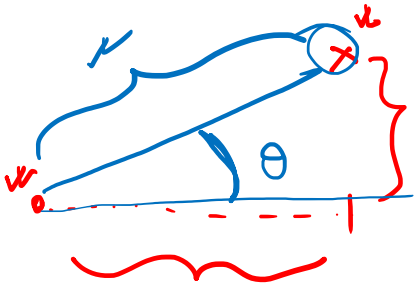
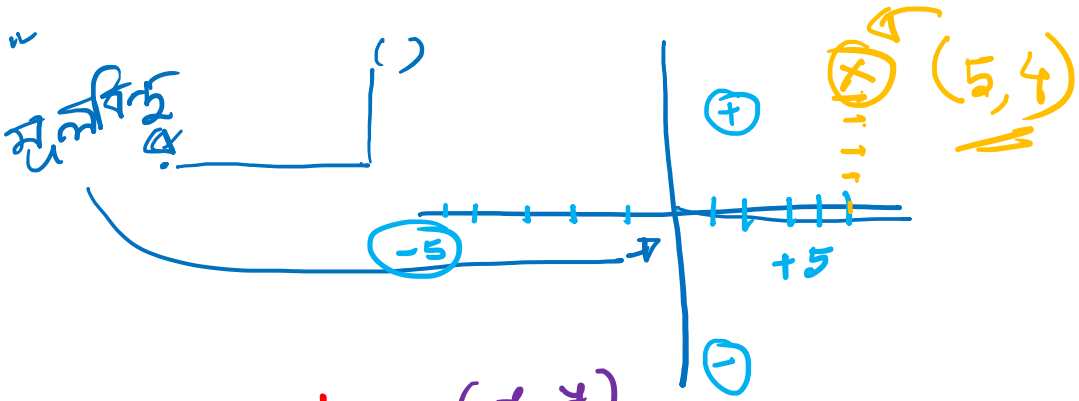


স্থানাঙ্ক জ্যামিতি

কার্তেসীয় স্থানাঙ্ক

$x = r\cos\theta$

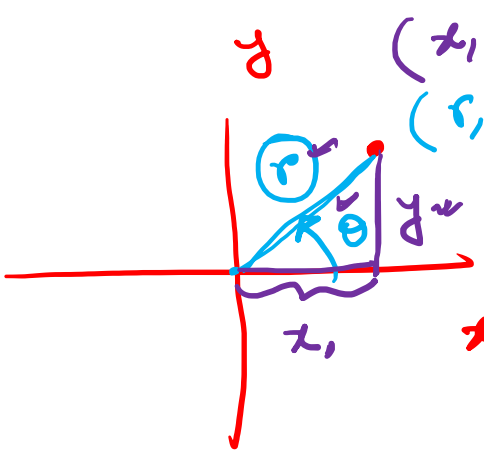
$y = r\sin\theta$



পোলার স্থানাঙ্ক

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

$\theta = \tan^{-1}\frac{y}{x}$



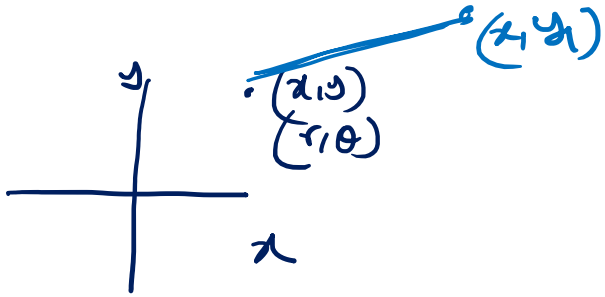
$x = r\cos\theta$ ①

$y = r\sin\theta$ ②

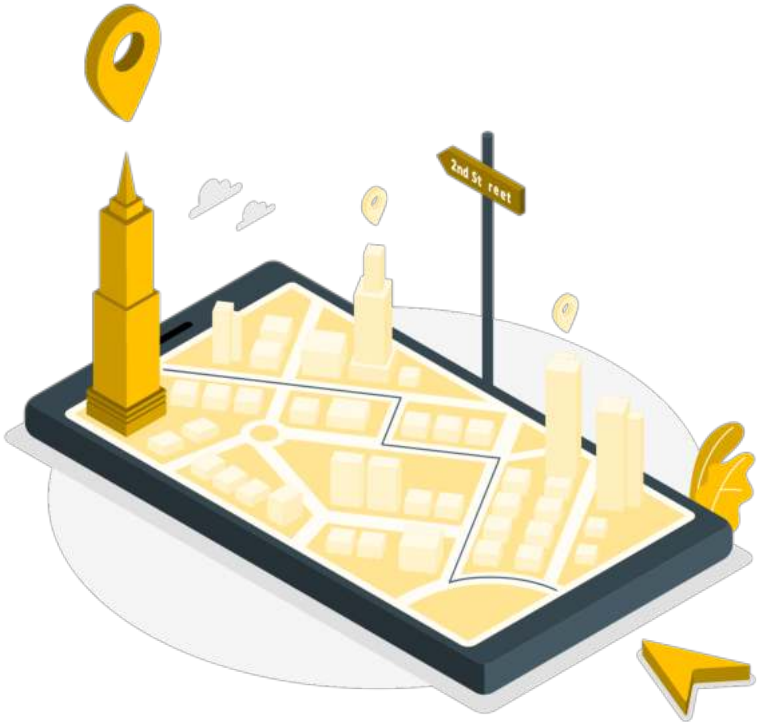
① + ② $\Rightarrow$ $x^2+y^2 = r^2(\sin^2\theta+\cos^2\theta)$

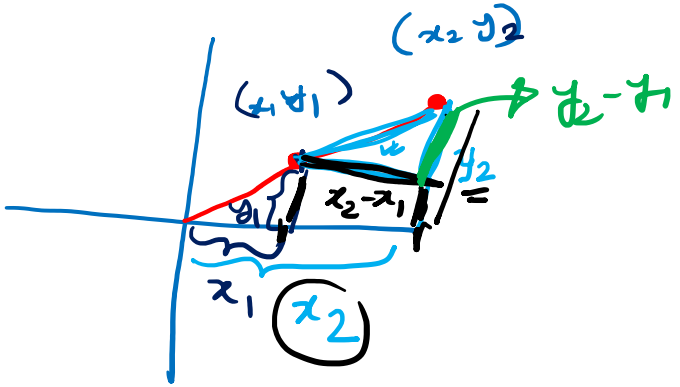
$r = \sqrt{x^2+y^2}$

② / ① $\Rightarrow \frac{\sin\theta}{\cos\theta} = \frac{y}{x} \Rightarrow \tan\theta = \frac{y}{x}$ $\left(\theta = \tan^{-1}\frac{y}{x}\right)$



TYPE 01: দূরত্ব





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

$(y_2 - y_1)$

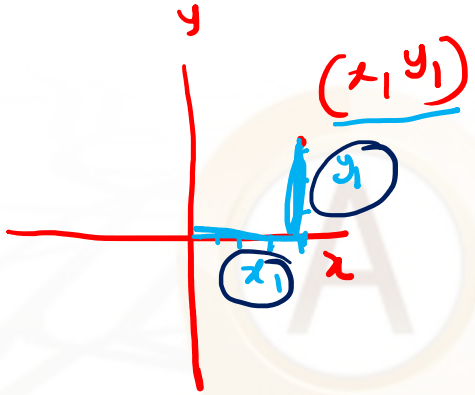
$(x_2 - x_1)$

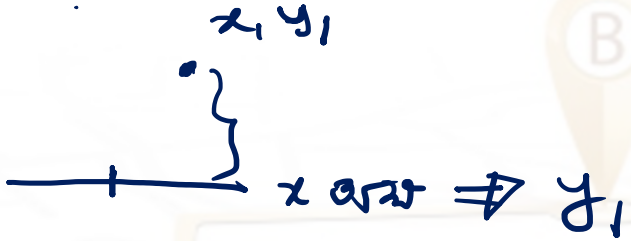
$\Rightarrow \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

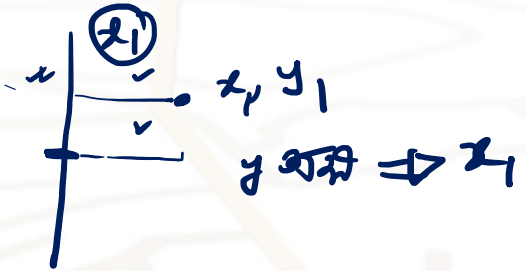
(x_1, y_1) $(x_2, y_2) \Rightarrow$

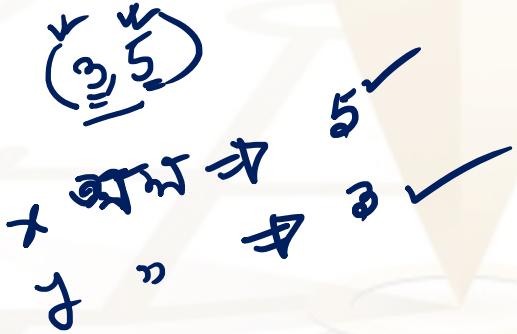
$$\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

TYPE 01: দূরত্ব



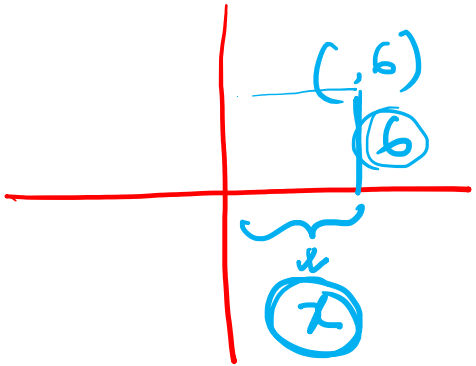






TYPE 01: দূরত্ব

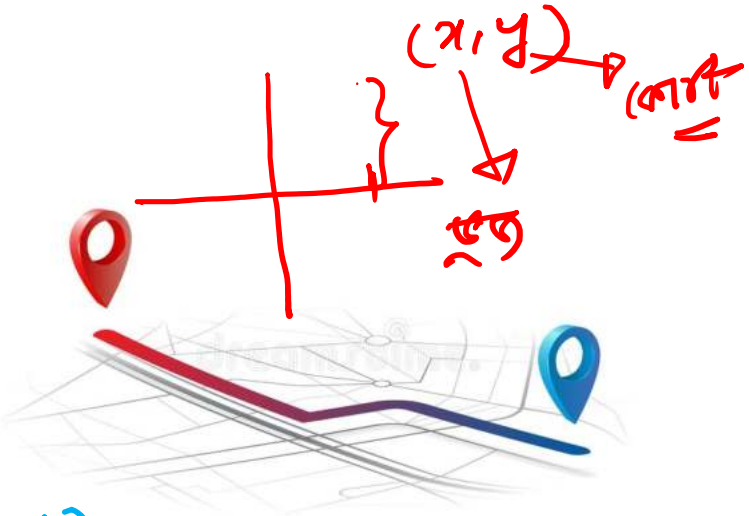
P বিন্দুর কোটি 6. x অক্ষ থেকে বিন্দুটির দূরত্ব y অক্ষ থেকে দূরত্বের অর্ধেক হলে বিন্দুটি স্থানাংক নির্ণয় কর।



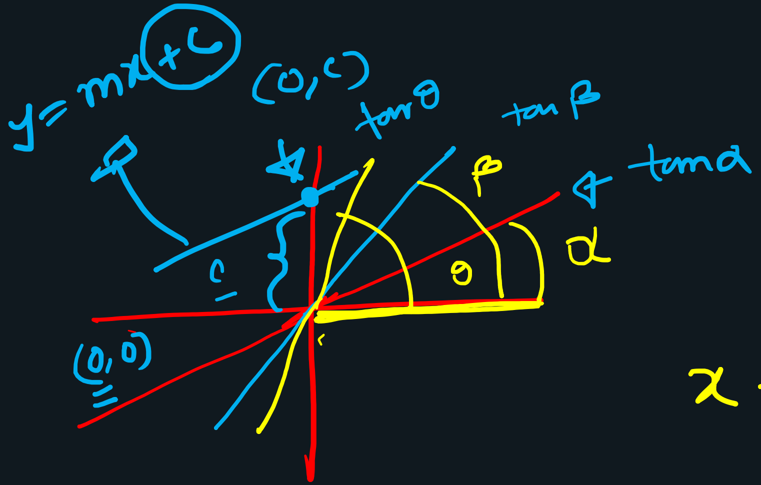
$6 = \frac{x}{2}$

$x = 12$

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



TYPE 01: দূরত্ব



$y = m x$ → ঢাল ⇒ $\tan\theta$ ⇒ $\dfrac{y_2 - y_1}{x_2 - x_1}$

x → ধনাত্মক =

✓ $y = (\tan\alpha)x$

✓ $y = (\tan\beta)x$

✓ $y = (\tan\theta)x$

$y = mx + c$ ⇒ $(0, c)$

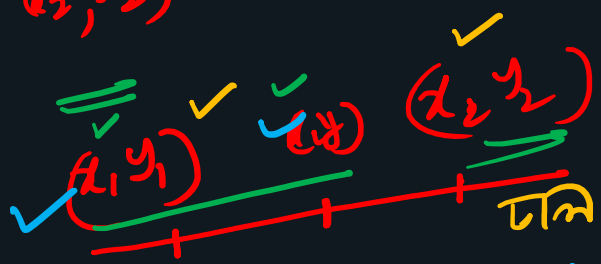
$y = mx$ ⇒ $(0, 0)$

$y = mx - c$ ⇒ $(0, -c)$

(x_1, y_1) → $(y - 0) = m(x - 0)$

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

(x_1, y_1) (x_2, y_2)



ঢাল $=$ ঢাল

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

একই, ঢাল

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

(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

$x = \alpha$

y = সমান্তরাল

← y অক্ষ → $x = 0$

(10,5)

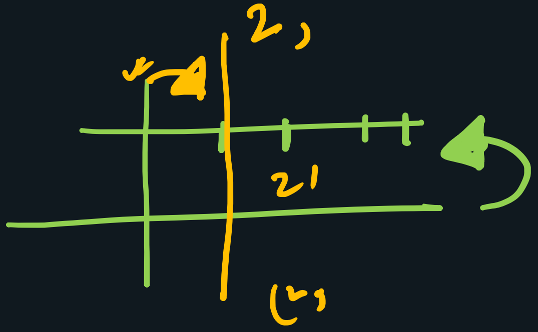
(3,x)

(1,5)

$x = 5$

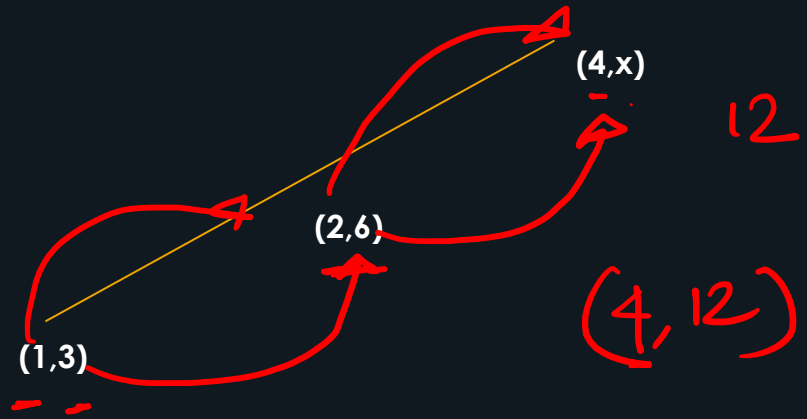
x অক্ষের সমান্তরাল → $y = 0$

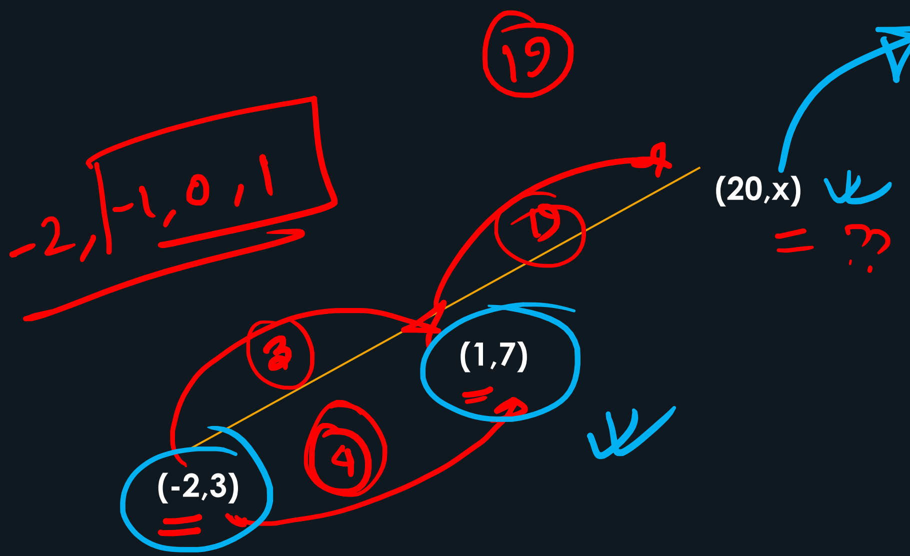
x সমান্তরাল $y = \beta$



y = বদলাচ্ছে না → x সমান্তরাল

x → y অক্ষের সমান্তরাল


(4,x)
12
(2,6)
(4,12)
(1,3)



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

$$\frac{4}{3} = \frac{x-7}{20-1} \Rightarrow \frac{4}{3} = \frac{x-7}{19}$$

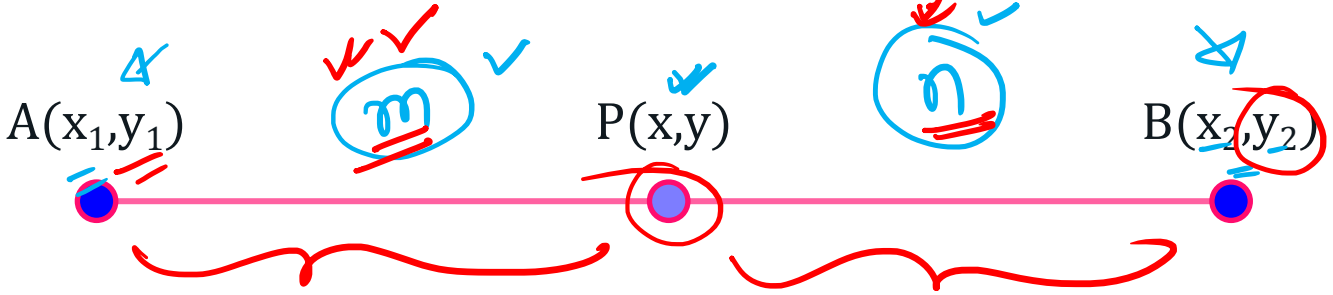
$$x = \frac{76}{3} + 7$$

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

$$97/3$$

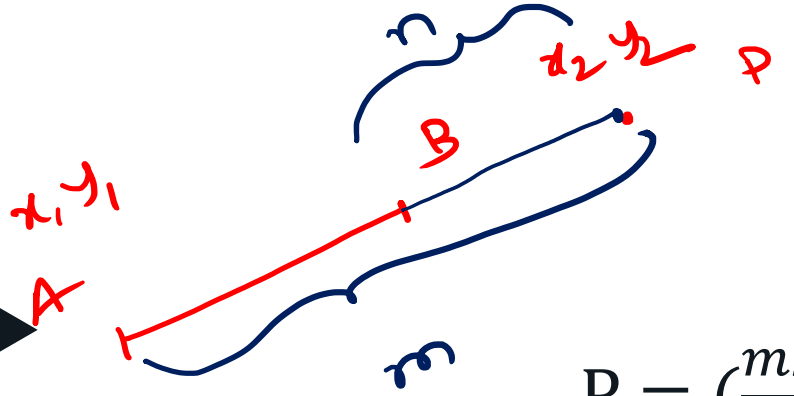
TYPE 03: অনুপাত

অন্তর্বিভক্তি



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

TYPE 03: অনুপাত

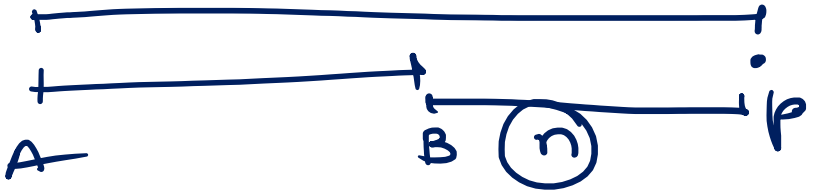


বহির্বিভক্তি

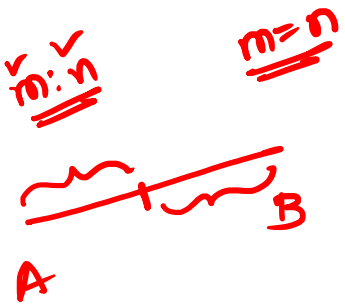
$$P = \left(\frac{mx_2 - nx_1}{m-n}, \frac{my_2 - ny_1}{m-n}\right).$$

m:n

m:n



TYPE 03: অনুপাত



m:m
1:1

m=1
n=1

মধ্যবিন্দু

$$x = \frac{mx_2 + nx_1}{m+n} = \frac{x_2 + x_1}{2}$$

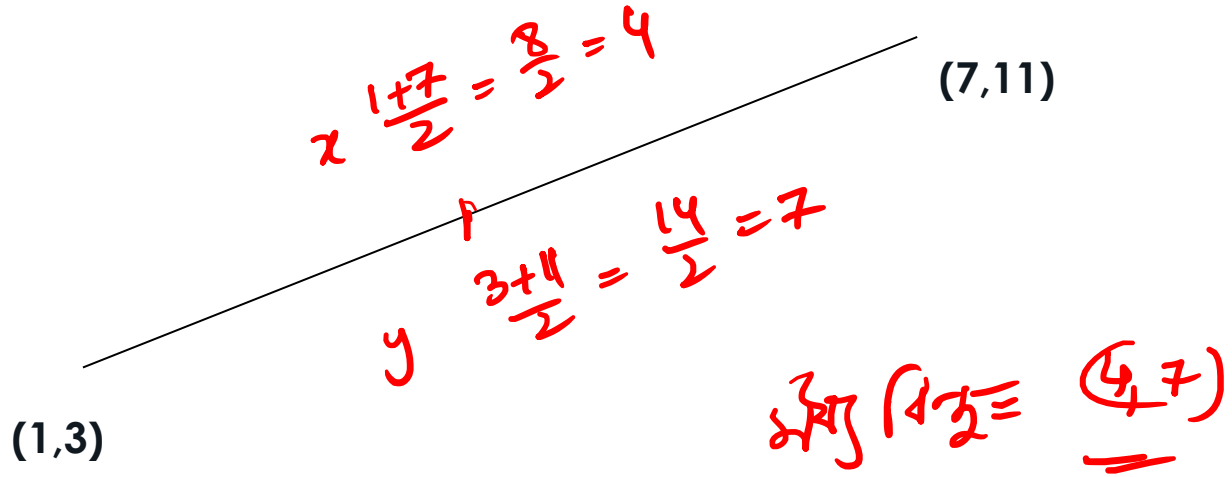
$$y = \frac{my_2 + ny_1}{m+n} = \frac{y_2 + y_1}{2}$$

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

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

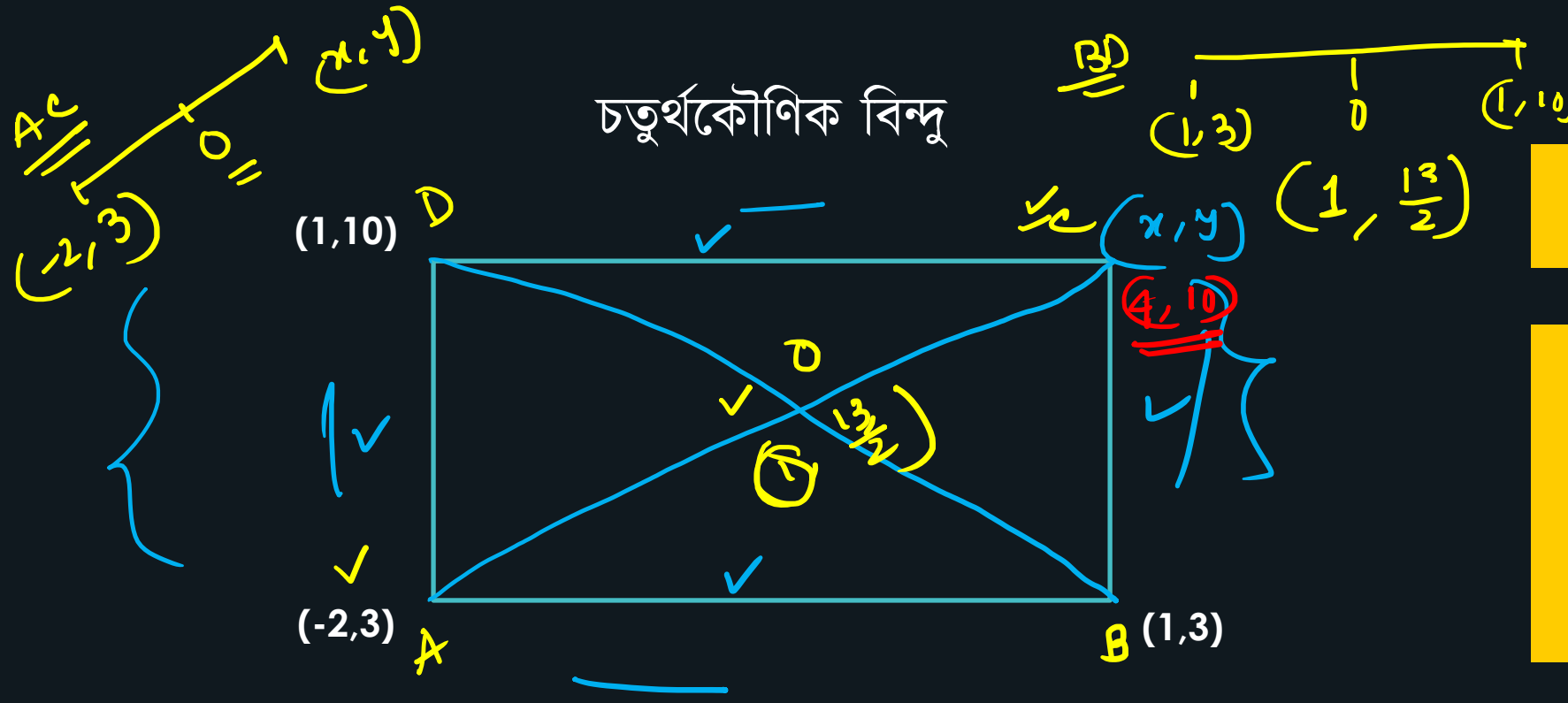
TYPE 03: অনুপাত

মধ্যবিন্দু



TYPE 03: অনুপাত

চতুর্থকৌণিক বিন্দু



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

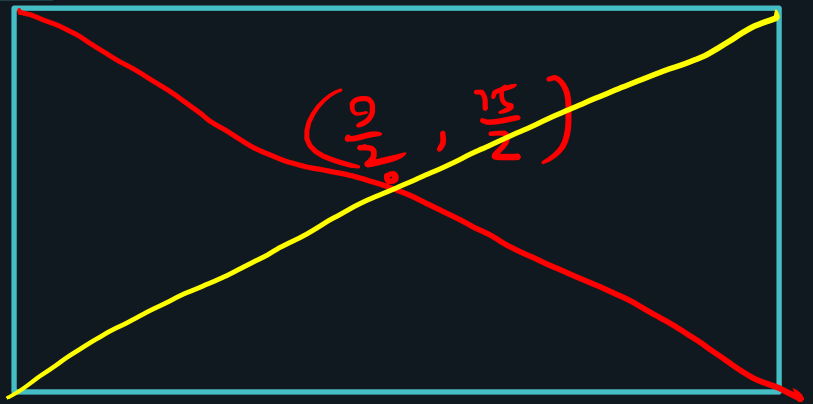
$x = 4$

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

$y = 10$

চতুর্থকৌণিক বিন্দু

(5,8)



(1,3)

(4,7)

$(8,12)$

(x, y)

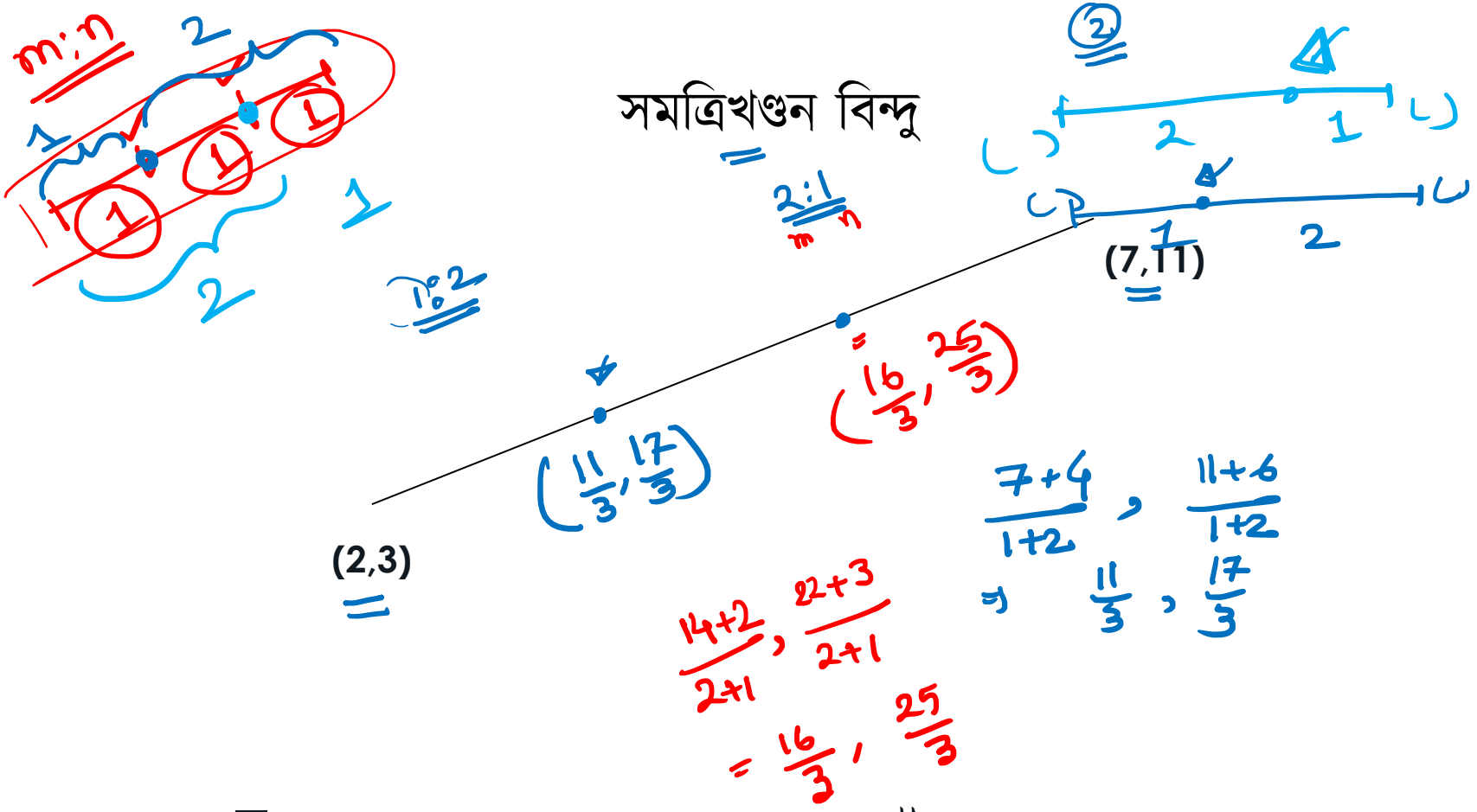
$\frac{x+1}{2} = \frac{9}{2}$

$x = 8$

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

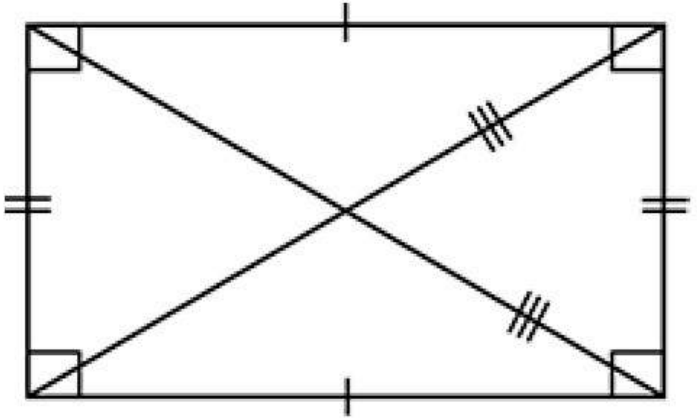
$y = 12$

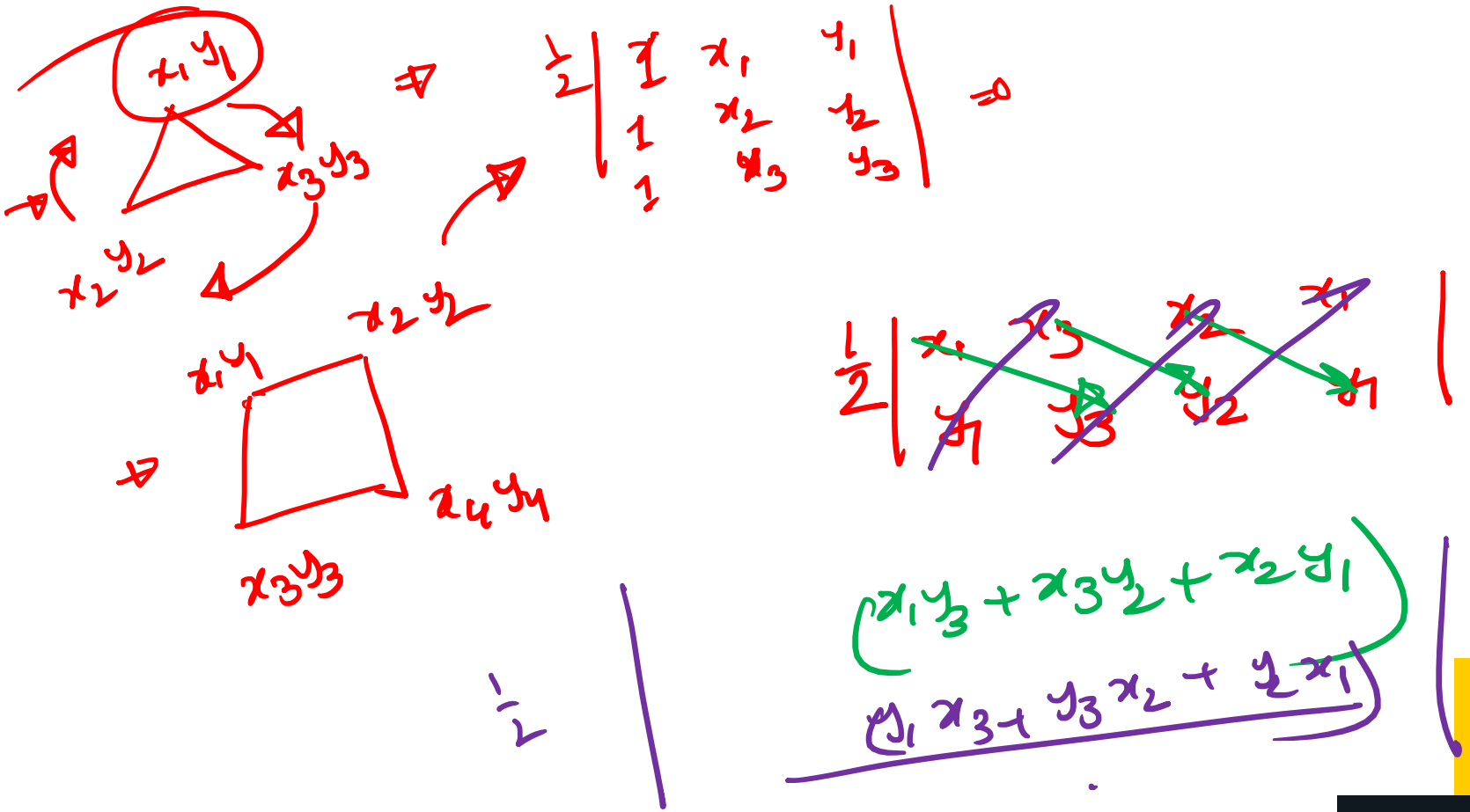
সমত্রিখণ্ডন বিন্দু



TYPE 03: অনুপাত

TYPE 03: ক্ষেত্রফল





TYPE 03: ক্ষেত্রফল

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

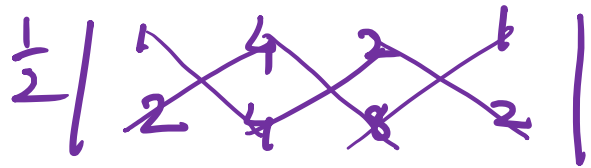
$\frac{1}{2}[(\quad)-(\quad)]$

TYPE 03: ক্ষেত্রফল

$x_1\ y_1\quad x_2\ y_2\quad x_3\ y_3$

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

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



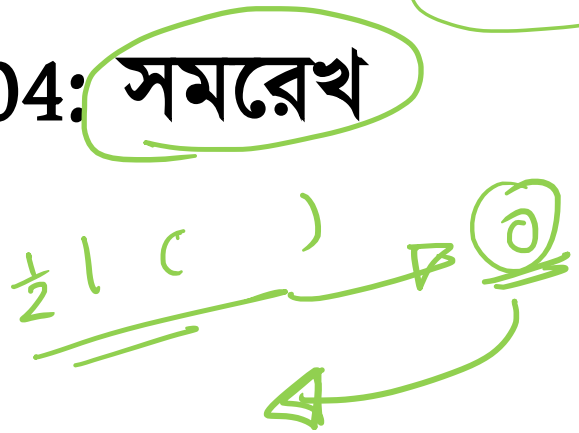
$$\frac{1}{2}\left| 4+32+4-(8+8+8) \right|$$

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

$$= 8$$

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

$$\frac{1}{2}\begin{vmatrix} x & 2 & 5 & x \\ y & 3 & 1 & y \end{vmatrix}$$

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

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

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

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

$$\frac{1}{2}\begin{vmatrix} 2 & 1 & 2 \\ 2-2x & 2 & b-2x \end{vmatrix} = 0$$

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

$$= 4 + b - 2 - 2b = 0$$

$$2 - b = 0$$

$$\boxed{b = 2}$$

TYPE 04: সমরেখ

Thanks