

13/06/2020

classmate

Date _____

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Ch-3 Exercise 3.3

Q.1 $11x + 15y = -23$ ——— ①
 $7x - 2y = 20$ ——— ②

Multiply ① by 2 and ② by 15

$22x + 30y = -46$ ——— ③
 $105x - 30y = 300$ ——— ④

Add ③ & ④,

$$\begin{array}{r} 22x + 30y = -46 \\ (+) 105x - 30y = 300 \\ \hline 127x = 254 \\ x = \frac{254}{127} \end{array}$$

$\boxed{x = 2}$

Putting value of x in ②

$$\begin{array}{r} 7x - 2y = 20 \\ 7(2) - 2y = 20 \\ -2y = 20 - 14 \\ y = \frac{6}{-2} \\ \boxed{y = -3} \end{array}$$

Q.2 $3x - 7y = -10$ ——— ①
 $-2x + y = 3$ ——— ②

Multiply ② by 7.

$$-14x + 7y = 21 \quad \text{--- ③}$$

Add ① & ③,

$$\begin{array}{r} 3x - 7y = -10 \\ (+) -14x + 7y = 21 \\ \hline -11x = 11 \end{array}$$

$$x = \frac{11}{-11}$$

$$x = -1$$

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

Putting value of x in ①

$$\begin{array}{r} 3x - 7y = -10 \\ 3(-1) - 7y = -10 \\ -7y = -10 + 3 \\ -7y = -7 \\ y = \frac{-7}{-7} \end{array}$$

$$\boxed{y = 1}$$

Q.3

$$0.4x + 0.3y = 1.7 \quad \text{--- ①}$$

$$0.7x - 0.2y = 0.8 \quad \text{--- ②}$$

Multiply ① & ② by 10.

$$4x + 3y = 17 \quad \text{--- ③}$$

$$7x - 2y = 8 \quad \text{--- ④}$$

Multiply (3) by 2 & (4) by 3.

$$8x + 6y = 34 \quad \text{--- (5)}$$

$$21x - 6y = 24 \quad \text{--- (6)}$$

Add (5) & (6)

$$\begin{array}{r} 8x + 6y = 34 \\ (+) 21x - 6y = 24 \\ \hline \end{array}$$

$$29x = 58$$

$$x = \frac{58}{29}$$

$$x = 2$$

$$\boxed{x = 2}$$

Putting value of x in (3)

$$4(2) + 3y = 17$$

$$8 + 3y = 17$$

$$3y = 17 - 8$$

$$y = \frac{9}{3}$$

$$\boxed{y = 3}$$

Q.4 $\frac{x}{2} + y = 0.8$

$$x + 2y = 0.8 \times 2$$

$$x + 2y = 1.6 \quad \text{--- (1)}$$

$$\frac{7}{x + y} = 10$$

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

$$\frac{7}{2x+y} = 10$$

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

$$7 = 10 \left(\frac{2x+y}{2} \right)$$

$$7 = \frac{20x+10y}{2}$$

$$14 = 20x + 10y \quad \text{--- (2)}$$

Multiply (1) by 20.

$$20x + 40y = 32 \quad \text{--- (3)}$$

Subtract (2) from (3),

$$\begin{array}{r} 20x + 40y = 32 \\ 20x + 10y = 14 \\ (-) \quad (-) \quad (-) \end{array}$$

$$30y = 18$$

$$y = \frac{18}{30} = \frac{3}{5}$$

$$y = 0.6$$

Putting value of y in (1)

$$x + 2y = 1.6$$

$$x + 2(0.6) = 1.6$$

$$x = 1.6 - 1.2$$

$$x = 0.4$$

Q. 5

$$7(y+3) - 2(x+2) = 14$$

$$7y + 21 - 2x - 4 = 14$$

$$7y - 2x = 14 - 17$$

$$7y - 2x = -3 \quad \text{--- (1)}$$

$$4(y-2) + 3(x-3) = 2$$

$$4y - 8 + 3x - 9 = 2$$

$$4y + 3x = 2 + 17$$

$$4y + 3x = 19 \quad \text{--- (2)}$$

Multiply (1) by 3 and (2) by 2.

$$21y - 6x = -9 \quad \text{--- (3)}$$

$$8y + 6x = 38 \quad \text{--- (4)}$$

Add (3) & (4),

$$21y - 6x = -9$$

$$(+)\ 8y + 6x = 38$$

$$29y = 29$$

$$y = \frac{29}{29}$$

$$\boxed{y = 1}$$

Putting value of y in (1)

$$7y - 2x = -3$$

$$7(1) - 2x = -3$$

$$-2x = -3 - 7$$

$$x = \frac{-10}{-2}$$

$$\boxed{x = 5}$$

Q.6

$$\frac{x}{7} + \frac{y}{3} = 5$$

$$\frac{3x + 7y}{21} = 5$$

$$3x + 7y = 5 \times 21$$

$$3x + 7y = 105 \quad \text{--- (1)}$$

$$\frac{x}{2} - \frac{y}{9} = 6$$

$$\frac{9x - 2y}{18} = 6$$

$$9x - 2y = 6 \times 18$$

$$9x - 2y = 108 \quad \text{--- (2)}$$

Multiply (1) by 3.

$$9x + 21y = 315 \quad \text{--- (3)}$$

Subtract (2) from (3)

$$\begin{array}{r} 9x + 21y = 315 \\ 9x - 2y = 108 \\ (-) \quad (+) \quad (-) \\ \hline \end{array}$$

$$23y = 207$$

$$y = \frac{207}{23} = 9$$

$$\boxed{y = 9}$$

Putting value of y in (1)

$$3x + 7y = 105$$

$$3x + 7(9) = 105$$

$$3x = 105 - 63$$

$$x = \frac{42}{3} 14$$

$$\boxed{x = 14}$$

Q.8 $\frac{4}{x} + 3y = 8$ — (1)

$$\frac{6}{x} - 4y = -5$$
 — (2)

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

$$4A + 3y = 8$$
 — (3)

$$6A - 4y = -5$$
 — (4)

Multiply (3) by 4 & (4) by 3.

$$16A + 12y = 32$$
 — (5)

$$18A - 12y = -15$$
 — (6)

Add (5) & (6)

$$\begin{array}{r} 16A + 12y = 32 \\ (+) 18A - 12y = -15 \\ \hline 34A = 17 \end{array}$$

$$A = \frac{17}{34}$$

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

$$\boxed{x = 2}$$

Putting value of x in ① $201 = (P) \dots$

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

$$\frac{4 \times 2}{x} + 3y = 8$$

$$3y = 6$$

$$y = \frac{6}{3}$$

$$\boxed{y = 2}$$

Q.9

$$x + y = 4$$

$$2x + y = 4 \times 2$$

$$2x + y = 8 \quad \text{————— ①}$$

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

$$x + 6y = 5 \times 3$$

$$x + 6y = 15 \quad \text{————— ②}$$

Multiply ② by 2.

$$2x + 12y = 30 \quad \text{————— ③}$$

subtract ① from ③

$$\begin{array}{r} 2x + 12y = 30 \\ 2x + y = 8 \\ \hline (-) \quad (-) \quad (-) \\ 11y = 22 \end{array}$$

$$y = \frac{2 \times 2}{11}$$

$$\boxed{y = 2}$$

Putting value of y in ①

$$2x + y = 8$$

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

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

$$\boxed{x = 3}$$

q.10 $x + 2y = \frac{3}{2}$

$$2x + 4y = 3 \quad \text{--- ①}$$

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

$$4x + 2y = 3 \quad \text{--- ②}$$

Multiply ① by 2.

$$4x + 8y = 6 \quad \text{--- ③}$$

subtract ② from ③.

$$4x + 8y = 6$$

$$4x + 2y = 3$$

$$\begin{array}{r} (-) \quad (-) \quad (-) \\ \hline \end{array}$$

$$6y = 3$$

$$y = \frac{31}{82}$$

$$\boxed{y = \frac{1}{2}}$$

Putting value of y in ①

$$2x + 4y = 3$$

$$2x + 4\left(\frac{1}{2}\right) = 3$$

$$2x = 3 - 2$$

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

Q. 12 $3x - (y + 7) + 2 = 10$

$$3x - y - 7 + 2 = 10$$

$$3x - y = 10 \times 11$$

$$3x - y - 7 + 2 = 10 \times 11$$

$$3x - y = 110 - 2 + 15$$

$$3x - y = 103 \quad \text{--- ①}$$

$$2y + \frac{x+11}{7} = 10$$

$$14y + x + 11 = 10 \times 7$$

$$14y + x = 70 - 11$$

$$x + 14y = 59 \quad \text{--- ②}$$

Multiply ① by 14.

~~$$462x - 14y = 1330 \quad \text{--- (3)}$$~~

Add (2) & (3),

~~$$\begin{array}{rcl}
 x + 14y & = & 59 \\
 (+) 462x - 14y & = & 1330 \\
 \hline
 463x & = & 1389
 \end{array}$$~~

$$462x - 14y = 1330 \quad \text{--- (3)}$$

Add (2) & (3),

$$\begin{array}{rcl}
 x + 14y & = & 59 \\
 (+) 462x - 14y & = & 1330 \\
 \hline
 463x & = & 1389 \\
 x & = & \frac{1389}{463} \\
 \boxed{x = 3}
 \end{array}$$

Putting value of x in (1)

$$\begin{array}{rcl}
 33x - y & = & 95 \\
 33(3) - y & = & 95 \\
 -y & = & 95 - 99 \\
 -y & = & -4 \\
 \boxed{y = 4}
 \end{array}$$

Q. 14

$$0.5x + 0.7y = 0.74 \quad \text{--- ①}$$

$$0.3x + 0.5y = 0.5 \quad \text{--- ②}$$

Multiply ① by 100 & ② by 10.

$$50x + 70y = 74 \quad \text{--- ③}$$

$$3x + 5y = 5 \quad \text{--- ④}$$

Multiply ④ by 14

$$42x + 70y = 70 \quad \text{--- ⑤}$$

subtract ⑤ from ③,

$$\begin{array}{r} 50x + 70y = 74 \\ 42x + 70y = 70 \\ \hline (-) \quad (-) \quad (-) \end{array}$$

$$8x = 4$$

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

$$\boxed{x = \frac{1}{2}} \Rightarrow \boxed{x = 0.5}$$

Putting value of x in ④,

$$3x + 5y = 5$$

$$3\left(\frac{1}{2}\right) + 5y = 5$$

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

$$5y = \frac{10 - 3}{2}$$

$$y = \frac{7}{2} \times \frac{1}{5}$$

$$y = \frac{7}{10}$$

$$\boxed{y = 0.7}$$

Q.16

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

$$\frac{1}{3x} + \frac{1}{2y} = \frac{13}{6} \quad \text{--- (2)}$$

Let $\frac{1}{x} = A$ & $\frac{1}{y} = B$

$$\frac{A}{2} + \frac{B}{3} = 2$$

$$3A + 2B = 2 \times 6$$

$$3A + 2B = 12 \quad \text{--- (3)}$$

$$\frac{A}{3} + \frac{B}{2} = \frac{13}{6}$$

$$2A + 3B = \frac{13}{6} \times 6$$

$$12A + 18B = 13 \quad \text{--- (4)}$$

Multiply (3) by 4.

$$12A + 8B = 48$$

$$2A + 3B = 13 \quad \text{--- (5)}$$

Multiply ① by 3 & ③ by 2.

$$6A + 9B = 39 \quad \text{---} \quad \textcircled{5}$$

$$6A + 4B = 24 \quad \text{---} \quad \textcircled{6}$$

Subtract ⑥ from ⑤.

$$6A + 9B = 39$$

$$6A + 4B = 24$$

$$\begin{array}{r} (-) \quad (-) \quad (-) \\ \hline \end{array}$$

$$5B = 15$$

$$B = \frac{15}{5} = 3$$

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

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

Putting value of B in ③

$$3A + 2B = 12$$

$$3A + 2(3) = 12$$

$$3A = 12 - 6$$

$$A = \frac{6}{3} = 2$$

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

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

Q. 18

$$\frac{3}{x} - \frac{1}{y} = -9 \quad \text{--- (1)}$$

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

$$\text{Let } A = \frac{1}{x} \text{ \& } B = \frac{1}{y}$$

$$3A - B = -9 \quad \text{--- (3)}$$

$$2A + 3B = 5 \quad \text{--- (4)}$$

Multiply (3) by 3.

$$9A - 3B = -27 \quad \text{--- (5)}$$

Add (4) & (5),

$$2A + 3B = 5$$

$$(+)\quad 9A - 3B = -27$$

$$11A = -22$$

$$A = \frac{-22}{11}$$

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

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

Putting value of A in (3).

$$3A - B = -9$$

$$3\left(\frac{-1}{2}\right) - B = -9$$

$$B = -6 + 9$$

$$B = 3$$

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

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

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

$$3A - B = -9$$

$$3\left(\frac{-1}{2}\right) - B = -9$$

$$B = -6 + 9$$

$$B = 3$$

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

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

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

Q. 20

$$\frac{1}{5x} + \frac{1}{6y} = 12 \quad \text{--- (1)}$$

$$\frac{1}{32} - \frac{3}{7y} = 8 \quad \text{--- (2)}$$

$$\text{Let } \frac{1}{x} = A \text{ \& } \frac{1}{y} = B$$

$$\frac{A}{5} + \frac{B}{6} = 12$$

$$6A + 5B = 12 \times 30$$

$$6A + 5B = 360 \quad \text{--- (3)}$$

$$\frac{A}{3} - \frac{3B}{7} = 8$$

$$7A - 9B = 8 \times 21$$

$$7A - 9B = 168 \quad \text{--- (4)}$$

Multiply (3) by 7 & (4) by 6,

$$42A + 35B = 2520 \quad \text{--- (5)}$$

$$42A - 54B = 1008 \quad \text{--- (6)}$$

Subtract (6) from (5),

$$\begin{array}{r} 42A + 35B = 2520 \\ 42A - 54B = 1008 \\ \hline (-) \quad (+) \quad (-) \end{array}$$

$$89B = \cancel{3528} 1512$$

$$B = \cancel{3528} 1512$$

89

$$\frac{1}{y} = \frac{1512}{89}$$

$y = \frac{89}{1512}$

Putting value of B in (3)

$$6A + 5B = 360$$

$$6A + 5\left(\frac{1512}{89}\right) = 360$$

$$6A + \frac{7560}{89} = 360$$

$$534A + 7560 = 360 \times 89$$

$$534A = 32040 - 7560$$

$$A = \frac{24480}{534} = 4080$$

$$\frac{1}{x} = \frac{4080}{89}$$

$x = \frac{89}{4080}$

Q.22 $\frac{4}{x} + 5y = 7$ ——— (1)

$\frac{3}{x} + 4y = 5$ ——— (2)

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

$4A + 5y = 7$ ——— (3)

$3A + 4y = 5$ ——— (4)

Multiply ~~3~~ ③ by 3 & ④ by 4

$$\begin{array}{r} 12A + 20A = 28 \\ 12A + \end{array}$$

$$12A + 15y = 21 \quad \text{--- (5)}$$

$$12A + 16y = 20 \quad \text{--- (6)}$$

Subtract ⑥ from ⑤,

$$\begin{array}{r} 12A + 15y = 21 \\ 12A + 16y = 20 \\ (-) \quad (-) \quad (-) \end{array}$$

$$\begin{array}{r} -y = 1 \\ \boxed{y = -1} \end{array}$$

Putting value of y in ③,

$$4A + 5y = 7$$

$$4A + 5(-1) = 7$$

$$4A = 7 + 5$$

$$A = \frac{12}{4} = 3$$

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

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

Q.25

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

$$\frac{x-y}{xy} = 6 \quad \text{--- (2)}$$

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

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

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

$$\frac{1}{y} - \frac{1}{x} = 6 \quad \text{--- (4)}$$

Let $\frac{1}{y} = A$ & $\frac{1}{x} = B$

$$A + B = 2 \quad \text{--- (5)}$$

$$A - B = 6 \quad \text{--- (6)}$$

Add (5) & (6)

$$\begin{array}{r} A + B = 2 \\ (4) \quad A - B = 6 \\ \hline 2A = 8 \\ A = 4 \\ \frac{1}{y} = 4 \\ y = \frac{1}{4} \end{array}$$

Putting value of A in (5)

$$A + B = 2$$

$$4 + B = 2$$

$$B = 2 - 4$$

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

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

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

Q.26 $\frac{2}{x} + \frac{3}{y} = 9$

$$\frac{2xy}{x^2} + \frac{3xy}{y^2} = 9$$

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

$$\frac{4}{x} + \frac{9}{y} = \frac{21}{xy}$$

$$\frac{4xy}{x} + \frac{9xy}{y} = 21$$

$$4y + 9x = 21 \quad \text{--- (2)}$$

Multiply ① by 2.

$$4y + 6x = 18 \quad \text{--- (3)}$$

Subtract ③ from ②,

$$\begin{array}{r} 4y + 9x = 21 \\ 4y + 6x = 18 \\ \hline (-) \quad (-) \quad (-) \end{array}$$

$$3x = 3$$

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

$$x = 1$$

$$\boxed{x = 1}$$

Putting value of x in ①,

$$2y + 3x = 9$$

$$2y + 3(1) = 9$$

$$2y = 9 - 3$$

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

$$\boxed{y = 3}$$

Q. 27

$$\frac{6}{x+y} = \frac{7}{x-y} + 3$$

$$\frac{6}{x+y} - \frac{7}{x-y} = 3 \quad \text{--- (1)}$$

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

$$\frac{1}{2(x+y)} - \frac{1}{3(x-y)} = 0$$

Let $\frac{1}{x+y} = A$ & $\frac{1}{x-y} = B$

$$6A - 7B = 3 \quad \text{--- (3)}$$

$$\frac{A}{2} - \frac{B}{3} = 0$$

$$3A - 2B = 0 \times 6$$

$$3A - 2B = 0 \quad \text{--- (4)}$$

Multiply (4) by 2,

$$6A - 4B = 0 \quad \text{--- (5)}$$

Subtract (5) from (3)

$$\cancel{6A} - 7B = 3$$

$$\cancel{6A} - 4B = 0$$

$$\begin{array}{r} (-) \quad (+) \quad (-) \\ \hline \end{array}$$

$$-3B = 3$$

$$B = -1$$

Putting value B in (3)

$$6A - 7B = 3$$

$$6A - 7(-1) = 3$$

$$6A = 3 - 7$$

$$A = \frac{-4}{6}$$

$$\frac{-2}{3}$$

$$A = \frac{-2}{3}$$

$$A = \frac{-2}{3}$$

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

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

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

$$A = -1$$

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

$$x-y$$

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

Multiply (7) by 2.

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

Add (6) & (8),

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

$$(+)\quad 2x - 2y = -2$$

$$4x = -5$$

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

Putting value of x in (6)

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

$$2\left(\frac{-5}{4}\right) + 2y = -3$$

$$2y = -3 + 5$$

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

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

Q.28

$$\frac{xy}{x+y} = \frac{6}{5}$$

$$\frac{5xy}{6x+6y} = 5$$

$$\frac{6x}{xy} + \frac{6y}{xy} = 5$$

$$\frac{6}{y} + \frac{6}{x} = 5 \quad \text{--- (1)}$$

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

$$\frac{xy}{6y-6x} = 0$$

$$\frac{6y}{xy} - \frac{6x}{xy} = 0$$

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

$$\text{Let } \frac{1}{x} = A \quad \& \quad \frac{1}{y} = B$$

$$6A + 6B = 5 \quad \text{--- (3)}$$

$$6A - 6B = 0 \quad \text{--- (4)}$$

Add (3) & (4)

$$6A + 6B = 5$$

$$(+)\ 6A - 6B = 0$$

$$12A = 5$$

$$A = \frac{5}{12}$$

$$\frac{1}{x} = \frac{5}{12}$$

$$\boxed{x = \frac{12}{5}}$$

Putting value of A in (4),

$$6A - 6B = 0$$

$$6\left(\frac{5}{12}\right) - 6B = 0$$

$$\frac{5}{2} = 6B$$

$$B = \frac{5}{2 \times 6}$$

$$\frac{1}{y} = \frac{5}{12}$$

$$\boxed{y = \frac{12}{5}}$$

23/06/2020

Ch-3
Exercise 3.3

2 10, 12
2 5, 6
3 5, 3

Q.32 $\frac{1}{2(x+2y)} + \frac{5}{3(3x-2y)} = \frac{-3}{2}$ ——— (1)

$\frac{5}{4(x+2y)} - \frac{3}{5(3x-2y)} = \frac{61}{60}$ ——— (2)

Let $\frac{1}{x+2y} = A$ and $\frac{1}{3x-2y} = B$

$\frac{A}{2} + \frac{5B}{3} = \frac{-3}{2}$

$3A + 10B = \frac{-3}{2} \times 6$

$3A + 10B = -9$ ——— (3)

$\frac{5A}{4} - \frac{3B}{5} = \frac{61}{60}$

$25A - 12B = \frac{61}{60} \times 60$

$25A - 12B = 61$ ——— (4)

Multiply (3) by 6 & (4) by 5.

$18A + 60B = -54$ ——— (5)

$125A - 60B = 305$ ——— (6)

Add (5) & (6)

$$\begin{array}{r} 18A + 60B = -54 \\ (+) \quad 125A - 60B = 305 \\ \hline 3 \end{array}$$

$$143A = -54 + 305$$

$$143A = \frac{-162 + 305}{3}$$

$$143A = \frac{143}{3}$$

$$A = \frac{143}{3 \times 143}$$

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

Putting value of A in (3)

$$3A + 10B = -9$$

$$3\left(\frac{1}{3}\right) + 10B = -9$$

$$10B = -9 - 1$$

$$B = \frac{-10}{10}$$

$$B = -1$$

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

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

$$x+2y = 3 \quad \text{--- (7)}$$

$$B = -1$$

$$3x - 2y$$

$$3x - 2y = -1 \quad \text{--- (8)}$$

Add ⑦ & ⑧,

$$\begin{array}{r} x + 2y = 3 \\ (+) \quad 3x - 2y = -1 \\ \hline 4x = 2 \end{array}$$

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

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

Putting value of x in ⑦

$$x + 2y = 3$$

$$\frac{1}{2} + 2y = 3$$

$$1 + 4y = 3 \times 2$$

$$4y = 6 - 1$$

$$\boxed{y = \frac{5}{4}}$$

$$Q.33 \quad \frac{5}{x+1} - \frac{2}{y-1} = \frac{1}{2} \quad \text{--- ①}$$

$$\frac{10}{x+1} + \frac{2}{y-1} = \frac{5}{2} \quad \text{--- ②}$$

$$\text{Let } \frac{1}{x+1} = A \text{ and } \frac{1}{y-1} = B$$

$$5A - 2B = \frac{1}{2}$$

$$10A - 4B = 1 \quad \text{--- ③}$$

$$10A + 2B = \frac{5}{2}$$

$$20A + 4B = 5 \quad \text{--- ④}$$

Add ③ & ④,

$$10A - 4B = 1$$

$$(+)\quad 20A + 4B = 5$$

$$30A = 6$$

$$A = \frac{6}{30}$$

$$A = \frac{1}{5}$$

Putting value of A in 3

$$10A - 4B = 1$$

$$2 \times 10 \left(\frac{1}{5} \right) - 4B = 1$$

$$-4B = 1 - 2$$

$$B = \frac{-1}{-4}$$

$$B = \frac{1}{4}$$

$$A = \frac{1}{5}$$

$$\frac{1}{x+1} = \frac{1}{5}$$

$$x+1 = 5$$

$$x = 5 - 1$$

$$\boxed{x = 4}$$

$$B = \frac{1}{4}$$

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

$$y-1 = 4$$

$$y = 4 + 1$$

$$\boxed{y = 5}$$

Q.34

$$x + y = 5xy$$

$$\frac{x+y}{xy} = 5$$

$$\frac{x}{xy} + \frac{y}{xy} = 5$$

$$\frac{1}{y} + \frac{1}{x} = 5 \quad \text{--- (1)}$$

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

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

$$\frac{3}{y} + \frac{2}{x} = 13 \quad \text{--- (2)}$$

Let $\frac{1}{y} = A$ & $\frac{1}{x} = B$

$$A + B = 5 \quad \text{--- (3)}$$

$$3A + 2B = 13 \quad \text{--- (4)}$$

Multiply (3) by 2

$$2A + 2B = 10 \quad \text{--- (5)}$$

Subtract (5) from (4)

$$\begin{array}{r} 3A + 2B = 13 \\ 2A + 2B = 10 \\ \hline (-) \quad (-) \quad (-) \end{array}$$

$$A = 3$$

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

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

Putting value of A in (3)

$$A + B = 5$$

$$B = 5 - 3$$

$$B = 2$$

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

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

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

Q.35

$$x + y = 2xy$$

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

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

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

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

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

$$\frac{1}{y} - \frac{1}{x} = 6 \quad \text{--- (2)}$$

$$\text{Let } \frac{1}{y} = A \text{ and } \frac{1}{x} = B$$

$$A + B = 2 \quad \text{--- (3)}$$

$$A - B = 6 \quad \text{--- (4)}$$

Add (3) & (4)

$$\begin{array}{r} A + B = 2 \\ (+) A - B = 6 \\ \hline 2A = 8 \end{array}$$

$$2A = 8$$

$$A = \frac{8}{2}$$

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

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

Putting value of A in (3)

$$A + B = 2$$

$$4 + B = 2$$

$$B = 2 - 4$$

$$B = -2$$

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

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

$$Q.37 \quad \frac{2}{3x+2y} + \frac{3}{3x-2y} = \frac{17}{5} \quad \text{--- (1)}$$

$$\frac{2}{5} + \frac{3}{1} = 2 \quad \text{--- (2)}$$

$$\text{Let } \frac{1}{3x+2y} = A \quad \text{and} \quad \frac{1}{3x-2y} = B$$

$$2A + 3B = \frac{17}{5} \quad \text{--- (3)}$$

$$10A + 15B = 17 \quad \text{--- (3)}$$

$$5A + B = 2 \quad \text{--- (4)}$$

Multiply (4) by 2.

$$10A + 2B = 4 \quad \text{--- (5)}$$

Subtract (5) from (3).

$$\begin{array}{r} 10A + 15B = 17 \\ 10A + 2B = 4 \\ \hline (-) \quad (-) \quad (-) \\ \hline 13B = 13 \\ B = 1 \end{array}$$

Putting value of B in (4)

$$5A + B = 2$$

$$5A = 2 - 1$$

$$A = \frac{1}{5}$$

$$A = \frac{1}{5}$$

$$\frac{1}{5} = \frac{1}{5}$$

$$3x+2y$$

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

$$B = 1$$

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

$$3x-2y$$

$$3x-2y = 1 \quad \text{--- (7)}$$

Add ⑥ and ⑦,

$$\begin{array}{r}
 3x + 2y = 5 \\
 (+) \quad 3x - 2y = 1 \\
 \hline
 6x = 6 \\
 \boxed{x = 1}
 \end{array}$$

Putting value of x in ⑥,

$$\begin{array}{r}
 3x + 2y = 5 \\
 3(1) + 2y = 5 \\
 2y = 5 - 3 \\
 y = \frac{2}{2} \\
 \boxed{y = 1}
 \end{array}$$

Q.44

$$\begin{array}{l}
 99x + 101y = 499 \text{ ——— ①} \\
 101x + 99y = 501 \text{ ——— ②}
 \end{array}$$

Multiply ① by 99 and ② by 101,

$$\begin{array}{l}
 9801x + 9999y = 49401 \text{ ——— ③} \\
 10201x + 9999y = 50601 \text{ ——— ④}
 \end{array}$$

Subtract ③ from ④

$$\begin{array}{r}
 10201x + 9999y = 50601 \\
 (-) \quad 9801x + 9999y = 49401 \\
 \hline
 (-) \quad 400x = 1200
 \end{array}$$

$$400x = 1200$$

$$x = \frac{1200}{400}$$

$$\boxed{x = 3}$$

Putting value of x in ①

$$\begin{array}{r}
 99x + 101y = 499 \\
 99(3) + 101y = 499 \\
 101y = 499 - 297
 \end{array}$$

$$y = \frac{202}{101} 2$$

$$\boxed{y = 2}$$

Q. 45

$$23x - 29y = 98 \quad \text{--- ①}$$

$$29x - 23y = 110 \quad \text{--- ②}$$

Multiply ① by 23 and ② by 29.

$$529x - 667y = 2254 \quad \text{--- ③}$$

$$841x - 667y = 3190 \quad \text{--- ④}$$

Subtract ③ from ④

$$841x - 667y = 3190$$

$$529x - 667y = 2254$$

$$\begin{array}{r} (-) \quad (+) \quad (-) \\ \hline \end{array}$$

$$312x = 936$$

$$x = \frac{936}{312}$$

$$312$$

$$\boxed{x = 3}$$

Putting value of x in ①

$$23x - 29y = 98$$

$$23(3) - 29y = 98$$

$$69 - 98 = 29y$$

$$y = \frac{-29}{29}$$

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

Q. 46

$$x - y + z = 4 \quad \text{--- ①}$$

$$x - 2y - 2z = 9 \quad \text{--- ②}$$

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

$$x - y + z = 4$$

$$x = 4 + y - z$$

Putting value of x in ② & ③,

$$x - 2y - 2z = 9$$

$$(4 + y - z) - 2y - 2z = 9$$

$$4 + y - z - 2y - 2z = 9$$

$$-y - 3z + 4 = 9$$

$$-y - 3z = 9 - 4$$

$$-y - 3z = 5 \quad \text{--- ④}$$

$$2x + y + 3z = 1$$

$$2(4 + y - z) + y + 3z = 1$$

$$8 + 2y - 2z + y + 3z = 1$$

$$3y + z = 1 - 8$$

$$3y + z = -7 \quad \text{--- ⑤}$$

Multiply ⑤ by 3

$$9y + 3z = -21 \quad \text{--- ⑥}$$

Add ④ & ⑥,

$$-y - 3z = 5$$

$$(+)\quad 9y + 3z = -21$$

$$8y = -16$$

$$y = \frac{-16}{8}$$

$$\boxed{y = -2}$$

Putting value of y in ⑤

$$3y + z = -7$$

$$3(-2) + z = -7$$

$$z = -7 + 6$$

$$\boxed{z = -1}$$

Putting value of y & z in ①

$$x - y + z = 4$$

$$x + 2 - 1 = 4$$

$$x + 1 = 4$$

$$x = 4 - 1$$

$$\boxed{x = 3}$$

$$21x + 47y = 110 \quad \text{--- ①}$$

$$47x + 21y = 162 \quad \text{--- ②}$$

Multiply ① by 21 and ② by 47.

$$441x + 987y = 2310 \quad \text{--- ③}$$

$$2209x + 987y = 7614 \quad \text{--- ④}$$

Subtract ③ from ④,

$$2209x + 987y = 7614$$

$$(-) \underline{441x + 987y = 2310}$$

$$1768x = 5304$$

$$x = \frac{5304}{1768} \cdot 3$$

$$\boxed{x = 3}$$

Putting value of x in ①

$$21x + 47y = 110$$

$$21(3) + 47y = 110$$

$$47y = 110 - 63$$

$$y = \frac{47}{47}$$

$$\boxed{y = 1}$$

Q.49

$$2x^3 + ax^2 + 2bx + 1$$

$$\text{Factor} = x + 1$$

~~$$\begin{array}{r}
 2x^2 + (a-2)x + (2b-a+2) \\
 x+1 \overline{) 2x^3 + ax^2 + 2bx + 1} \\
 \underline{2x^3 + 2x^2} \\
 (-) (-) \\
 (a-2)x^2 + 2bx + 1 \\
 \underline{(a-2)x^2 + (a-2)x} \\
 (-) (-) \\
 (2b-a+2)x + 1 \\
 \underline{(2b-a+2)x + (2b-a+2)} \\
 (-) (-)
 \end{array}$$~~

If

$$x + 1 = 0$$

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

$$2x^3 + ax^2 + 2bx + 1 = 0$$

$$\Rightarrow 2(-1)^3 + a(-1)^2 + 2b(-1) + 1 = 0$$

$$\Rightarrow -2 + a - 2b + 1 = 0$$

$$\Rightarrow a - 2b = 1 \quad \text{--- (1)}$$

$$\Rightarrow a - 2b = 1 \quad \text{--- (1)}$$

$$2a - 3b = 4 \quad \text{--- (2)}$$

Multiply (1) by 2.

$$2a - 4b = 2 \quad \text{--- (3)}$$

Subtract (3) from (2).

$$\begin{array}{r} 2a - 3b = 4 \\ (-) 2a - 4b = 2 \\ \hline b = 2 \end{array}$$

Putting value of b in (1)

$$a - 2(2) = 1$$

$$a = 1 + 4$$

$$\boxed{a = 5}$$

Q.50

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

$$5x + 10y = 50 \quad \text{--- (1)} \Rightarrow x + 2y = 10 \quad \text{--- (1)}$$

$$\frac{x}{8} + \frac{y}{6} = 15$$

$$6x + 8y = 15 \times 48$$

$$6x + 8y = 720$$

$$3x + 4y = 360 \quad \text{--- (2)}$$

Multiply (1) by 2

$$2x + 4y = 20 \quad \text{--- (3)}$$

Subtract ③ from ②,

$$\begin{array}{r} 3x + 4y = 360 \\ 2x + 4y = 20 \\ (-) \quad (-) \quad (-) \end{array}$$

$$x = 340$$

④

Putting value of x in ①

$$x + 2y = 10$$

$$2y = 10 - 340$$

$$y = \frac{-330}{2}$$

$$y = -165$$

⑤

$$y = \lambda x + 5$$

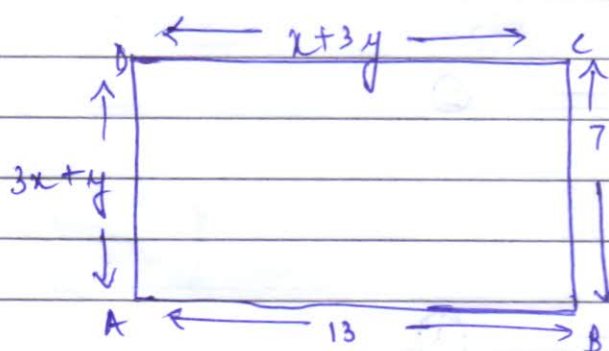
$$\lambda = \frac{y - 5}{x}$$

$$\lambda = \frac{-165 - 5}{340} \quad [\text{Using ④ \& ⑤}]$$

$$\lambda = \frac{-170}{340} \times 1$$

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

Q.51



As opp. sides of rectangle are equal,

$$\therefore x + 3y = 13 \quad \text{--- ①}$$

$$3x + y = 7 \quad \text{--- ②}$$

Multiply ② by 3.

$$9x + 3y = 21 \quad \text{--- ③}$$

Subtract ① from ③,

$$9x + 3y = 21$$

$$x + 3y = 13$$

$$\begin{array}{r} (-) \quad (-) \quad (-) \\ \hline \end{array}$$

$$8x = 8$$

$$\boxed{x = 1}$$

Putting value of x in ①

$$x + 3y = 13$$

$$3y = 13 - 1$$

$$y = \frac{12}{3}$$

$$\boxed{y = 4}$$

$$Q.52 \quad x + y = 2 \quad \text{--- ①}$$

$$2x - y = 1 \quad \text{--- ②}$$

Add ① & ②,

$$x + y = 2$$

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

$$\hline 3x = 3$$

$$\boxed{x = 1}$$

Putting value of x in 1

$$x + y = 2$$

$$y = 2 - 1$$

$$\boxed{y = 1}$$

New eq -

$$x - y = 1 - 1$$

$$\boxed{x - y = 0}$$

$\therefore$ We can find infinitely many lines.

Q. 53 $x = -1$

$$y = 3$$

Pair of linear eq -

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

$$\boxed{x + y = 2}$$

$$x - y = -1 - 3$$

$$\boxed{x - y = -4}$$

$\therefore$ We can find infinitely many pairs of linear equations.