

Chapter - 3 Pairs of Linear Equations in Two Variables

Note Point :-

The general form of linear equations in two variables x & y is

$$a_1x + b_1y + c_1 = 0$$

$$\& a_2x + b_2y + c_2 = 0,$$

where $a_1, b_1, c_1, a_2, b_2, c_2$ are all real numbers & $a_1^2 + b_1^2 \neq 0, a_2^2 + b_2^2 \neq 0$.

Substitution Method :-

$$a_1x + b_1y + c_1 = 0$$

$$a_2x + b_2y + c_2 = 0$$

i) Consistent system - The system is called consistent if it has at least one solution.

→ a) Intersecting lines - when two lines intersect then it means it has unique solution i.e.

$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

→ b) Coincide lines - when two ^{lines} coincide with one other, then it has infinite solutions

$$\text{i.e. } \frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

iii) Inconsistent system - The system is called inconsistent if it has no solution.

a) Parallel lines - parallel lines means the eqn has no solution i.e. $a_1 = b_1 \neq c_1$

Ex-3.1

Ques-1 Aftab tells - - - - - graphically
 → set age of Aftab be 'x' & his daughter age be 'y'

Seven years ago - A.T.Q

① $x - 7 = y - 49$
 $\Rightarrow x - y + 42 = 0$

Three years from then - A.T.Q

② $x + 3 = 3(y + 3)$
 $\Rightarrow x + 3 = 3y + 9$
 $\Rightarrow x - 3y - 6 = 0$ (11)

graphically representation of eq ①

$x - y = -42$
 $\pm y = 42 \pm x$

x	0	-7
y	42	49

graphical representation of eq ②

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

x	3	9
y	-2	5

the - - - - - geometrically

Let the price of bat be ₹x & that of ball be ₹y.
 It is given that 3 bats & 6 balls cost ₹3900.

① $3x + 6y = 3900$

Also one bat & 3 balls of same kind cost ₹1300.

graphical representation of eq ①

when $y = 0$
 $3x + 0 = 3900$
 $3x = 3900$
 $x = 1300$

when $x = 0$
 $0 + 6y = 3900$
 $6y = 3900$
 $y = 650$

x	1300	0
y	0	650

graphical representation of eq ②

when $y = 100$
 $x + 300 = 1300 \Rightarrow x = 1000$

when $x = 100$
 $100 + 3y = 1300$
 $3y = 1200$
 $y = 400$

x	1000	100
y	300	400

2-3 other rest

Let cost of 1 kg apple be x & 1 kg grapes be y
 It is given that 2 kg apples & 1 kg grapes cost 160
 $\therefore 2x + y = 160$ (i)
 It is given that 1 kg apples & 2 kg grapes cost 300
 $\therefore x + 2y = 300$ (ii)
 Graphical representation of eq (i)
 when $x = 20$, $y = 120$
 when $y = 0$, $2x = 160$
 $x = 80$
 when $x = 0$, $y = 160$
 when $y = 0$, $x = 80$
 Graphical representation of eq (ii)
 when $y = 0$, $x = 300$
 when $x = 0$, $2y = 300$
 $y = 150$
 when $y = 0$, $x = 150$
 when $x = 0$, $y = 75$

x	0	150
y	160	0

x	0	80
y	120	0

2-4 To students

Let the no of girls be x / no boys be y & girls be q girls.
 $2x + y = 10$ (i)
 $y = x + 4$
 Substituting the value of y in eq (i)

Hence the lines have a unique solution & the pair of lines intersect at a point.

$\frac{a_1}{a_2} = \frac{5}{-1}$, $\frac{b_1}{b_2} = \frac{-1}{-1}$, $\frac{c_1}{c_2} = \frac{-9}{-9}$
 here, $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

2-5 To find the pair of equation & find their solutions :-

2-6 $5x - 4y + 8 = 0$
 $7x + 6y - 8 = 0$
 $2x + 5y - 16 = 0$
 $2x + 5y - 16 = 0$
 $2x + 5y - 16 = 0$

adding eq (i) & (iv)
 $2x + 5y - 16 = 0$
 $2x + 5y - 16 = 0$
 $2x + 5y - 16 = 0$
 $2x + 5y - 16 = 0$
 $2x + 5y - 16 = 0$

adding eq (i) & (ii)
 $12x + 19y = 96$
 $x + y = 8$
 $11x + 18y = 88$
 $11x + 18y = 88$
 $11x + 18y = 88$

Let pencil be x & pen be y
 $5x + 3y = 50$ (i)
 $7x + 5y = 46$ (ii)
 $5x + 3y = 50$
 $7x + 5y = 46$
 $5x + 3y = 50$

$$\begin{aligned}
 2) \quad & 8x + 2y + 12 = 0 \\
 & 18x + 5y + 24 = 0 \\
 & 0 = 9 + 5x + 12 = 0 \\
 & 0 = 18 + 5x + 24 = 0 \\
 & \frac{a_1}{a_2} = \frac{8}{18} = \frac{4}{9}, \quad \frac{b_1}{b_2} = \frac{2}{5} = \frac{4}{10} = \frac{2}{5} \\
 & \frac{c_1}{c_2} = \frac{12}{24} = \frac{1}{2} \neq \frac{4}{9}
 \end{aligned}$$

$\Rightarrow$ Hence, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
 Hence, it has no solution & the pair of lines are parallel to each other.

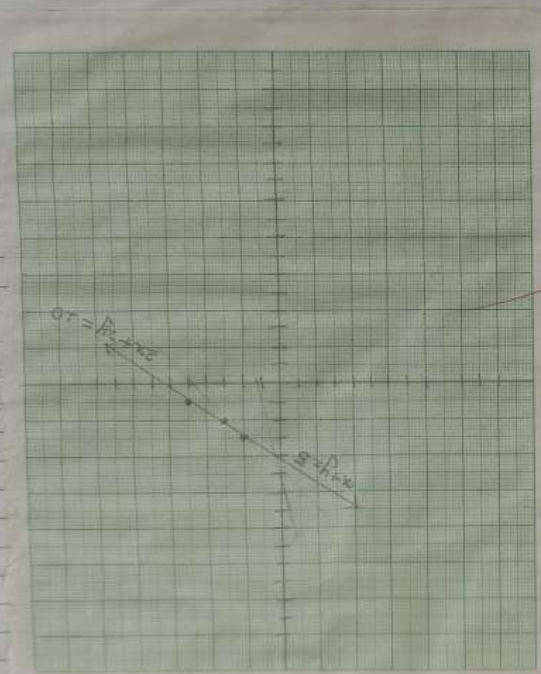
$$\begin{aligned}
 4) \quad & x + y = 5; \quad 2x + 2y = 10 \\
 & x + y - 5 = 0; \quad 2x + 2y - 10 = 0 \\
 & a_1 = 1, b_1 = 1, c_1 = -5 \\
 & a_2 = 2, b_2 = 2, c_2 = -10 \\
 & \frac{a_1}{a_2} = \frac{1}{2}, \quad \frac{b_1}{b_2} = \frac{1}{2}, \quad \frac{c_1}{c_2} = \frac{-5}{-10} = \frac{1}{2} \\
 & \Rightarrow \frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \quad \text{Hence, it is coincident} \\
 & \text{Graphical representation} \rightarrow
 \end{aligned}$$

$\Rightarrow$ It is inconsistent.
 $\Rightarrow$ Hence, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ & it has no solution thus

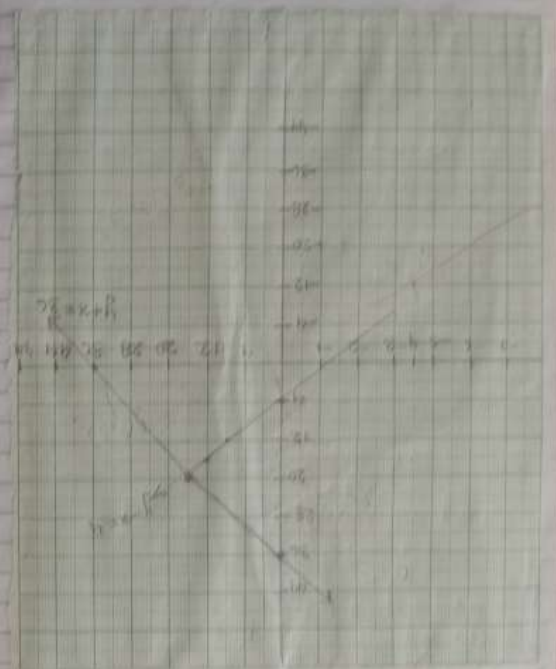
x	1	2	3
y	4	3	2

x	4	3	2
y	1	2	3

$x + y = 5$
 $x = 5 - y$
 $2x - 2y = 10$
 $2(5 - y) - 2y = 10$



5. Half - $\Rightarrow$ let the width of garden be x & length be y.
 ATQ
 $y - x = 4$ --- (i)



$$\text{For eq (ii) } y + x = 26$$

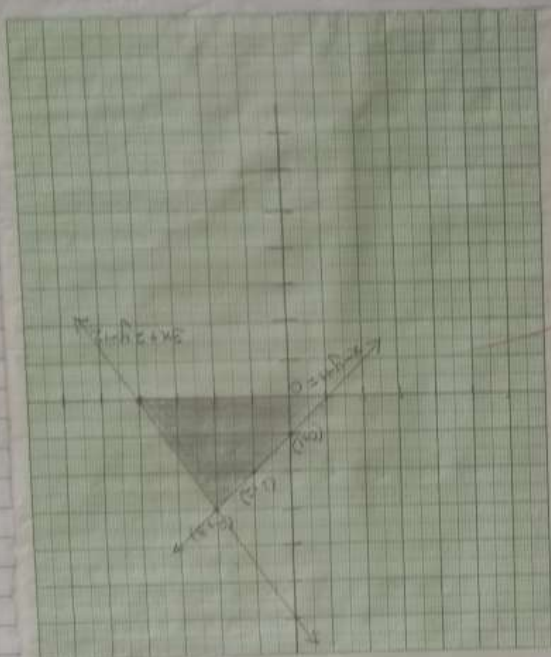
x	0	26
y	26	0

$$\text{For eq (i) } y - x = 4$$

x	0	4
y	4	0

$$(ii) \quad y + x = 26$$

Write on White
Date _____
Page _____



$$\text{For eq (i) } x - y = 1$$

x	0	1
y	1	0

$$(ii) \quad y = 2$$

∴ Draw the graphs - - - - - region

$$\begin{aligned} \text{!!)} \quad \frac{3x}{8} - \frac{5y}{2} &= -2 \quad \text{--- (i)} \\ \frac{x}{8} + \frac{y}{2} &= \frac{13}{6} \quad \text{--- (ii)} \end{aligned}$$

From eq (i)

$$3x - 10y = -12 \quad \text{--- (iii)}$$

Substituting the value of x in eq (ii)

$$\frac{-12 + 10y}{8} + \frac{y}{2} = \frac{13}{6}$$

$$-12 + 10y + 4y = 13$$

$$14y = 25$$

$$y = \frac{25}{14}$$

1) Solve these pairs by substitution method.

i) $x + y = 14$
 $x - y = 4$
 $x + y = 14$ --- (i)
 $x - y = 4$ --- (ii)

Adding (i) and (ii)

$$2x = 18$$

$$x = 9$$

Putting the value of x in eq (i)

$$9 + y = 14$$

$$y = 5$$

2) $2x - 3y = 8$

Write on White

2) Solve --- $y = mx + 3$ --- (i)

From eq (i)

$$2x - 4y = -8$$

$$2x - 4y = -8$$

$$2x - 4y = -8$$

$$2x - 4y = -8$$

$$2x - 4y = -8$$

Substituting the value of y in eq (ii)

$$2x - 4\left(\frac{25}{14}\right) = -8$$

$$2x - \frac{100}{7} = -8$$

$$2x = -8 + \frac{100}{7}$$

$$2x = \frac{-56 + 100}{7}$$

$$2x = \frac{44}{7}$$

$$x = \frac{22}{7}$$

$$\begin{aligned} \text{For } y, \text{ taking eq. (i)} \\ y &= 3x/13 \\ x &= 26 \\ 2x - x &= 26 \end{aligned}$$

$$\begin{aligned} \text{Substituting the value of } y \text{ in eq. (ii)} \\ y - x &= 26 \quad \text{--- (i)} \\ y &= 2x - 26 \end{aligned}$$

1) Let the first number be x & the other number be y .
 2) Down the pair of linear equations & find their solution by substitution method.

$$\begin{aligned} \text{For } m, \\ y &= m+5 \quad (\text{given}) \\ 5 &= m(-2)+3 \\ m &= \frac{-2}{-2} \\ m &= 1 \end{aligned}$$

$$\begin{aligned} \text{For } n, \\ n &= -2 \\ 9 &= 13 - 15 \\ 9 &= 2 \end{aligned}$$

$$\begin{aligned} \text{For eq. (i)} \\ 6x + 18 &= 5y + 15 \\ 6x - 5y &= -3 \quad \text{--- (iv)} \\ 11x + 22 &= 8y + 18 \\ 11x - 8y &= 18 - 22 \\ 11x - 8y &= -4 \quad \text{--- (v)} \end{aligned}$$

$$\begin{aligned} \text{--- (iv)} \quad x+2 &= \frac{3}{6} \\ \text{--- (v)} \quad x+2 &= \frac{11}{8} \end{aligned}$$

ATQ

iii) Let the numerator be x & denominator be y .

hence the angles be 99° & 81°

$$\begin{aligned} \text{Substituting this in eq. (iii)} \\ x &= 99^\circ \\ y &= 81^\circ \end{aligned}$$

$$\begin{aligned} \text{Substituting this in eq. (ii)} \\ x - (180 - x) &= 18 \\ 2x - 180 + x &= 18 \\ 2x &= 18 + 180 \\ x &= 198 \end{aligned}$$

ATQ

ii) Let the larger is be x & smaller be y .
 And their sum will be 180° .

elimination method:

$$\begin{aligned} x - \frac{y}{2} &= 3 \\ 3x - y &= 6 \quad \text{--- (iv)} \end{aligned}$$

in eq (i)

Substituting this in eq (i)

$$\begin{aligned} x - \frac{y}{2} &= 3 \\ x &= 3 + \frac{y}{2} \end{aligned}$$

Substituting this in eq (ii)

$$\begin{aligned} 3x + 4y &= 6 \\ 3\left(3 + \frac{y}{2}\right) + 4y &= 6 \\ 9 + \frac{3y}{2} + 4y &= 6 \\ 9 + \frac{3y + 8y}{2} &= 6 \\ 9 + \frac{11y}{2} &= 6 \\ \frac{11y}{2} &= 6 - 9 \\ \frac{11y}{2} &= -3 \\ 11y &= -6 \\ y &= -\frac{6}{11} \end{aligned}$$

Substitution method:

$$\begin{aligned} \frac{x}{2} + \frac{y}{3} &= 1 \quad \text{--- (i)} \\ x + \frac{2y}{3} &= 2 \quad \text{--- (ii)} \end{aligned}$$

Subtracting eq (i) from eq (ii)

$$\begin{aligned} x + \frac{2y}{3} &= 2 \\ \frac{x}{2} + \frac{y}{3} &= 1 \\ \hline \frac{x}{2} + \frac{2y}{3} - \frac{x}{2} - \frac{y}{3} &= 2 - 1 \\ \frac{2y}{3} - \frac{y}{3} &= 1 \\ \frac{y}{3} &= 1 \\ y &= 3 \end{aligned}$$

Write on White

Let age of Nani be x & Sonu be y

5 years ago, $x - 5 = 3y - 5$

10 years before,

$$\begin{aligned} x + 10 &= 2(y + 10) \\ x + 10 &= 2y + 20 \\ x - 2y &= 10 \quad \text{--- (i)} \end{aligned}$$

adding subtracting eq (i) from (ii)

$$\begin{aligned} x - 2y &= 10 \\ x - 3y &= 0 \\ \hline x - 2y &= 10 \\ x - 3y &= 0 \\ \hline y &= -20 \\ y + 20 &= 0 \\ x - 2y &= 10 \\ x - 2(-20) &= 10 \\ x + 40 &= 10 \\ x &= -30 \end{aligned}$$

Substituting the value in eq (i)

$$\begin{aligned} x - 2y &= 10 \\ x - 2(-20) &= 10 \\ x + 40 &= 10 \\ x &= -30 \end{aligned}$$

2. Form the pair of L.E. & solve by elimination method:

Subtracting eq (iii) from eq (iv)

$$\begin{aligned} 3x + 4y &= -6 \\ 2x + y &= -9 \\ \hline x + 3y &= 3 \end{aligned}$$

Substituting this in eq (iii)

$$\begin{aligned} 2x + y &= -9 \\ 2x + 3(-1) &= -9 \\ 2x - 3 &= -9 \\ 2x &= -9 + 3 \\ 2x &= -6 \\ x &= -3 \end{aligned}$$

$$\frac{x}{24} = \frac{-6}{8} = \frac{-1}{4}$$

$$\frac{x}{24} = -\frac{1}{4} \Rightarrow x = -6$$

$$y = -1$$

$$3x - 8y - 15 = 0$$

$$3(-6) - 8(-1) - 15 = 0$$

$$-18 + 8 - 15 = 0$$

$$-25 = 0$$

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

$$\frac{y}{1} = \frac{1}{4} \Rightarrow y = \frac{1}{4}$$

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

$$\frac{y}{-8} = \frac{-5}{4} = \frac{5}{4}$$

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

$$a_1 = 2, b_1 = 1, c_1 = -5$$

$$a_2 = 3, b_2 = 2, c_2 = -8$$

$$3x + 2y = 8$$

$$2x + y = 5$$

$$\frac{x}{-21} = \frac{-1}{4} = \frac{1}{-4}$$

It has infinitely many solutions

Hence, $a=5, b=1$ are the values for given eqⁿ to have infinitely many solⁿ.

Substituting this in eq (ii)

$$[a=5]$$

$$4b = 4$$

$$b = 1$$

Subtracting (i) from (ii)

$$a - 5b = 0$$

$$a - 5(1) = 0$$

$$a - 5 = 0$$

$$a = 5$$

$$6a + 2b - 4 = 7a - 7b$$

$$a - b = 3$$

$$a - 5 = 3$$

$$a = 8$$

$$a - 9b = -4$$

$$a - 9(1) = -4$$

$$a - 9 = -4$$

$$a = 5$$

$$6a + 2b - 4 = 7a - 7b$$

$$a - b = 3$$

$$a - 5 = 3$$

$$a = 8$$

$$a - 9b = -4$$

$$a - 9(1) = -4$$

$$a - 9 = -4$$

$$a = 5$$

$$6a + 2b - 4 = 7a - 7b$$

$$a - b = 3$$

$$a - 5 = 3$$

$$a = 8$$

$$a - 9b = -4$$

$$a - 9(1) = -4$$

$$a - 9 = -4$$

$$a = 5$$

Substituting this in eq ①

$$x + 20 \times 30 = 1000$$

$$x = 1000 - 600$$

$$x = 400$$

ii) let numerator be x & denominator be y

ATQ

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

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

$$\frac{x}{y} = \frac{y+8}{y+8} = \frac{y+8}{y+8}$$

$$4x - y = y + 8$$

$$4x - y = 8 \quad \text{--- (1)}$$

Subtracting eq ① from ②

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

$$[x = 5]$$

Substituting this in eq ①

$$4x - y = 8$$

$$4 \times 5 - y = 8$$

$$20 - y = 8$$

$$-y = 8 - 20$$

$$-y = -12$$

$$y = 12$$

∴ Fraction = $\frac{12}{5}$

ATQ let no of right and wrong answers be x & wrong answers be y

$$3x - y = 40 \quad \text{--- (1)}$$

$$4x - y = 50 \quad \text{--- (2) or } 2x - y = 25$$

v)

let length of rectangle be x & breadth be y

ATQ

$$(x-5)(y+3) = xy - 9$$

$$xy + 3x - 5y - 15 = xy - 9$$

$$3x - 5y - 6 = 0 \quad \text{--- (1)}$$

$$(x+3)(y+2) = xy + 6$$

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

$$+ 2x + 3y + 6 = 0 \quad \text{--- (2)}$$

Substituting this value in eq ②, we obtain

$$[x = 40 \text{ km/h}]$$

$$[y = 60 \text{ km/h}]$$

$$2x = 120$$

$$4x = 240$$

$$4x - y = 20 \quad \text{--- (1)}$$

$$1(x+y) = 100 \quad \text{--- (2)}$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

$$x + y = 100$$

By cross multiplication method,

$$\frac{-5}{-5} = \frac{-6}{-4} = \frac{3}{1}$$

$$\frac{505 - (-18)}{1} = \frac{-12 - (-103)}{1} = \frac{-103 - (-10)}{1}$$

$$\frac{523}{1} = \frac{121}{1} = \frac{67}{1}$$

$$\frac{17}{1} = \frac{19}{1} \quad \& \quad \frac{17}{1} = \frac{19}{1}$$

$$y = 9$$

$$2x - 3.6$$

2) Solve the following pairs of equation:-

$$\frac{2x}{1} + \frac{3y}{1} = 2 \quad ; \quad \frac{3x}{1} + \frac{1}{1} = \frac{6}{13}$$

$$\text{let } \frac{x}{1} = u \quad \& \quad \frac{y}{1} = v$$

$$\frac{u}{1} + \frac{v}{1} = 2 \quad ; \quad \frac{u}{1} + \frac{v}{1} = \frac{6}{13}$$

$$3u + 2v = 2$$

$$3u + 2v = 12 \quad \text{--- (1)}$$

(11)

Write on White
Date _____
Page _____

$$x-1 = 3 \quad \boxed{x=4}$$

$$\frac{x-1}{3} = \frac{1}{1}$$

$$x-1 = 3$$

$$2x+1 = 7$$

$$15x+3y = 6$$

Multiply eq (1) by 3 & adding eq (1) & (11)

$$5x + y = 2 \quad \text{--- (1)} \quad ; \quad 6x - 3y = 1 \quad \text{--- (11)}$$

$$\text{let } \frac{x-1}{1} = p \quad \& \quad \frac{y-2}{1} = q$$

$$\frac{x-1}{5} + \frac{y-2}{1} = 2 \quad ; \quad \frac{x-1}{6} + \frac{y-2}{3} = 1$$

$$x = 1 \quad \boxed{x=1}$$

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

$$2u + v = 12 \quad \boxed{u=2}$$

Substituting the value of v in eq (1)

$$y = 1 \quad \boxed{y=1}$$

$$\frac{y}{1} = 3$$

$$v = 3$$

$$5v = 15$$

$$6x + 4v = 24$$

$$6x + 9v = 39$$

Multiplying eq (1) & 3 in (11) & subtracting (1) from (11)

$$\text{ii) } \frac{\frac{1}{2}x}{\frac{1}{2}} + \frac{\frac{1}{2}y}{\frac{1}{2}} = 2 \quad \text{; } \frac{\frac{1}{2}x}{\frac{1}{4}} - \frac{\frac{1}{2}y}{\frac{1}{4}} = 2 \quad \text{; } \frac{\frac{1}{2}x}{\frac{1}{9}} - \frac{\frac{1}{2}y}{\frac{1}{9}} = 2$$

$$[x=1]$$

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

$$u = 1$$

$$7u = 7 \quad \text{; } 15 - 8 = 7$$

Substituting the value of u in eq ①

$$[y=1]$$

$$\frac{1}{y} = 1$$

$$v = 1$$

$$65v = 65$$

$$16v + 14u = 30$$

$$40v - 14u = 35$$

adding both

$$\text{Multiplying eq ① by 7 & eq ② by 2 & adding both}$$

$$\text{① } 7x - 2y = 5 \quad \text{② } 8x + 7y = 15$$

$$\text{let } \frac{1}{x} = u \quad \text{; } \frac{1}{y} = v$$

$$\frac{7}{x} - \frac{2}{y} = 5 \quad \text{; } \frac{8}{x} + \frac{7}{y} = 15$$

$$\frac{7x}{xy} - \frac{2y}{xy} = 5 \quad \text{; } \frac{8x}{xy} + \frac{7y}{xy} = 15$$

$$\frac{7x - 2y}{xy} = 5 \quad \text{; } \frac{8x + 7y}{xy} = 15$$

v)

→

→

→

→

→

→

→

→

→

→

→

→

→

→

→

→

→

$$\text{① } x + y = 10 \quad \text{② } x - y = 2$$

$$\text{③ } x + y = 20 \quad \text{④ } x - y = 4$$

For downstream, speed of current = y km/h

For upstream, speed of current = y km/h

2) Formulate the following pairs & solve:-

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

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

$$\frac{1}{y} = 1$$

Multiply eq ① by 3 & adding both eqs

$$\text{① } 2x + 3y = 2 \quad \text{② } 4x - 9y = 1$$

$$\text{③ } 2x + 3y = 2 \quad \text{④ } 4x - 9y = 1$$

$$\text{⑤ } 2x + 3y = 2 \quad \text{⑥ } 4x - 9y = 1$$

$$\text{⑦ } 2x + 3y = 2 \quad \text{⑧ } 4x - 9y = 1$$

$$\text{⑨ } 2x + 3y = 2 \quad \text{⑩ } 4x - 9y = 1$$

$$\text{⑪ } 2x + 3y = 2 \quad \text{⑫ } 4x - 9y = 1$$

$$\text{⑬ } 2x + 3y = 2 \quad \text{⑭ } 4x - 9y = 1$$

$$\text{⑮ } 2x + 3y = 2 \quad \text{⑯ } 4x - 9y = 1$$

$$\text{⑰ } 2x + 3y = 2 \quad \text{⑱ } 4x - 9y = 1$$

$$\text{⑲ } 2x + 3y = 2 \quad \text{⑳ } 4x - 9y = 1$$

$$\text{㉑ } 2x + 3y = 2 \quad \text{㉒ } 4x - 9y = 1$$

$$\text{㉓ } 2x + 3y = 2 \quad \text{㉔ } 4x - 9y = 1$$

$$\text{㉕ } 2x + 3y = 2 \quad \text{㉖ } 4x - 9y = 1$$

$$\text{㉗ } 2x + 3y = 2 \quad \text{㉘ } 4x - 9y = 1$$

$$\text{㉙ } 2x + 3y = 2 \quad \text{㉚ } 4x - 9y = 1$$

$$\text{㉛ } 2x + 3y = 2 \quad \text{㉜ } 4x - 9y = 1$$

$$\frac{P}{1} - \frac{36}{1}$$

$$T = 498.$$

$$G = \Lambda O B I + n/c \pm$$

Multiplying eq (ii)

8. $34 + 15 = 49$ $49 - 15 = 34$ $34 + 15 = 49$ $49 - 15 = 34$

$$n = \frac{R}{1 - r} \quad n = \frac{x}{1 - r}$$

D E R x L R x

ATQ

0-100

9. D

2	8	3	2
2	8	3	2

adding eq (1) & (2)

100

ATG

2

(89)

$$= 290 \text{ km}$$

Obtain bus total time

$$81 = 3^4$$

0.36

$$h = nct$$

$$b = 5 + 176E$$

Ca

1 - 98

61. $\frac{1}{2} \times 100 = 50\%$

not on Y83 Pro

$$\rightarrow \text{let } \frac{1}{x} = p \quad \& \quad \frac{1}{y} = q$$

$$\rightarrow 66p + 240q = 4$$

$$\rightarrow 15p + 60q = 1 \quad \text{--- (1)}$$

$$100p + 200q = 25$$

$$\rightarrow 600p + 1200q = 25$$

$$\rightarrow 20p + 48q = 1 \quad \text{--- (11)}$$

By cross multiplication method.

$$\rightarrow \frac{x}{60} = \frac{y}{-1} = \frac{4}{-15} = \frac{1}{15}$$

$$\rightarrow \frac{x}{-60+48} = \frac{y}{-24+15} = \frac{1}{-720-1440}$$

$$\rightarrow \frac{x}{-12} = \frac{y}{-9} = \frac{1}{-720}$$

$$\rightarrow \boxed{x = 60 \text{ km/hr}} \quad \& \quad \boxed{y = 80 \text{ km/hr}}$$

~~12/6000~~

