

① নতুন (h, k) বিকল্পগুলি প্রদান

$$6h - k - 1 = 0 \quad \text{--- ③}$$

② নতুন (k, h) বিকল্পগুলি প্রদান

$$2k - 5h - 5 = 0$$

$$-5h + 2k - 5 = 0 \quad \text{--- ④}$$

from (iii) (iv) $A(h, k) = (1, 5)$
 $B(k, h) = (5, 1)$

$\therefore AB$ রেখার সমীকরণ =

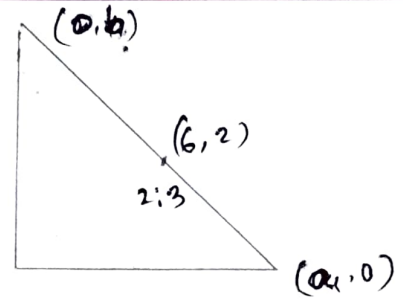
$$\frac{x-1}{1-5} = \frac{y-5}{5-1}$$

$$\Rightarrow \frac{x-1}{-4} = \frac{y-5}{4}$$

$$\Rightarrow x-1+y-5=0$$

$$\Rightarrow x+y=6 \quad (\text{Ans})$$

②



$$6 = \frac{2 \times 0 + 3 \times b}{5}$$

$$a = 6 = \frac{2 \times 0 + 3 \times a}{5}$$

$$a = 10$$

Again,

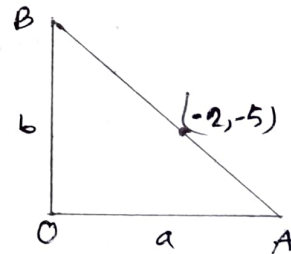
$$2 = \frac{2 \times b + 3 \times 0}{5}$$

$$b = 5$$

\therefore নির্ণয় সমীকরণ $\frac{x}{10} + \frac{y}{5} = 1$

$$\Rightarrow x + 2y = 10 \quad (\text{Ans})$$

③



We know,

$$\frac{x}{a} + \frac{y}{b} = 1$$

$$\frac{-2}{a} + \frac{-5}{b} = 1$$

$$\Rightarrow \frac{-2}{-2b} + \frac{-5}{b} = 1$$

$$\Rightarrow \frac{1-5}{b} = 1$$

$$\Rightarrow b = -4$$

$$\therefore a = 8$$

অন্যভাবে,

$$0A + 20B = 0$$

$$a + 2b = 0$$

$$a = -2b$$

④

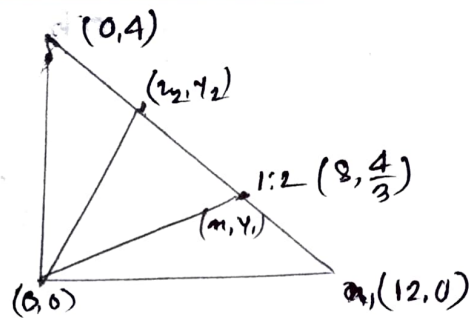
সংলগ্ন রেখার সমীকরণ,

$$\therefore \frac{x}{8} + \frac{y}{-4} = 1$$

$$\frac{x-2y}{8} = 1$$

$$x-2y=8 \quad (\text{Ans})$$

④



$$x + 3y - 12 = 0$$

$$\frac{x}{12} + \frac{y}{4} = 1$$

$$\therefore x = \frac{1 \times 0 + 2 \times 12}{3}$$

$$x = 8$$

$$y = \frac{1 \times 4 + 2 \times 0}{3}$$

$$y = \frac{4}{3}$$

$$x_2 = \frac{8+0}{2} = 4 \text{ (અર્થઘટક)}$$

$$y_2 = \frac{4/3 + 4}{2}$$

$$\Rightarrow \frac{8 + 12}{3} \times \frac{1}{2}$$

$$\Rightarrow \frac{8}{3}$$

$\therefore x, y$ અનુસાર આ બંને સમીકરણ,

$$\frac{x-8}{8-0} = \frac{y-0}{0-\frac{4}{3}}$$

$$= \frac{x-8}{8} = \frac{y-0}{-\frac{4}{3}}$$

$$\Rightarrow \frac{x-0}{0-8} = \frac{y-0}{0-\frac{4}{3}}$$

$$\Rightarrow \frac{4x}{3} = 8y$$

$$\Rightarrow \frac{4x-8y}{3} = 0$$

$$\Rightarrow 4x - 8y = 0$$

$$x - 2y = 0 \text{ (Any)}$$

Again,

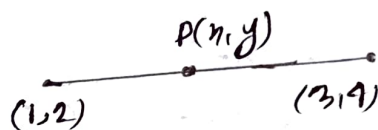
$$\frac{x-0}{0-4} = \frac{y-0}{0-\frac{8}{3}}$$

$$\Rightarrow \frac{8x}{3} = 4y$$

$$\Rightarrow 8x - 12y = 0$$

$$\Rightarrow 2x - 3y = 0 \text{ (Any)}$$

⑤



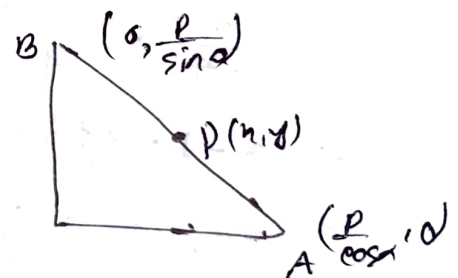
⑤2 દિશામાંથી જણાવે સમીકરણ,

$$\frac{x-1}{1-3} = \frac{y-2}{2-4}$$

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

$$\Rightarrow x - y + 1 = 0 \text{ Any}$$

⑥



$$x \cos \alpha + y \sin \alpha = p$$

$$\frac{x}{\frac{p}{\cos \alpha}} + \frac{y}{\frac{p}{\sin \alpha}} = 1$$

$$\Rightarrow x = \frac{\frac{p}{\cos \alpha} + 0}{2}$$

$$\Rightarrow 2x = \frac{p}{\cos \alpha}$$

$$\Rightarrow \cos^2 \alpha = \frac{p^2}{4x^2} \text{ --- ①}$$

$$y = \frac{\frac{p}{\sin \alpha} + 0}{2}$$

$$\Rightarrow 2y = \frac{p}{\sin \alpha}$$

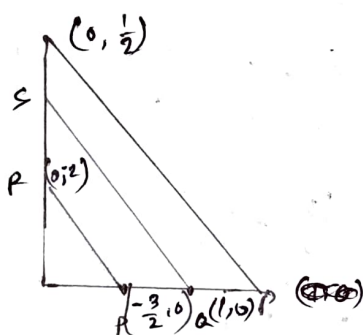
$$\Rightarrow \sin \alpha = \frac{p^r}{4y^r} \quad \text{--- (1)}$$

$$\text{for } \textcircled{1} + \textcircled{1}$$

$$1 = \frac{p^r y^r + p^r n^r}{4n^r y^r}$$

$$4n^r y^r = p^r (n^r + y^r) \quad (\text{shown})$$

⑦



$$PR \Rightarrow 4x + 3y + 6 = 0$$

$$\frac{x}{-\frac{6}{3}} + \frac{y}{-\frac{6}{2}} = 1$$

$$\Rightarrow \frac{x}{-\frac{6}{3}} + \frac{y}{-\frac{6}{2}} = 0$$

$$QS \Rightarrow x + 2y - 1 = 0$$

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

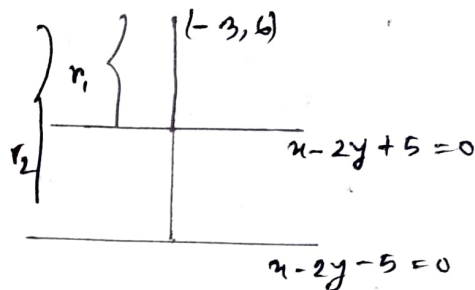
now,

$$RQ = RS$$

$$\Rightarrow \sqrt{\left(-\frac{3}{2} - 1\right)^2} = \sqrt{\left(\frac{1}{2} + 2\right)^2}$$

$$\Rightarrow \frac{5}{4} = \frac{5}{4} \quad (\text{shown})$$

⑧



$$r_1 = \left| \frac{x - 2y + 5}{\sqrt{5}} \right| = \left| \frac{-3 - 12 + 5}{\sqrt{5}} \right|$$

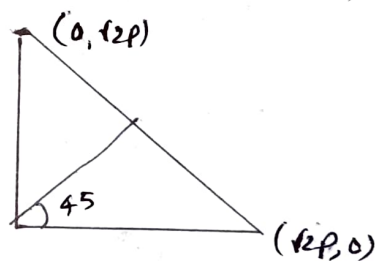
$$= \left| \frac{10}{\sqrt{5}} \right|$$

$$r_2 = \left| \frac{x - 2y - 5}{\sqrt{5}} \right| = \left| \frac{-3 - 12 - 5}{\sqrt{5}} \right|$$

$$= \left| \frac{20}{\sqrt{5}} \right|$$

$$\therefore r_2 = 2r_1 \quad (\text{shown})$$

⑨



we know,

$$x \cos 45^\circ + y \sin 45^\circ = p$$

$$x \frac{1}{\sqrt{2}} + y \frac{1}{\sqrt{2}} = p$$

$$\frac{x}{\sqrt{2}p} + \frac{y}{\sqrt{2}p} = 1$$

$$\begin{aligned} \frac{1}{2} \times 2p \times 2p &= 8 \\ p &= 2\sqrt{2} \end{aligned}$$

from ①

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

$$x + y = 4 \quad (\text{Ans})$$

(10) $x \cos \alpha + y \sin \alpha = p$
 $ax + by = c$

$$\frac{\cos \alpha}{a} \pm \frac{\sin \alpha}{b} = \frac{p}{c}$$

from 1st 3rd term,

$$\cos \alpha = \frac{ap}{c}$$

$$\cos^2 \alpha = \frac{a^2 p^2}{c^2} \quad \text{--- (1)}$$

from 2nd 3rd term

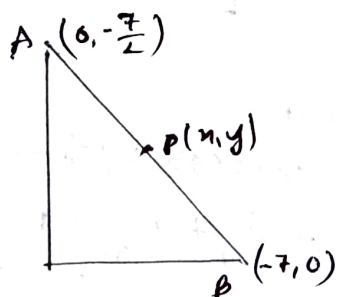
$$\sin^2 \alpha = \frac{b^2 p^2}{c^2} \quad \text{--- (11)}$$

(1) + (11)

$$1 = \frac{p^2 (a^2 + b^2)}{c^2}$$

$$p = \frac{c}{\sqrt{a^2 + b^2}} \quad (\text{Ans})$$

(12)



$$x + 2y + 7 = 0$$

$$\frac{x}{-7} + \frac{y}{-7/2} = 1$$

$$x = \frac{-7 + 0}{2} = \frac{-7}{2}$$

$$y = \frac{-7/2 + 0}{2} = \frac{-7}{4}$$

$$AB = \sqrt{(-7)^2 + (-7/2)^2}$$

$$\Rightarrow 7.86 \quad 7.826$$

$$\therefore \text{perimeter} = (7.826)^2$$

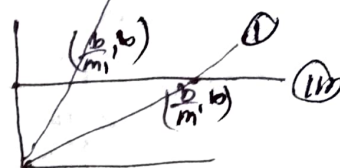
$$= 61.25 \text{ sq units}$$

(2)

$$y = mx \quad \text{--- (1)}$$

$$y = m_1 x \quad \text{--- (11)}$$

$$y = b \quad \text{--- (111)}$$



$$\frac{1}{2} \begin{vmatrix} \frac{b}{m} & b & 1 \\ \frac{b}{m_1} & b & 1 \\ 0 & 0 & 1 \end{vmatrix}$$

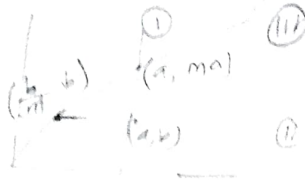
$$\Rightarrow \frac{1}{2} \begin{vmatrix} \frac{b}{m} - \frac{b}{m_1} & b-b & 0 \\ \frac{b}{m_1} - 0 & b-0 & 0 \\ 0 & 0 & 1 \end{vmatrix}$$

$$\Rightarrow \frac{1}{2} \left| \frac{b^2}{m} - \frac{b^2}{m_1} \right|$$

$$\Rightarrow \frac{b^2}{2} \left| \frac{1}{m} - \frac{1}{m_1} \right|$$

$$\Rightarrow \frac{b^2}{2} \left(\frac{1}{m} - \frac{1}{m_1} \right) \quad (\text{Ans})$$

(13) $x = a$ ——— (1)
 $y = b$ ——— (2)
 $y = mx$ ——— (3)



$$\frac{1}{2} \left| \begin{array}{cc|c} \frac{b}{m} & b & 1 \\ a & ma & 1 \\ a & b & 1 \end{array} \right|$$

$$\Rightarrow \frac{1}{2} \left| \begin{array}{cc|c} \frac{b}{m} - a & b - ma & 0 \\ a - a & ma - b & 0 \\ a & b & 1 \end{array} \right|$$

$$\Rightarrow \frac{1}{2} \left| \frac{b-ma}{m} \quad (ma-b) \right|$$

$$\Rightarrow \frac{1}{2m} |mab - ma^2 + b^2 + mab|$$

$$\Rightarrow \frac{1}{2m} |ma^2 + 2mab + b^2|$$

$$= \frac{1}{2m} |(ma+b)^2|$$

$$\Rightarrow \frac{1}{2m} (b-ma)^2 \text{ (Ans)}$$

(15) 4 lines intersect at point $y = b$

$$4x + 3y = 6$$

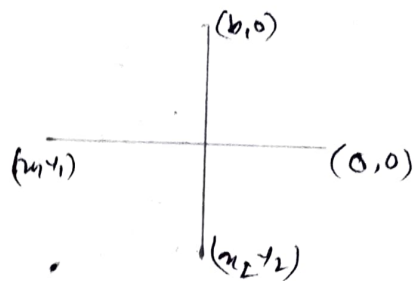
$$x - 2y = 7$$

$$(x, y) = (3, -2)$$

$$y = b = -2$$

$$y + 2 = 0 \text{ (Ans)}$$

(14)



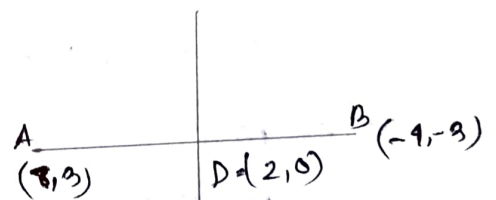
अतः, $m_1 \times m_2 = -1$

$$m_1 \frac{y_1 - 0}{x_1 - 0} \times \frac{y_2 - 0}{x_2 - 0} = -1$$

$$\Rightarrow \frac{y_1 y_2}{x_1 x_2} = -1$$

$$\Rightarrow y_1 y_2 + x_1 x_2 = 0 \text{ (proved)}$$

(16)



AB रेखा का समीकरण =

$$\frac{x-8}{8+4} = \frac{y-3}{3+3}$$

$$\Rightarrow \frac{x-8}{12} = \frac{y-3}{6}$$

$$\Rightarrow x - 8 - 2y + 6 = 0$$

$$\Rightarrow x - 2y = 2$$

(Ans)

Again, $2x + y + k = 0$

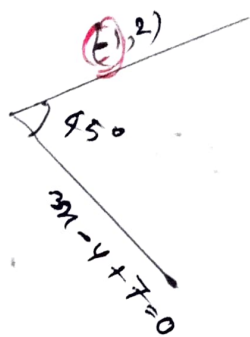
$$(2, 0) \text{ बिन्दु पर, } 4 + 0 + k = 0$$

$$k = -4$$

$$\therefore \text{ समीकरण, } 2x + y - 4 = 0 \text{ (Ans)}$$

(b) यदि दो रेखाएँ $y = \frac{x}{2} + \frac{3}{2}$ और $y = \frac{x}{2} + \frac{3}{2}$ हों, तो वे एक ही रेखा होंगी।

17



$$y-2 = m(x+1)$$

$$m_1 = m \quad \text{--- (1)}$$

$$y = 3x+7$$

$$m_2 = 3 \quad \text{--- (2)}$$

$$\tan \theta = \pm \frac{m_1 - m_2}{1 + m_1 m_2}$$

$$1 = \pm \frac{m-3}{1+3m}$$

$$(1+3m) = \pm (m-3)$$

(+) निम्न,

$$1+3m = m-3$$

$$\Rightarrow 1+3m-m+3=0$$

$$\Rightarrow 2m = -4$$

$$m = -2$$

(-) निम्न,

$$1+3m+m-3=0$$

$$4m = 2$$

$$m = \frac{1}{2}$$

$m = -2$
from

① अतः,

$$y-2 = -2(x+1)$$

$$\Rightarrow y-2+2x+2=0$$

$$\Rightarrow 2x+y=0$$

Again, $m = \frac{1}{2}$

$$y = \frac{1}{2}x+7$$

$$\Rightarrow (y+2) = \frac{1}{2}(x+1)$$

$$\Rightarrow 2y+4 = x+1$$

$$\Rightarrow x-2y+5=0 \quad \text{Ans}$$

अतः,

$$2x+y=0$$

$$m = 2$$

अतः स्पर्शक,

$$m_1 \times m_2 = -2 \times \frac{1}{2} = -1$$

(proved)

\therefore अतः,

$$y-2 = -2(x+1)$$

$$\Rightarrow y-2 = -2x-2$$

$$\Rightarrow 2x+y=0$$

Again,

$$y-2 = \frac{1}{2}(x+1)$$

$$2y-4 = x+1$$

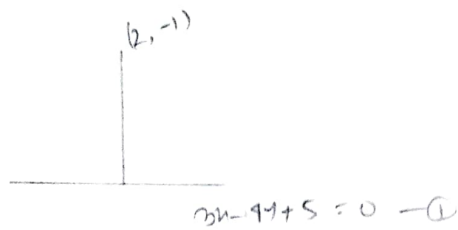
$$\Rightarrow x-2y+5=0$$

अतः स्पर्शक,

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

(proved)

18)



① নং প্রদত্ত লম্ব রেখার সমীকরণ.

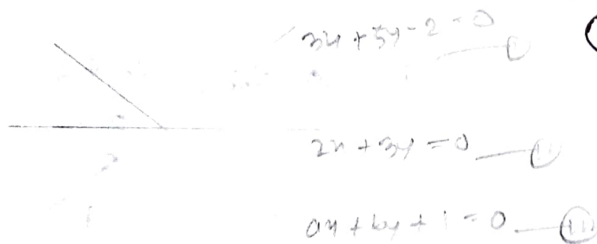
$$4x + 3y + k = 0$$

$(2, -1)$ বিন্দুগামী,
 $8 - 3 + k = 0$
 $k = -5$

$$\therefore 4x + 3y - 5 = 0$$

\therefore দ্রষ্টব্যিকৃত সীমান্ত = $(\frac{1}{5}, \frac{7}{5})$ (Ans)

19)



from ① & ②

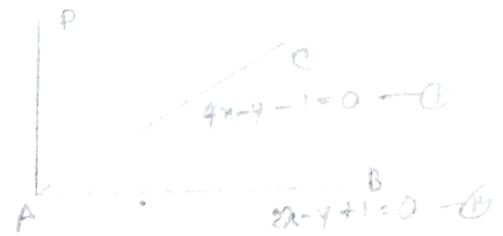
$$(x, y) = (-6, 4)$$

① নং $(-6, 4)$ বিন্দুগামী,

$$-6a + 4b + 1 = 0$$

$$6a - 4b = 1 \text{ (Ans)}$$

20)



from ① & ② $(x, y) = (1, 3)$

Ap (প্রদত্ত) সমীকরণ,

$$x + 2y + k = 0$$

$(1, 3)$ বিন্দুগামী,

$$1 + 6 + k = 0$$

$$k = -7$$

$$\therefore x + 2y - 7 = 0 \text{ (Ans)}$$

21)

at $(2, 1)$ $y - 1 = m(x - 2)$
 $m_1 = m$

60°

$x - y + 4 = 0$
 $m_2 = 1$

$$\tan \theta = \frac{m_1 - m_2}{1 + m_1 m_2}$$

$$\sqrt{3} = \pm \frac{m - 1}{1 + m}$$

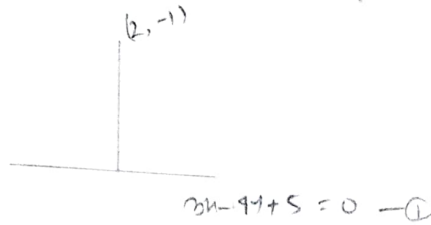
(+) sign,

$$\sqrt{3} + 13m = m - 1$$

$$\sqrt{3} + 1 = m(1 - \sqrt{3})$$

$$m = \frac{1 + \sqrt{3}}{1 - \sqrt{3}}$$

18)



① नए प्र लम्ब रेखाए समीकरण.

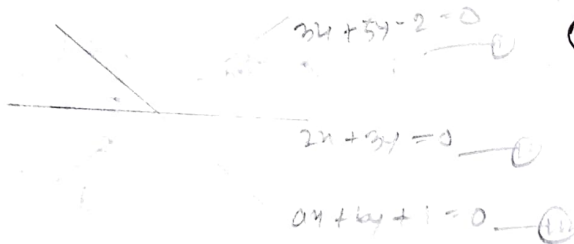
$$4x + 3y + k = 0$$

$(2, -1)$ बिन्दुमा, $8 - 3 + k = 0$
 $k = -5$

$$\therefore 4x + 3y - 5 = 0$$

\therefore वांछित रेखाएक $= \left(\frac{4}{5}, \frac{7}{5}\right)$ (Ans)

19)



from ① & ②

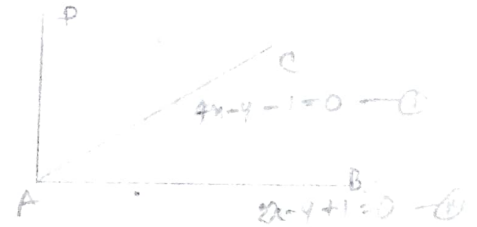
$$(x, y) = (-6, 4)$$

① नए $(-6, 4)$ बिन्दुमा,

$$-6a + 4b + 1 = 0$$

$$6a - 4b = 1 \text{ (Ans)}$$

20)



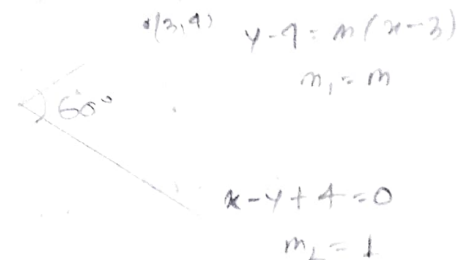
from ① & ② $(x, y) = (1, 3)$

Ap (अथवा) समीकरण,
 $x + 2y + k = 0$

$(1, 3)$ बिन्दुमा,
 $1 + 6 + k = 0$
 $k = -7$

$$\therefore x + 2y - 7 = 0 \text{ (Ans)}$$

21)



$$\tan \theta = \frac{m_1 - m_2}{1 + m_1 m_2}$$

$$\sqrt{3} = \pm \frac{m - 1}{1 + m}$$

(+) सि, $\sqrt{3} + 1 + 3m = m - 1$

$$\sqrt{3} + 1 = m(1 - \sqrt{3})$$

$$m = \frac{1 + \sqrt{3}}{1 - \sqrt{3}}$$

(1) (10),

$$\sqrt{3} + \sqrt{3}m = -m + 1$$

$$m(\sqrt{3} + 1) = 1 - \sqrt{3}$$

$$m = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$$

\therefore समीकरण,

$$y - 4 = \frac{1 + \sqrt{3}}{1 - \sqrt{3}} (x - 3)$$

$$(y - 4)(1 - \sqrt{3}) = (1 + \sqrt{3})(x - 3)$$

$$(y - 4)(1 + \sqrt{3}) = (1 - \sqrt{3})(x - 3)$$

(Ans)

(22)

$$7x + 13y - 87 = 0 \quad \text{--- (1)}$$

$$5x - 8y + 7 = 0 \quad \text{--- (2)}$$

$$(x, y) = (5, 4)$$

we know

$$x \pm y = a$$

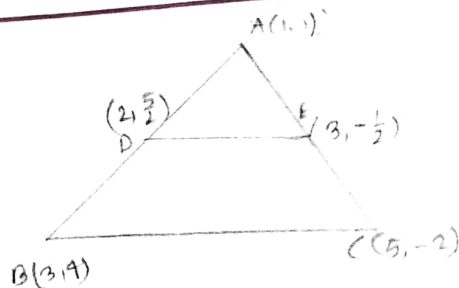
$$a = 5 \pm 4 = 9, 1$$

\therefore समीकरण,

$$x + y = 9$$

$$x - y = 1 \quad \text{(Ans)}$$

(23)



DE रेखा पर समीकरण,

$$\frac{x - 2}{2 - 3} = \frac{y - \frac{5}{2}}{\frac{5}{2} + \frac{1}{2}}$$

$$\Rightarrow \frac{x - 2}{-1} = \frac{2y - 5}{6}$$

$$\Rightarrow 6x - 12 + 2y - 5 = 0$$

$$\Rightarrow 6x + 2y - 17 = 0 \quad \text{(Ans)}$$

$$BC \text{ पर ढल} = \frac{5 - 4}{3 - 1} = \frac{4 - 2}{3 - 1} = -3$$

$$DE \text{ पर ढल} = \frac{5/2 + 1/2}{2 - 3} = \frac{6/2}{-1} = -3$$

$$\therefore BC \parallel DE$$

(Ans) (Showered)

$$BC = \sqrt{(3 - 1)^2 + (4 - 2)^2} = 2\sqrt{2}$$

$$DE = \sqrt{(2 - 3)^2 + (\frac{5}{2} + \frac{1}{2})^2} = \sqrt{10}$$

$$\therefore BC = 2DE$$

$$DE = 2 \times BC \quad \text{(Showered)}$$

$$BC = \frac{1}{2} DE$$

$$(24) \quad r = \pm \left| \frac{3x \cos \theta + 5y \sin \theta - 15}{\sqrt{9 \cos^2 \theta + 25 \sin^2 \theta}} \right|$$

(+9,0) बिन्दु परी,

$$r_1 = \pm \left| \frac{12 \cos \theta - 15}{\sqrt{9 \cos^2 \theta + 25 \sin^2 \theta}} \right|$$

(-4,0) बिन्दु परी,

$$r_2 = \pm \left| \frac{(12 \cos \theta - 15)}{\sqrt{9 \cos^2 \theta + 25 \sin^2 \theta}} \right|$$

$$r_1 \times r_2 = \frac{144 \cos^2 \theta - 225}{9 \cos^2 \theta + 25 \sin^2 \theta}$$

$$\Rightarrow \frac{144 \cos^2 \theta - 225}{9 \cos^2 \theta + 25 - 25 \cos^2 \theta}$$

$$\Rightarrow \frac{16(144 \cos^2 \theta - 225)}{25 - 16 \cos^2 \theta}$$

$$\Rightarrow \frac{9(16 \cos^2 \theta - 225)}{- (16 \cos^2 \theta - 25)}$$

$$= -9 \quad (\text{showed})$$

(25)

$$r_1 = \pm \left| \frac{4x + 3y - c}{5} \right|$$

(0,0) बिन्दु परी,

$$r_1 = \frac{0}{5}$$

$$r_2 = \frac{2(c+3)}{13}$$

$$\text{अबसाद, } \frac{c}{5} = \frac{2(c+3)}{13}$$

$$\Rightarrow 13c = 10 + 30$$

$$c = 10$$

(26)

$$r_1 = \pm \left| \frac{-K}{\sqrt{\sec^2 \theta + \csc^2 \theta}} \right|$$

$$r' = \pm \left| \frac{-K \cos 2\theta}{\sqrt{\cos^2 \theta + \sin^2 \theta}} \right|$$

$$\text{L.H.S} = 4r^2 + r'^2$$

$$\Rightarrow \frac{4K^2}{\sec^2 \theta + \csc^2 \theta} + K^2 \cos^2 2\theta$$

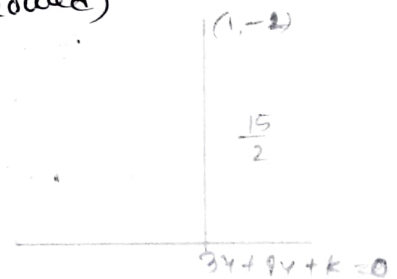
$$\Rightarrow \frac{4K^2 \sin^2 \theta \cdot \cos^2 \theta}{\sin^2 \theta + \cos^2 \theta} + K^2 \cos^2 2\theta$$

$$\Rightarrow K^2 (2 \sin^2 \theta \cdot \cos^2 \theta) + K^2 \cos^2 2\theta$$

$$\Rightarrow K^2 (\sin^2 2\theta + \cos^2 2\theta)$$

$$\Rightarrow K^2 \quad (\text{showed})$$

(27)



$$3x + 4y = 7$$

अबसाद,

$$\frac{15}{2} = \pm \left| \frac{3x + 4y + k}{5} \right|$$

$$\frac{15}{2} = \pm \left| \frac{3 - 8 + k}{5} \right|$$

(+) ली,

$$\frac{k-5}{5} = \frac{15}{2}$$

$$k = \frac{85}{2}$$

(-) निरूप,

$$\frac{-k+5}{5} = \frac{15}{2}$$

$$-k = \frac{65}{2}$$

$$k = -\frac{65}{2}$$

अतः समीकरण,

$$3x+4y+\frac{85}{2}=0$$

$$6x+8y+85=0 \quad (\text{Ans})$$

$$3x+4y-\frac{65}{2}=0$$

$$6x+8y-65=0 \quad (\text{Ans})$$

(28)

$$\frac{3x-4y+1}{5} = \frac{4x+3y+1}{5}$$

(+) निरूप,

$$3x-4y+1-4x-3y-1=0$$

$$-x-7y=0$$

$$x+7y=0$$

(a,b) विकल्प,

$$a+7b=0$$

(-) निरूप,

$$3x-4y+1+4x+3y+1=0$$

$$7x-y+2=0$$

(a,b)

$$7a-b+2=0$$

(Ans)

(29)

$$\frac{2x-y+1}{\sqrt{5}} = \frac{x-2y+4}{\sqrt{5}}$$

(+) निरूप,

$$2x-y+1-x+2y-4=0$$

$$x+y-3=0 \quad \text{--- (1)}$$

(-) निरूप,

$$2x-y+1+x-2y+4=0$$

$$\Rightarrow 3x-3y+5=0 \quad \text{--- (2)}$$

y अक्ष पर $x=0$

from (1)

$$\therefore y=3$$

from (2)

$$y = \frac{5}{3}$$

P अक्ष अक्षांक, $(0, 3)$

Q अक्ष अक्षांक, $(0, \frac{5}{3})$

$$PQ \text{ अक्ष (दूरी)} = \sqrt{(0-0)^2 + (3-\frac{5}{3})^2}$$

$$= \frac{4}{3}$$

(Ans)

(30) Here,
 $a_1 a_2 + b_1 b_2$

$$\Rightarrow 12 + 12 > 0$$

(+) \Rightarrow अनुरूप

$$\frac{4y - 3x - 3}{5} = + \frac{3y - 4x - 5}{5}$$

$$4y - 3x - 3 - 3y + 4x + 5 = 0$$

$$\Rightarrow x + y + 2 = 0 \quad (\text{Ans})$$

(31)

$$\frac{12x - 5y + 1}{13} = \pm \frac{5x + 12y - 16}{13}$$

(+) \Rightarrow नोट,

$$12x - 5y + 1 - 5x - 12y + 16 = 0$$

$$7x - 17y + 17 = 0 \quad \text{--- (1)}$$

(-) \Rightarrow नोट,

$$12x - 5y + 1 + 5x + 12y - 16 = 0$$

$$17x + 7y - 15 = 0$$

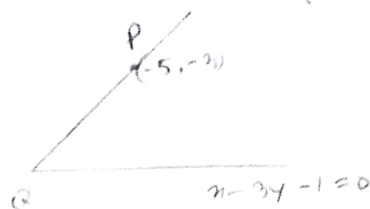
from (1)

(a, b) अनुरूप,

$$-17 + 17 = 0$$

$$= 0 \quad (\text{showed})$$

(32)



$$\tan \theta = \frac{5}{12}$$

P विकसित राम्रो अनुरूप,

$$4 + 3 = \frac{5}{12} (x + 5)$$

$$12y + 36 - 5x - 25 = 0$$

$$\Rightarrow 5x - 12y - 11 = 0$$

$$\therefore Q \text{ विकसित राम्रो अनुरूप = (7, 2)$$

$$\therefore PQ \text{ अव दिव = } \sqrt{(7+5)^2 + (2+3)^2}$$

$$\Rightarrow 13 \quad (\text{Ans})$$

(33)

$$(a, b) \quad (a', b') \quad (a - a', b - b')$$

(a, b) (a', b') विकसित राम्रो अनुरूप,

$$\frac{x - a}{a - a'} = \frac{y - b}{b - b'}$$

$$\Rightarrow x(b - b') - ab + ab' = y(a - a') - ab + ab'$$

$$\Rightarrow x(b - b') + ab' = y(a - a') + ab$$

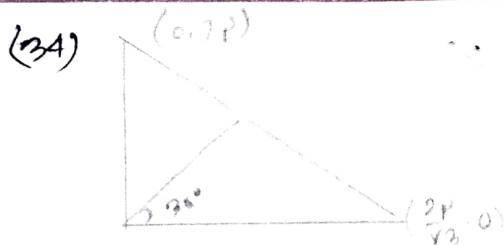
(a - a', b - b') अनुरूप,

$$ab' - (b - b')(a - a') = (b - b')(a - a') + ab$$

$$ab' = ab$$

$$\therefore x(b - b') + ab' = y(a - a') + ab$$

$$x(b - b') = y(a - a') \quad (\text{showed})$$



we know,

$$x \cos 30^\circ + y \sin 30^\circ = p$$

$$\frac{\sqrt{3}x}{2} + \frac{y}{2} = p \quad \text{--- (1)}$$

$$\frac{x}{\frac{2p}{\sqrt{3}}} + \frac{y}{2p} = 1$$

अब हम,

$$\frac{1}{2} \times \frac{2p}{\sqrt{3}} \times 2p = \frac{50}{\sqrt{3}}$$

$$p = 5$$

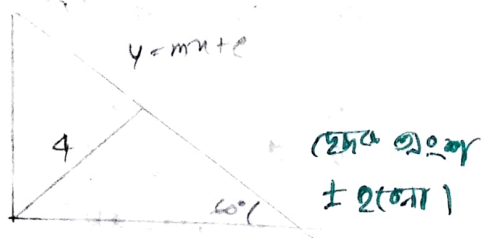
from (1)

$$\frac{\sqrt{3}x}{2} + \frac{y}{2} = 5$$

$$\sqrt{3}x + y = 10$$

(Ans)

(35)



$$\tan 60^\circ = \sqrt{3}$$

$$y = \sqrt{3}x + c$$

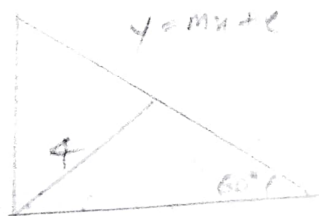
$$\sqrt{3}x - y + c = 0$$

अब हम,

$$4 = \frac{|c|}{\sqrt{4}} \quad \text{सूत्र का उपयोग करके}$$

$$c = \pm 8$$

(35)



$$\tan 60^\circ = \tan 60^\circ = \sqrt{3}$$

$$y = \sqrt{3}x + c$$

$$\sqrt{3}x - y + c = 0$$

अब हम,

$$4 = \frac{|c|}{2}$$

$$\Rightarrow 4 = \pm \left| \frac{c}{2} \right| \quad \text{द्वि-विकल्प सूत्र}$$

$$\Rightarrow c = \pm 8$$

$$\therefore \sqrt{3}x - y \pm 8 = 0$$

(Ans)

Again,

$$\frac{x}{\pm 8/\sqrt{3}} + \frac{y}{\pm 8} = 1$$

$\therefore x$ व y अक्षों (होकर) अक्षों (पर)।

$$\left(\frac{8}{\sqrt{3}}, 8 \right)$$

(Ans)

$$\therefore \text{अब हम, } \sqrt{3}x - y \pm 8 = 0$$

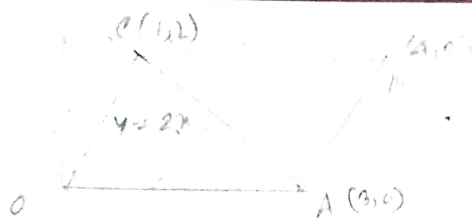
$$\sqrt{3}x - y \pm 8 = 0$$

$$\frac{x}{\pm 8/\sqrt{3}} + \frac{y}{\pm 8} = 1$$

$\therefore x$ अक्षों (होकर) अक्षों (पर)।

$$x \quad y \quad 8 \quad (Ans)$$

(36)



$$y = 2$$

$$y = 2x \therefore x = 1$$

\therefore A विक्रय स्थानांक (3,0)

C " " (1,2)

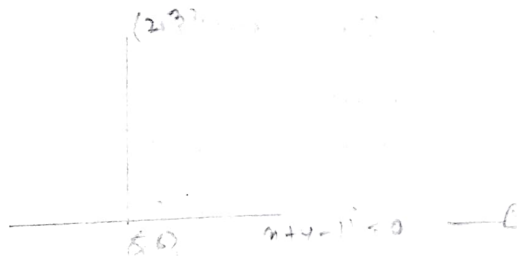
$$\therefore \text{AC का नर्व अमीकरण} = \frac{x-1}{1-3} = \frac{y-2}{2-0}$$

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

$$\Rightarrow x-1 + y-2 = 0$$

$$\Rightarrow x+y = 3 \text{ (Ans)}$$

(37)



① नर नर अमीकरण दिखाने,

$$x-y+k=0$$

$$(2,3) \text{ विक्रयस्थान, } 2-3+k=0$$

$$k = 1$$

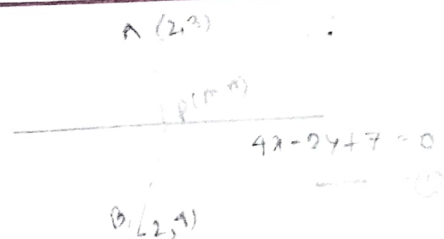
$$x-y+1=0$$

\therefore आपविक्रय स्थानांक = (5,6)

$$\therefore \text{नम्रिक (दूरी)} = \sqrt{(5-2)^2 + (6-3)^2}$$

$$= \sqrt{9+9} = 3\sqrt{2} \text{ (Ans)}$$

(38)



\therefore PA (विक्रय स्थानांक) =

$$\frac{x-2}{2-2} = \frac{y-3}{3-4}$$

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

$$\Rightarrow x-y+1=0$$

① नर (m,n) विक्रयस्थान,

$$4m-2n+7=0 \text{ --- (i)}$$

$$PA = PB$$

$$\Rightarrow (m-2)^2 + (n-3)^2 = (m+2)^2 + (n-4)^2$$

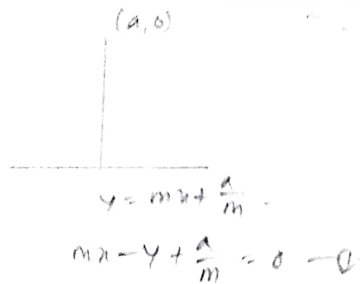
$$\Rightarrow m^2 - 4m + 4 + n^2 - 6n + 9 = m^2 + 4m + 4 + n^2 - 8n + 16$$

$$\Rightarrow 8m - 2n + 7 = 0 \text{ --- (ii)}$$

from (i) (ii)

$$\therefore \text{विक्रयस्थान } (0, \frac{7}{2}) \text{ (Ans)}$$

(39)



① નરૂ પ્રશ્ન નમિ (રૂપર,

$$x + my + k = 0$$

(a, 0) ચિત્તગમી

$$a + k = 0$$

$$k = -a$$

$$x + my - a = 0$$

$$y = \frac{a}{m} - \frac{x}{m}$$

અર્થમાત્ર

$$mx + \frac{a}{m} = \frac{a}{m} - \frac{x}{m}$$

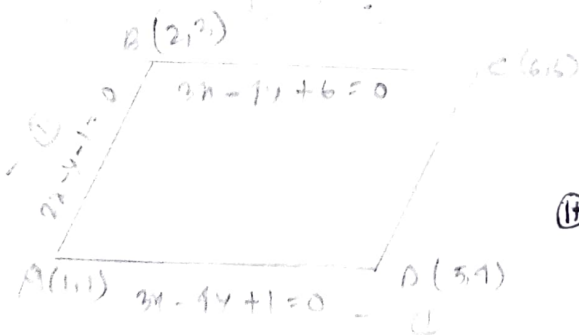
$$mx + \frac{x}{m} = 0$$

$$x \left(m + \frac{1}{m} \right) = 0$$

$$x = 0 \quad \left| \quad m + \frac{1}{m} = 0 \right.$$

(showed)

(40)



① નરૂ પ્રશ્ન સમાકુલ (રૂપર,

$$3x - 4y + k = 0$$

(6,6) ચિત્તગમી

$$18 - 24 + k = 0$$

$$k = 6$$

$$= 3x - 4y + 6 = 0$$

∴ B ચિત્તગમી (2,3)

② નરૂ પ્રશ્ન સમાકુલ (રૂપર,

$$2x - y + k = 0$$

(6,6) ચિત્તગમી,

$$12 - 6 + k = 0$$

$$k = -6$$

$$2x - y - 6 = 0$$

∴ D ચિત્તગમી (5,4)

∴ A નરૂ પ્રશ્ન સમાકુલ,

$$\frac{x-1}{1-6} = \frac{y-1}{1-6}$$

$$= \frac{x-1}{-5} = \frac{y-1}{-5}$$

$$\Rightarrow x - y = 0$$

B D નરૂ પ્રશ્ન સમાકુલ,

$$\frac{x-2}{2-5} = \frac{y-3}{3-4}$$

$$\Rightarrow \frac{x-2}{-3} = \frac{y-3}{-1}$$

$$x - 2 = 3y - 9$$

$$\Rightarrow x - 3y + 7 = 0$$

(Ans)

③ નરૂ પ્રશ્ન સમાકુલ (રૂપર,

$$2x - y + k = 0$$

(6,6) ચિત્તગમી,

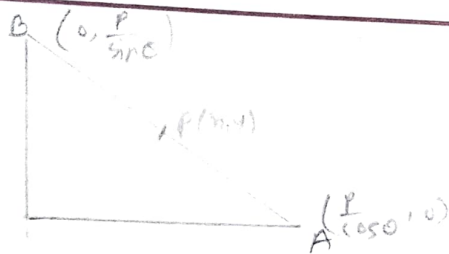
$$12 - 6 + k = 0$$

$$k = -6$$

$$\therefore 2x - y + 6 = 0$$

B નરૂ પ્રશ્ન સમાકુલ (2,3)

(41)



$$x \cos \theta + y \sin \theta = p$$

$$\frac{x}{\frac{p}{\cos \theta}} + \frac{y}{\frac{p}{\sin \theta}} = 1$$

$$\therefore x = \frac{\frac{p}{\cos \theta} + 0}{2}$$

$$\text{or, } 2x = \frac{p}{\cos \theta}$$

$$\text{or, } \cos \theta = \frac{p}{2x} \quad \text{--- (1)}$$

Similarly,

$$\sin \theta = \frac{p}{2y} \quad \text{--- (2)}$$

$$\text{(1) + (2)} \quad 1 = \frac{p(n^2 + y^2)}{4x^2 y^2}$$

$$p^2(n^2 + y^2) = 4x^2 y^2 \quad (\text{Ans})$$

(42)

$$(2k-2)x + (3k-2)y - (4k-1) = 0$$

$$\frac{2k-2=0}{k=1} \quad \frac{(3-2)y - (4-1)=0}{y=3}$$

Again,

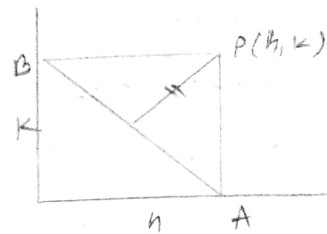
$$3k-2=0 \quad \left(2 \cdot \frac{2}{3} - 2 \right)x - \left(4 \cdot \frac{2}{3} - 1 \right) = 0$$

$$k = \frac{2}{3} \quad \frac{4-6}{3}x - \frac{8-3}{3} = 0$$

$$\Rightarrow -\frac{2}{3}x - \frac{5}{3} = 0$$

$$x = \frac{5}{3} \times \frac{3}{-2} = -\frac{5}{2}$$

(43)



$$\frac{x}{h} + \frac{y}{k} = 1$$

$$\frac{kx + hy}{hk} = 1$$

$$kx + hy = hk \quad \text{--- (1)}$$

① नए रव मय (रव -

$$hx - ky + c = 0$$

(h, k) बिन्दु पर,

$$h^2 - k^2 + c = 0$$

$$\therefore c = -(h^2 - k^2) = k^2 - h^2$$

\therefore समीकरण है,

$$hx - ky - (h^2 - k^2) = 0$$

$$\Rightarrow hx - ky - h^2 + k^2 \quad (\text{Ans})$$

$$hx - ky + (k^2 - h^2) = 0$$

\therefore बिन्दु $\left(-\frac{5}{2}, 3\right)$

(44) Here,

$$3 \times 12 + (4 \times -5) \\ \Rightarrow 36 - 20 = 16 > 0$$

\therefore - 2nd quadrant (2nd)

$$\frac{3x + 4y - 11}{5} = - \frac{12x - 5y - 2}{13}$$

$$\text{or, } 39 + 52y - 143 + 60x - 25y \\ - 10 = 0$$

$$\text{or, } 90x + 27y - 153 = 0$$

$$\text{or, } 11x + 3y - 17 = 0$$

(Ans)

(45)

$$\frac{2x + 3y - 5}{\sqrt{13}} = \pm \frac{3x + 2y - 7}{\sqrt{13}}$$

(+) If,

$$2x + 3y - 5 - 3x - 2y + 7 = 0$$

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

$$x - y - 2 = 0$$

Subtracting, $2 = 0$

$$\therefore x - y = 0$$

(-) If,

$$2x + 3y - 5 + 3x + 2y - 7 = 0$$

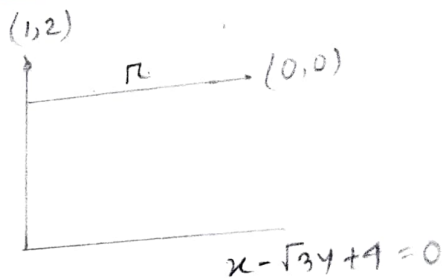
$$5x + 5y - 12 = 0$$

$$5x + 5y = 0 \quad [c=0]$$

$$x + y = 0$$

\therefore subtracting, $x + y = 0$
 $x - y = 0$ (Ans)

(46)



① If the line is perpendicular,

$$\sqrt{3}x + y + k = 0$$

(1, 2) is on the line,

$$\sqrt{3} + 2 + k = 0$$

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

$$\therefore \sqrt{3}x + y - (2 + \sqrt{3}) = 0$$

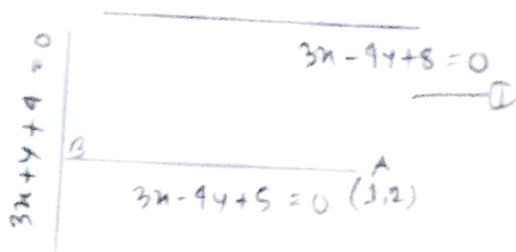
Therefore,

$$r = \pm \left| \frac{\sqrt{3}x + y - (2 + \sqrt{3})}{\sqrt{(\sqrt{3})^2 + 1}} \right|$$

$$= \pm \left| \frac{-2 + \sqrt{3}}{\sqrt{2}} \right|$$

$$\Rightarrow \frac{2 + \sqrt{3}}{\sqrt{2}} \quad (\text{Ans})$$

(47)



① नए एव समीकरण (द्वारा -

$$3x - 4y + k = 0$$

(1, 2) बिन्दु पर,

$$3 - 8 + k = 0$$

$$k = 5$$

$$\therefore 3x - 4y + 5 = 0$$

$$\therefore \text{A व B बिन्दुओं के बीच की दूरी} = \left(-\frac{7}{5}, \frac{1}{5} \right)$$

$$\therefore \text{AB की दूरी} = \sqrt{\left(-\frac{7}{5} - 1 \right)^2 + \left(\frac{1}{5} - 2 \right)^2}$$

$$= 13 \text{ (Ans)}$$

(48)

$$\frac{3x + 7y - 12}{5} = \pm \frac{5x + 12y - 52}{13}$$

(+) चिह्न,

$$39x + 52y - 156 - 25x - 60y + 260 = 0$$

$$\Rightarrow 14x - 8y + 104 = 0$$

(-) चिह्न,

$$39x + 52y - 156 + 25x + 60y - 260 = 0$$

$$64x + 112y - 416 = 0$$

$$16(4x + 7y - 26) = 0$$

$$4x + 7y - 26 = 0 \text{ (Ans)}$$