

স্থানাঙ্ক জ্যামিতি

=

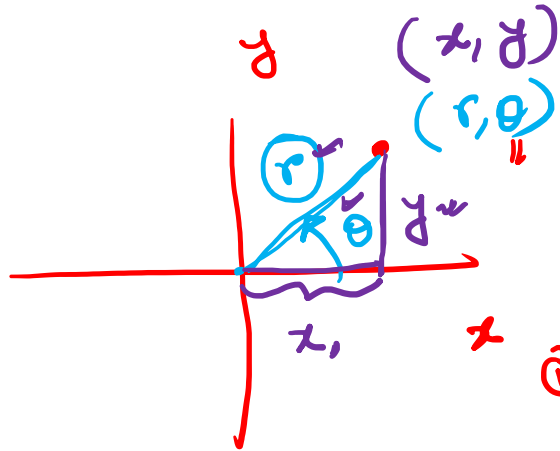
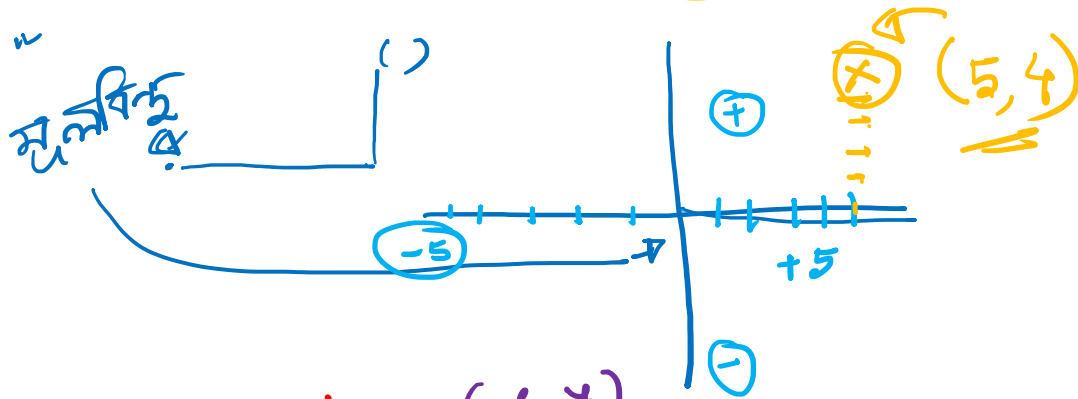


কার্তেসীয় স্থানাঙ্ক

$$\begin{aligned} x &= r \cos \theta \\ y &= r \sin \theta \end{aligned}$$

পোলার স্থানাঙ্ক

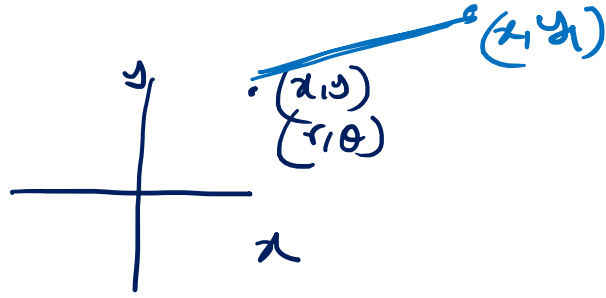
$$\begin{aligned} r &= \sqrt{x^2 + y^2} \\ \theta &= \tan^{-1} \frac{y}{x} \end{aligned}$$



$$\begin{aligned} x &= r \cos \theta \quad \text{--- (1)} \\ y &= r \sin \theta \quad \text{--- (2)} \end{aligned}$$

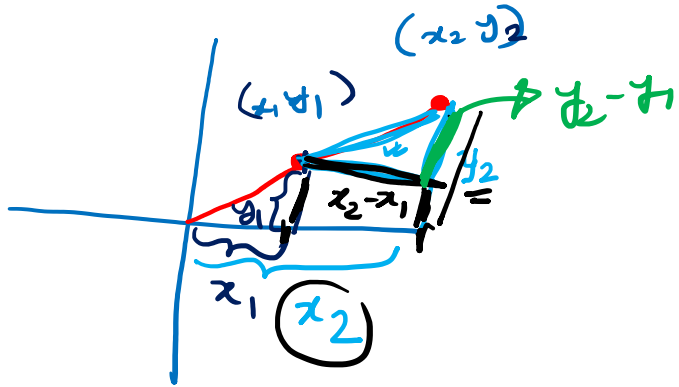
$$x^2 + y^2 = r^2 (\sin^2 \theta + \cos^2 \theta)$$

$$\begin{aligned} r &= \sqrt{x^2 + y^2} \\ \frac{y}{x} &= \frac{\sin \theta}{\cos \theta} \Rightarrow \tan \theta = \frac{y}{x} \quad (\theta = \tan^{-1} \frac{y}{x}) \end{aligned}$$



TYPE 01: দূরত্ব





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

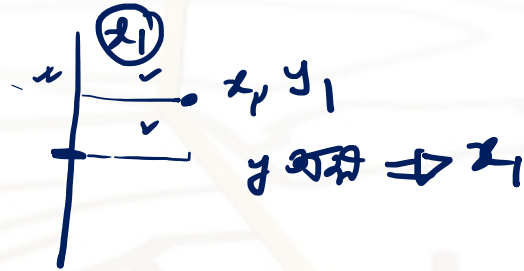
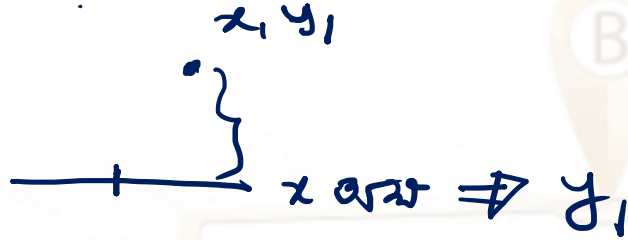
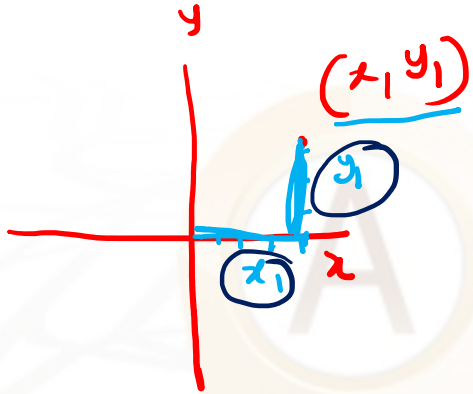
$$\Rightarrow \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$(x_1, y_1) \quad (x_2, y_2) \Rightarrow$$

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



TYPE 01: দূরত্ব

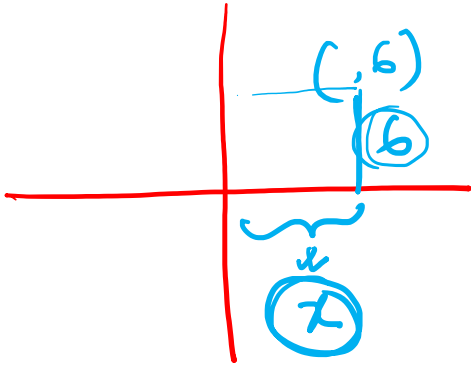


$(3, 5)$
 x অক্ষ $\Rightarrow 3$
 y " $\Rightarrow 5$

TYPE 01: দূরত্ব

(x, y)

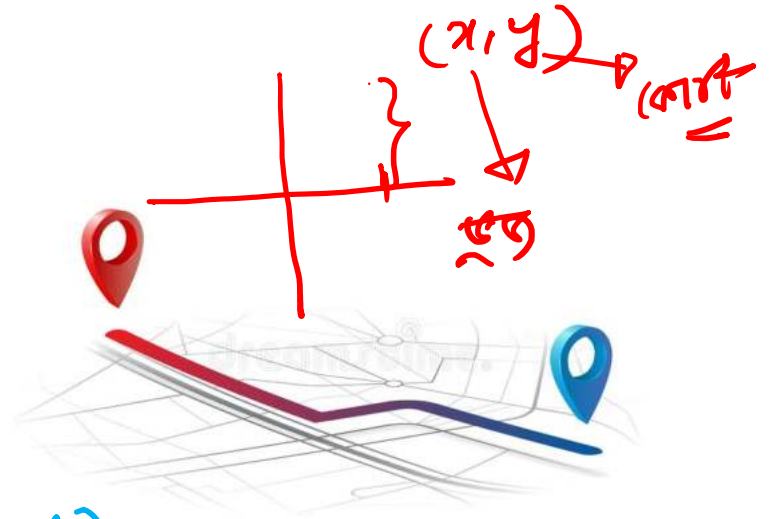
P বিন্দুর কোটি 6. x অক্ষ থেকে বিন্দুটির দূরত্ব y অক্ষ থেকে দূরত্বের অর্ধেক হলে বিন্দুটি স্থানাংক নির্ণয় কর।



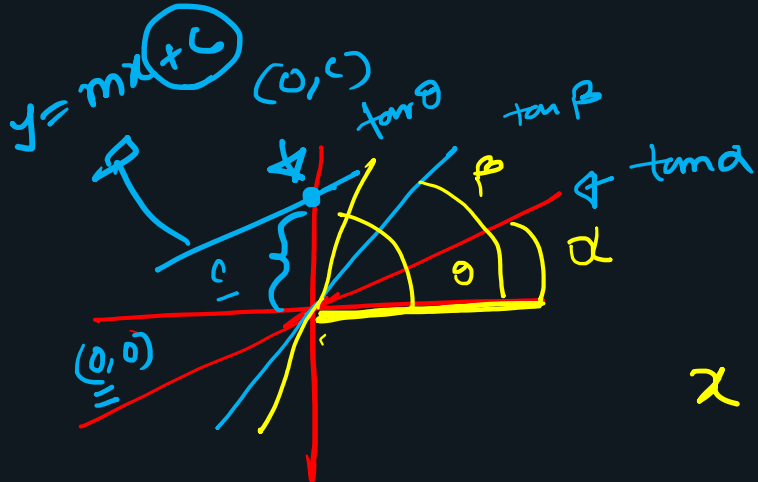
$$y = \frac{x}{2}$$

$$x = 12$$

$$(x, y) = (12, 6)$$



TYPE 01: দূরত্ব



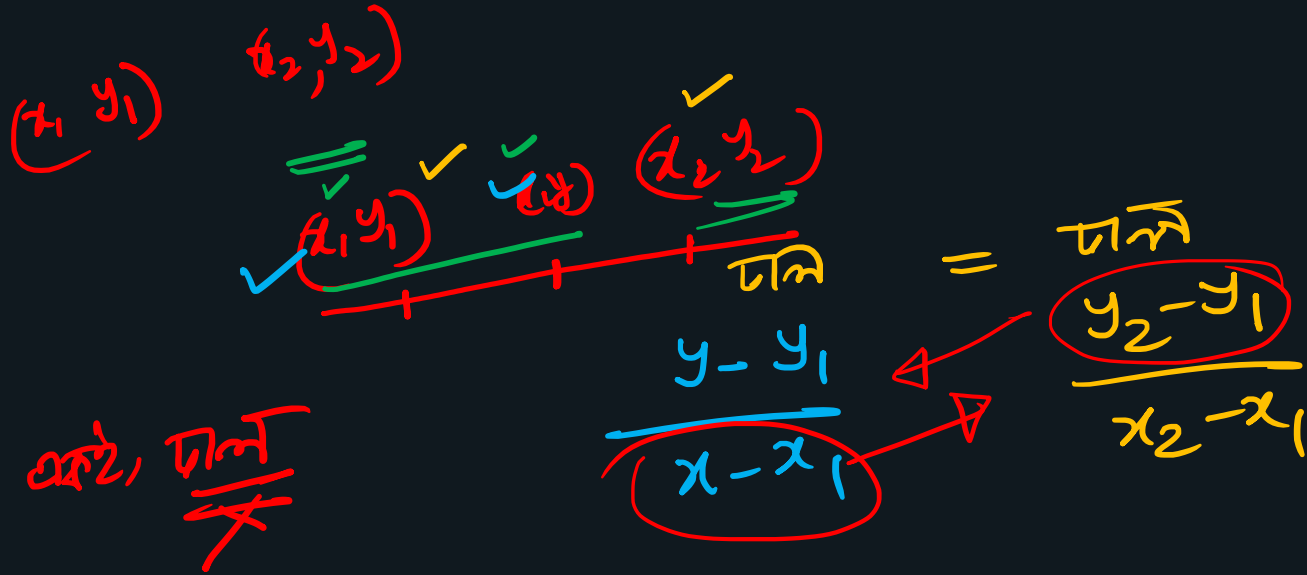
$$y = \sqrt{m}x \Rightarrow \sqrt{m} \Rightarrow \boxed{\tan \theta = \frac{y_2 - y_1}{x_2 - x_1}}$$

$x \rightarrow \text{सिर्फ } x =$

- ✓ $y = (\tan \alpha)x$
- ✓ $y = (\tan \beta)x$
- ✓ $y = (\tan \theta)x$

$y = mx + c \Rightarrow (0, c)$
 $y = mx \Rightarrow (0, 0)$
 $y = mx - c \Rightarrow (0, -c)$

$(x_1, y_1) \Rightarrow (y - y_1) = m(x - x_1)$



$$\frac{y - y_1}{-(y_2 + y_1)} = \frac{x - x_1}{-(x_2 + x_1)}$$

(x_1, y_1) (x_2, y_2)

$$\frac{y - y_1}{y_1 - y_2} = \frac{x - x_1}{x_1 - x_2}$$

TYPE 02: বিন্দুর স্থানাঙ্ক



$$\boxed{\lambda = \alpha}$$

$y = \text{অন্যতরান}$

$$\leftarrow y \text{ অন্যতর} \rightarrow \boxed{\lambda = 0}$$

$(2, 5)$
 $(3, 5)$

$(10, 5)$



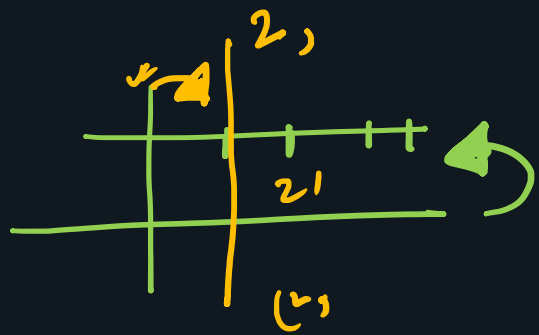
$(3, x)$

$$\underline{\underline{x = 5}}$$

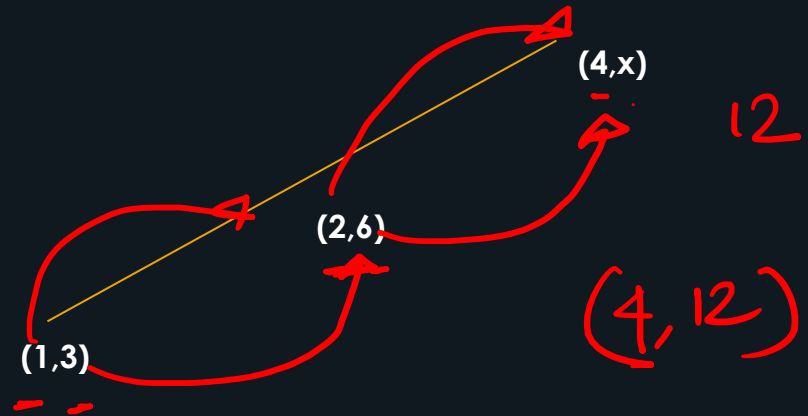
x বক্রের
সমিকরণ \rightarrow

$$\boxed{y = 0}$$

x অন্যতর \rightarrow $\boxed{y = 5}$



$y = \text{বক্রের}$ বা x অন্যতরান
 $x \rightarrow$ y বক্রের, অন্যতরান





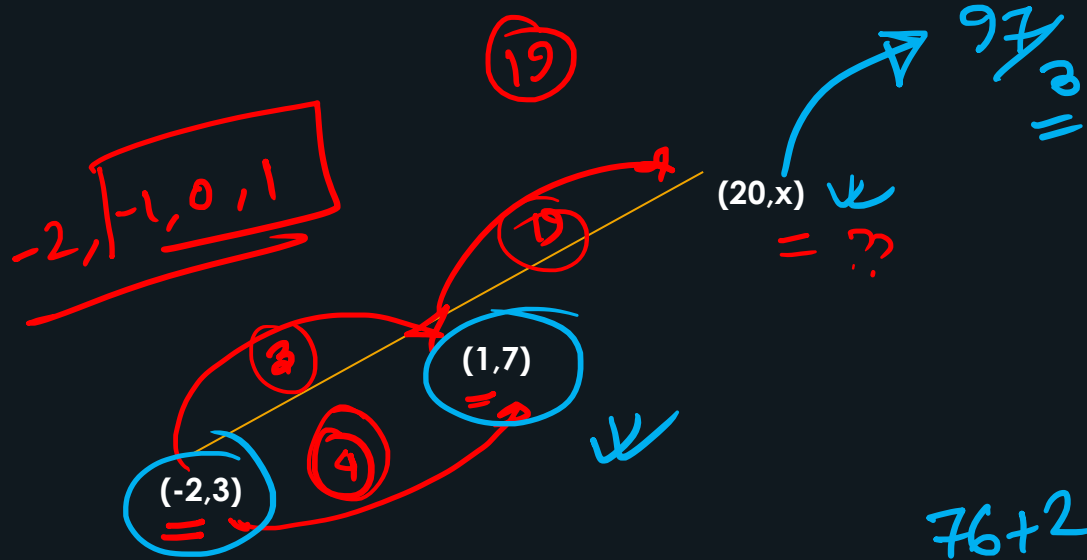
$$\frac{7-3}{1+2} = \frac{4}{3}$$

$$\frac{4}{3} = \frac{x-7}{20-1}$$

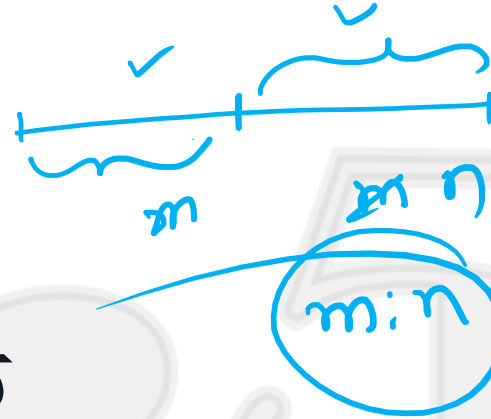
$$\Rightarrow \frac{4}{3} = \frac{x-7}{19}$$

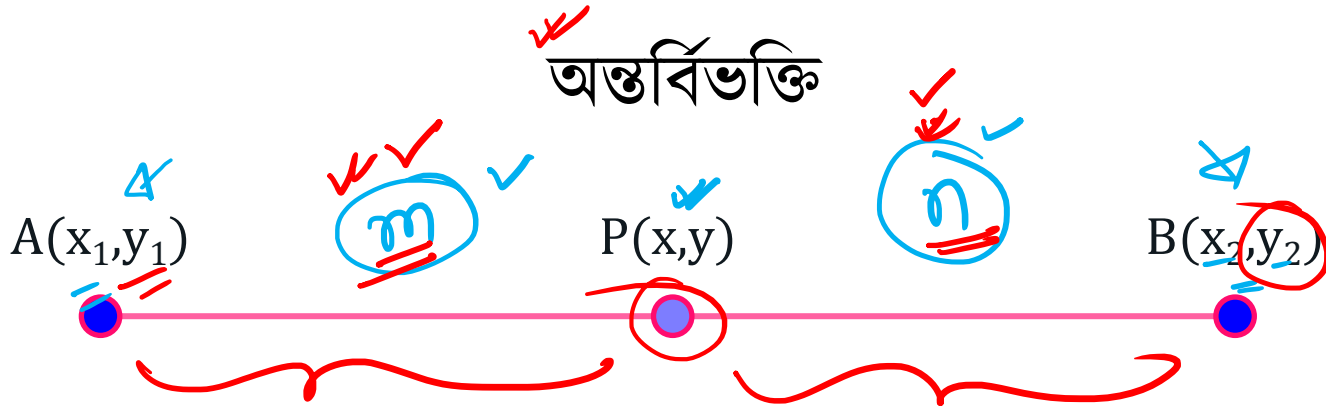
$$x = \frac{76}{3} + 7$$

$$\frac{76+21}{3} = \frac{97}{3}$$



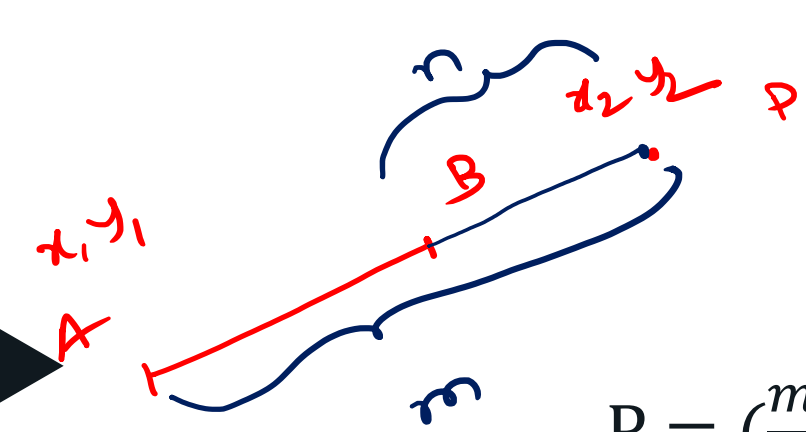
TYPE 03: অনুপাত





$$P = \left(\frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n} \right).$$

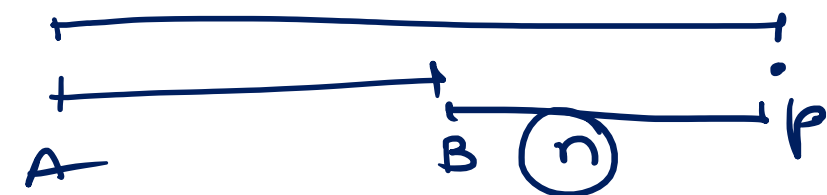
TYPE 03: অনুপাত



বহির্বিভক্তি

$$P = \left(\frac{mx_2 - nx_1}{m-n}, \frac{my_2 - ny_1}{m-n} \right)$$

m;n



TYPE 03: অনুপাত

$m:n$ $m=n$



A

B

$m:m$
 $1:1$

$m=1$
 $n=1$

মধ্যবিন্দু

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

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

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

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

TYPE 03: অনুপাত

মধ্যবিন্দু

$(1,3)$ $(7,11)$

$x = \frac{1+7}{2} = \frac{8}{2} = 4$

$y = \frac{3+11}{2} = \frac{14}{2} = 7$

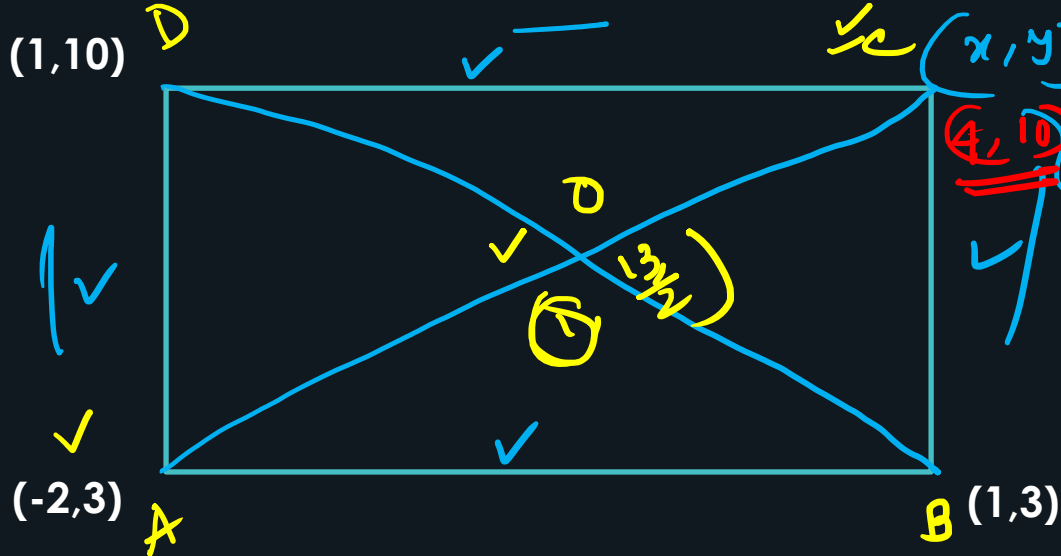
মধ্য বিন্দু \equiv $(4,7)$

TYPE 03: অনুপাত

চতুর্ভুজিক বিন্দু

$\frac{AC}{2} = \frac{BD}{2}$
 $(2,3)$ (x,y)

$\frac{BD}{2}$
 $(1,3)$ 0 $(1,10)$
 $(1, \frac{13}{2})$



$\frac{x-2}{2} = \frac{1}{2}$
 $x = 4$

$\frac{y+3}{2} = \frac{13}{2}$
 $y = 10$





$$\frac{x+1}{2} = \frac{9}{2}$$

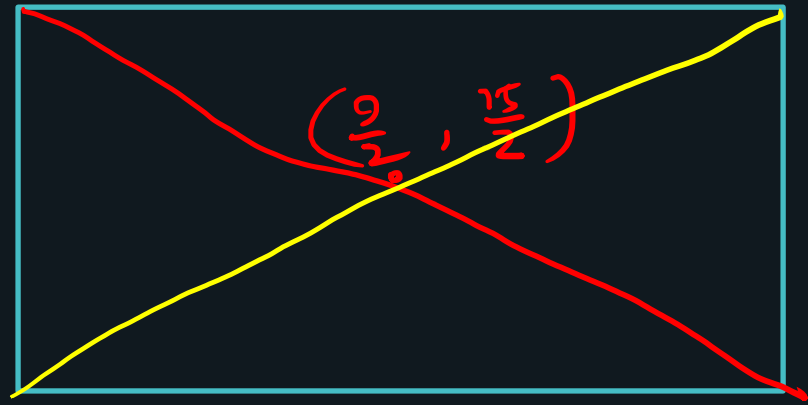
$$\underline{\underline{x=8}}$$

চতুর্কৌণিক বিন্দু

(5,8)

(1,3)

(4,7)



$(\frac{9}{2}, \frac{15}{2})$

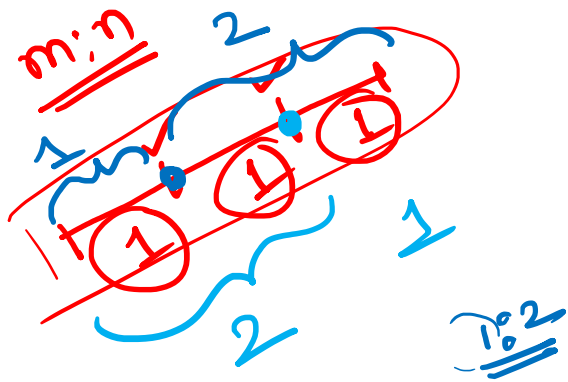
(8,12)

(x,y)

$$\frac{y+3}{2} = \frac{15}{2}$$

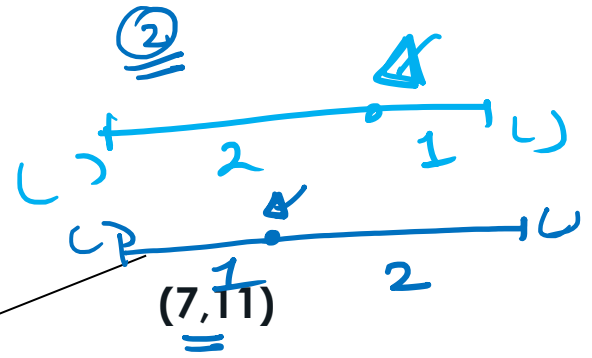
$$y = 12$$





সমত্রিখণ্ডন বিন্দু

$$= \frac{2:1}{3}$$



$$(2,3)$$

$$\left(\frac{11}{3}, \frac{17}{3}\right)$$

$$\left(\frac{16}{3}, \frac{25}{3}\right)$$

$$\frac{7+4}{1+2}, \frac{11+6}{1+2}$$

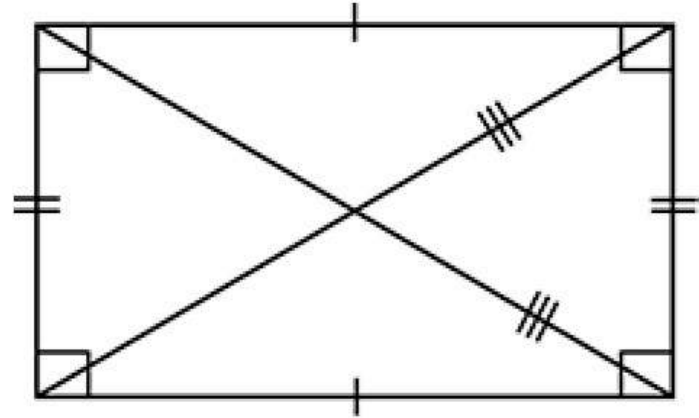
$$= \frac{11}{3}, \frac{17}{3}$$

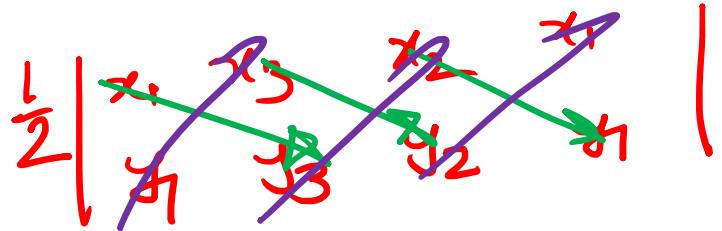
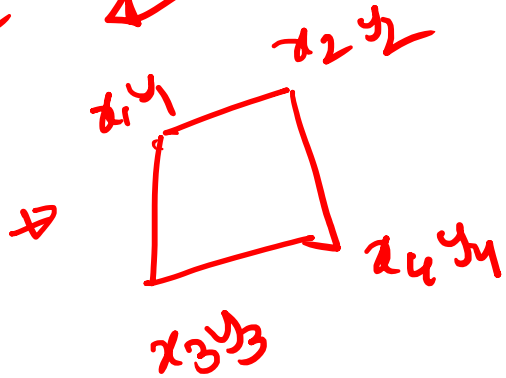
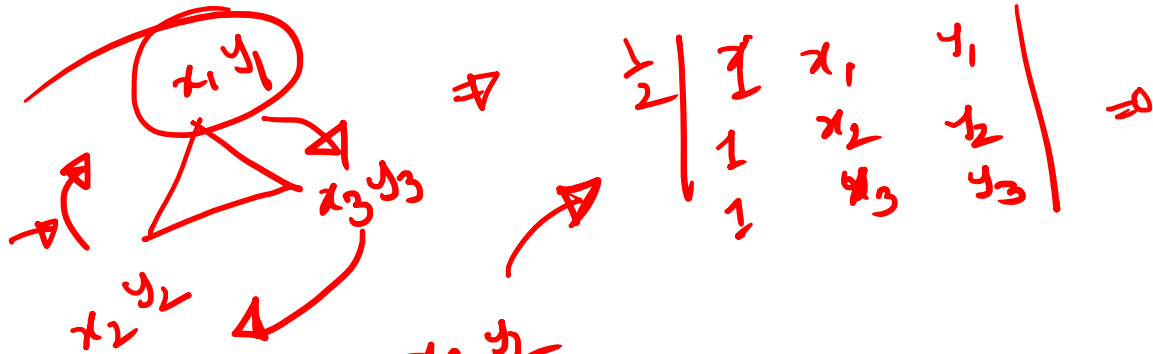
$$\frac{14+2}{2+1}, \frac{22+3}{2+1}$$

$$= \frac{16}{3}, \frac{25}{3}$$

TYPE 03: অনুপাত

TYPE 03: ক্ষেত্রফল





$$\begin{aligned}
 & (x_1 y_3 + x_3 y_2 + x_2 y_1) \\
 & - (x_1 y_2 + x_2 y_3 + x_3 y_1)
 \end{aligned}$$

TYPE 03: ক্ষেত্রফল



$$A = \frac{1}{2} \begin{vmatrix} \checkmark x_1 & \checkmark x_2 & \checkmark x_3 & \dots & \checkmark x_n & \checkmark x_1 \\ y_1 & y_2 & y_3 & \dots & y_n & y_1 \end{vmatrix}$$

$$\frac{1}{2} [(C) - (C)]$$

$$=$$

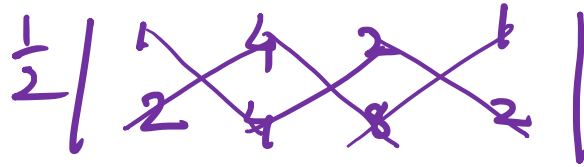
TYPE 03: ক্ষেত্রফল



x_1 y_1 x_2 y_2 x_3 y_3

(1, 2) (4, 4) ও (2, 8) যথাক্রমে ত্রিভুজ ABC এর বাহুত্রয়ের শীর্ষবিন্দু ABC ত্রিভুজটির ক্ষেত্রফল নির্ণয় কর।

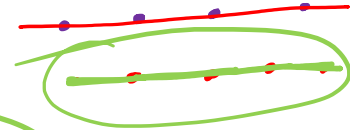
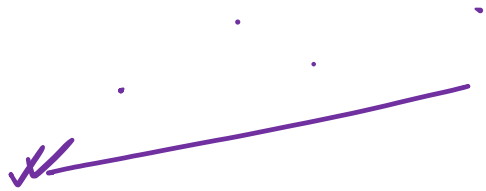
- a) 32 বর্গ একক
- b) 64 বর্গ একক
- c) 16 বর্গ একক
- ✓ d) 8 বর্গ একক



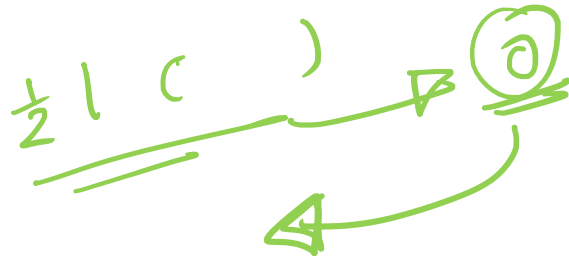
$$\frac{1}{2} \left| \begin{array}{cccc} 1 & 2 & 4 & 4 \\ 2 & 4 & 8 & 2 \end{array} \right|$$

$$\Rightarrow \frac{1}{2} | 40 - 24 | = \frac{1}{2} | 16 |$$
$$= 8$$

TYPE 03: ক্ষেত্রফল



TYPE 04: সমরেখ



(x, y), (2, 3) এবং (5, 1) একই সরলরেখায় অবস্থিত হলে -

a) $4x - 3y - 17 = 0$

b) $2x + 3y - 13 = 0$

c) $3x + 4y - 17 = 0$

d) $3x + 4y + 17 = 0$

$$\frac{1}{2} \left| \begin{array}{ccc|cc} x & 2 & 5 & x & \\ y & 3 & 1 & y & \end{array} \right|$$

$$\frac{1}{2} \left| 3x + 2 + 5y - 2y - 15 - x \right| = 0$$

$$= \frac{1}{2} \left| 2x + 3y - 13 \right| = 0$$

$$2x + 3y - 13 = 0$$

TYPE 04: সমরেখ

(2, 2 - 2x), (1, 2) এবং (2, b - 2x) বিন্দুগুলো সমরেখ হলে, b - এর মান
(06 - 07)

A. -1

B. 1

C. 2

D. -2

$$\frac{1}{2} \left| \begin{array}{ccc} 2 & 1 & 2 \\ 2-2x & 2 & b-2x \end{array} \right| = 0$$

$$= \frac{1}{2} \left| 4 + b - 2x + 4 - 4x - (2 - 2x + 4 + 2b - 4x) \right| = 0$$
$$= 4 + b - 2 - 2b = 0$$

$$2 - b = 0$$

$$\boxed{b = 2}$$

TYPE 04: সমরেখ

The image features a dark blue background with the word "Thanks" in a bold, yellow, sans-serif font centered in the middle. Surrounding the text are various abstract geometric elements: a vertical white line on the left with three white upward-pointing triangles; a vertical yellow line on the right with a white horizontal bar crossing it; a vertical white line on the bottom right with three downward-pointing triangles (one white, one yellow, one white); and a yellow circle on the far right. In the bottom left, there are yellow and white rectangular shapes, including a white horizontal bar and a yellow vertical bar.

Thanks