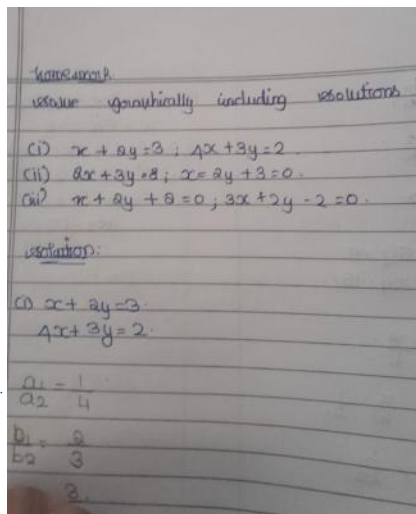




$$\frac{a_1}{a_2} = \frac{1}{4} \quad \frac{b_1}{b_2} = -\frac{2}{3}$$

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

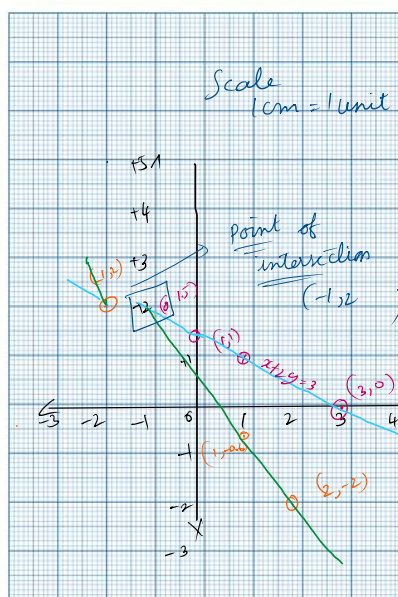
$$\begin{aligned} \text{If } x &= 0 \\ y &= \frac{3-0}{2} = \frac{3}{2} = 1.5 \\ x &= 1 \\ y &= \frac{3-1}{2} = \frac{2}{2} = 1 \end{aligned}$$

$$\begin{aligned} \text{If } x &= 3 \\ y &= \frac{3-3}{2} = 0 \\ y &= 0 \end{aligned}$$

x	0	1	3
y	1.5	1	0

$y = \frac{3-x}{2}$ $y = \frac{2-4x}{3}$ $x + 2y = 3$
 $\Rightarrow 3(3-x) = 2(2-4x)$ $-1 + 2y = 3$
 $9 - 3x = 4 - 8x$ $2y = 3 + 1$
 $-3x + 8x = 4 - 9$ $y = \frac{4}{2}$
 $5x = -5$ $y = 2$
 $x = -1$ $x, y = (-1, 2)$

Check to find point of intersection



$$\begin{aligned} \text{eqn (2)} \quad 4x + 3y &= 2 \\ 3y &= 2 - 4x \\ y &= \frac{2-4x}{3} \end{aligned}$$

x	2	1	-1
y = $\frac{2-4x}{3}$	-2	-0.6	2
x, y	(2, -2)	(1, -0.6)	(-1, 2)

$$\begin{aligned} x &= 2 \\ y &= \frac{2-4(2)}{3} = \frac{-6}{3} = -2 \\ x &= 1 \\ y &= \frac{2-4(1)}{3} = \frac{-2}{3} = -0.6 \end{aligned}$$

Ex = 3.2
Book Ex 2.1

Q.] The difference between two numbers is 26 and one number is three times the other. Find them.

Sol : Let the two numbers be x and y. ($x > y$)

According to the first condition,

$$x - y = 26 \quad \dots (i)$$

According to the second condition,

$$x = 3y \quad \dots (ii)$$

Substituting (ii) in (i)

$$3y - y = 26$$

$$2y = 26$$

$$y = 13$$

Substituting y = 13 in (ii)

$$x = 3(13)$$

$$x = 39$$

∴ The given numbers are 39 and 13.

check

$$x - y = 26 \Rightarrow 39 - 13 = 26$$

Q. Form the pair of linear equations for the following problem and find their solution by

substitution method

A fraction becomes $\frac{9}{11}$, if 2 is added to both the numerator and the denominator. If, 3 is added to both the numerator and the denominator it becomes $\frac{5}{6}$. Find the fraction.

Sol: Let the numerator and the denominator of the fraction be x and y ($y \neq 0$).

∴ Original fraction is $\frac{x}{y}$ ($y \neq 0$)

According to the 1st condition,

$$\frac{x+2}{y+2} = \frac{9}{11}$$

$$11x + 22 = 9y + 18$$

$$\therefore 11x = 9y + 18 - 22$$

$$\therefore x = \frac{9y-4}{11} \quad \dots (i)$$

According to the 2nd condition,

$$\frac{x+3}{y+3} = \frac{5}{6}$$

$$6x + 18 = 5y + 15$$

$$6x - 5y = -3 \quad \dots (ii)$$

Substituting eqⁿ (i) in eqⁿ (ii)

$$6 \left[\frac{9y-4}{11} \right] - 5y = -3$$

$$\therefore \frac{54y-24}{11} - 5y = -3$$

$$\therefore 54y - 24 - 55y = -33$$

$$\therefore -y = -33 + 24$$

$$\therefore -y = -9$$

$$\therefore y = 9$$

Substituting $y = 9$ in eqⁿ (ii)

$$6x - 5(9) = -3$$

$$\therefore 6x - 45 = -3$$

$$\therefore 6x = -3 + 45$$

$$\therefore 6x = 42$$

$$\therefore x = 7$$

$$\therefore \frac{x}{y} = \frac{7}{9}$$

∴ Required fraction is $\frac{7}{9}$

$$\checkmark \quad 11x - 9y = -4 \quad \text{--- (1) } \times 6$$

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

This is in elimination method

$$66x - 54y = -24$$

$$66x - 55y = -33$$

$$\begin{array}{r} - \\ + \\ + \end{array}$$

$$\boxed{1y = 9} \quad \text{Sub in}$$

$$11x - 9y = -4$$

$$11x - 9(9) = -4$$

$$11x - 81 = -4$$

$$11x = -4 + 81 = +77$$

$$x = \frac{+77}{11}$$

$$\boxed{x = 7}$$

$$+9y = +4 + 11x$$

$$y = \frac{11x+4}{9} \rightarrow \text{sub in eqn (2)}$$

$$6x - 5y = -3$$

$$6x - 5\left(\frac{11x+4}{9}\right) = -3$$

$$6x - \frac{(55x+20)}{9} = -3 \quad \times 9$$

$$54x - (55x+20) = -27$$

$$-1x = -27 + 20$$

$$\boxed{x = 7}$$