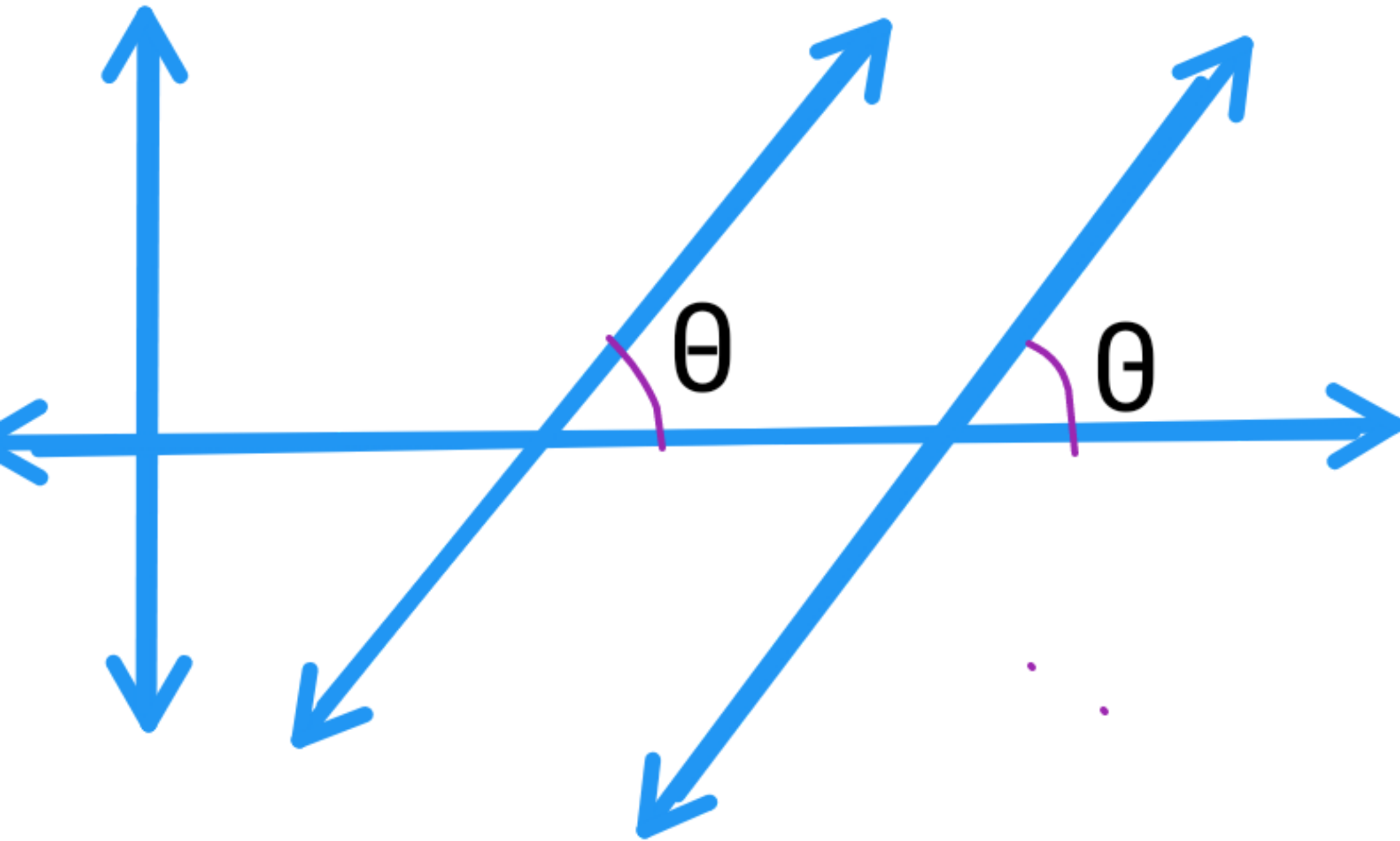
$$m = -\tan(180 - \theta)$$

two conditions

when two lines are parallel

then

$$m_1 = m_2$$



When two lines are perpendicular
to each other

$$m_1 \times m_2 = -1$$

