Chapter - 3

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

EXERCISE 3·1

Q1) Aftab tells his daughter, "Seven years ago, I was seven times as old as you were then. Also, three years from now, I shall be three times old as you will be." Represent this situation algebrically and graphically.

→ Let the current age of Aftab be x yrs.
Let the current age of Aftab's daughter be y yrs.

Seven years ago, Age of Aftab $= x-7$
Aftab's daughter $= y-7$

Aftab was seven time as olde as here daughter

$$(x-7) = 7(y-7)$$
$$x-7 = 7y-49$$
$$x-7-7y-49 = 0$$
$$x-7y+42 = 0 \quad -(1)$$

Three years later, Age of Aftab $= x+3$
Her daughter $= x+3$

Aftab will be three times as her daughter

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

Now, plotting equation.

$x - 7y + 42 = 0 \quad - (1)$

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

Solving (1)

$x - 7y + 42 = 0$

$7y = x + 42$

$y = \frac{x+42}{7}$

x	0	7
$y = \frac{x+42}{7}$	6	7

Let $x = 0$

$y = \frac{0+42}{7}$

$y = \frac{42}{7} = 6$

So, $x = 0, y = 6$ is a solution

$(0,6)$

Let $x \cancel{y} = 7$

$y = \frac{7+42}{7}$

$y = \frac{49}{7} = 7$

So $x = 7, y = 7$ is a solution

$(7,7)$

Solving (2)

$x - 3y - 6 = 0$

$3y = x - 6$

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

x	0	6
$y = \frac{x-6}{7}$	-2	0

Let $x = 0$

$y = \frac{0-6}{3}$

$y = -2$

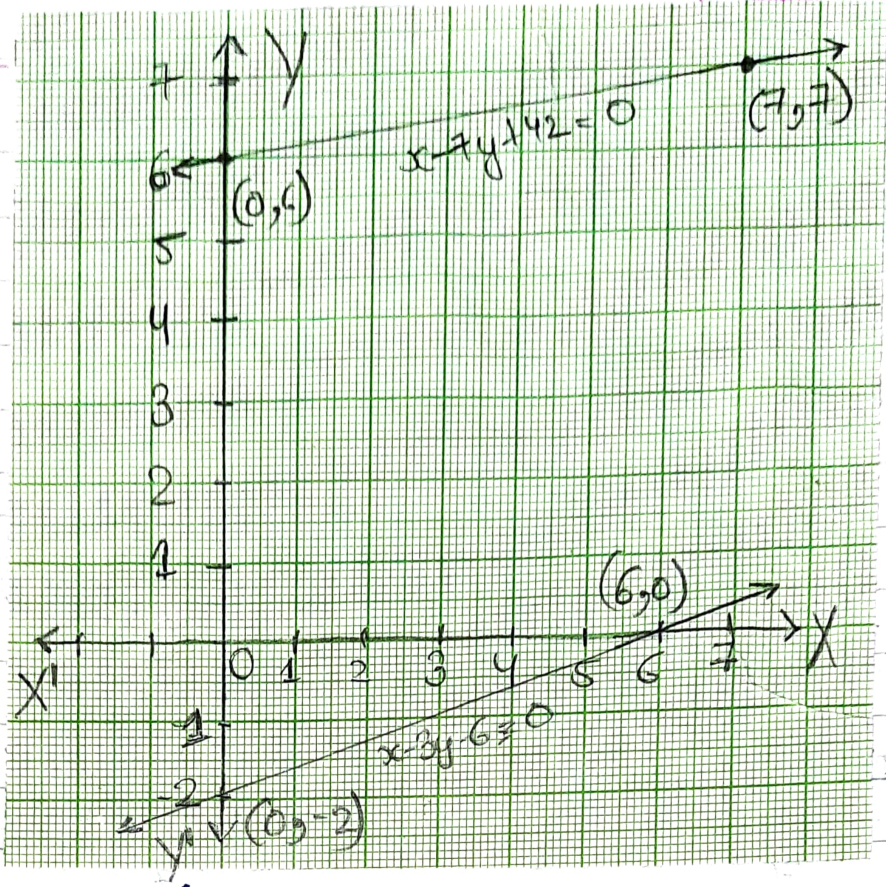
So, $x = 0, y = -2$ $(0,-2)$ is a solution

let $x = 6$

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

$y = 0$

So $x = 6, y = 0$ $(6,2)$ is a solution



Q2) The coach of a cricket teams buys 3 bat and 6 balls for RS. 3900. Later, she buys another bat and 3 more balls of the same Kind for Rs. 1300. Represent this situation algebrically and geometrically

=> Let the cost of one bat be Rs. x
Let the cost of one ball be Rs. y

Given that, 3 bats and 6 balls cost Rs. 3900

$$3x + 6y = 3900$$

$$\frac{3x}{3} + \frac{6y}{3} = \frac{3900}{3}$$

$$3(x+2y) = 3(1300)$$

$$x + 2y = 1800 \quad -①$$

She buys another bat and 3 more balls of same Rs. 1300

$$x + 3y = 1300$$

Now plotting, $x+2y-1300=0 \quad -①$

$$x+3y-1300=0$$

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Solving ①

$x+2y-1300=0$

$2y=1800-x$

$y=\frac{1300-x}{2}$

x	0	100
$y=\frac{1300-x}{2}$	650	600

Let $x=0$

$y=\frac{1300-0}{2}$

$y=650$

So, $(0, 650)$ is a solution

let $x=100$

$y=\frac{1800-100}{2}$

$y=600$

So, $(100, 600)$ is a solution

Solving ②

$x+3y-1300=0$

$3y=1300-x$

$y=\frac{1300-x}{3}$

x	0	100
$y=\frac{1300-x}{2}$	433.33	400

Let $x=0$

$y=\frac{1300-0}{3}$

$y=433.33$

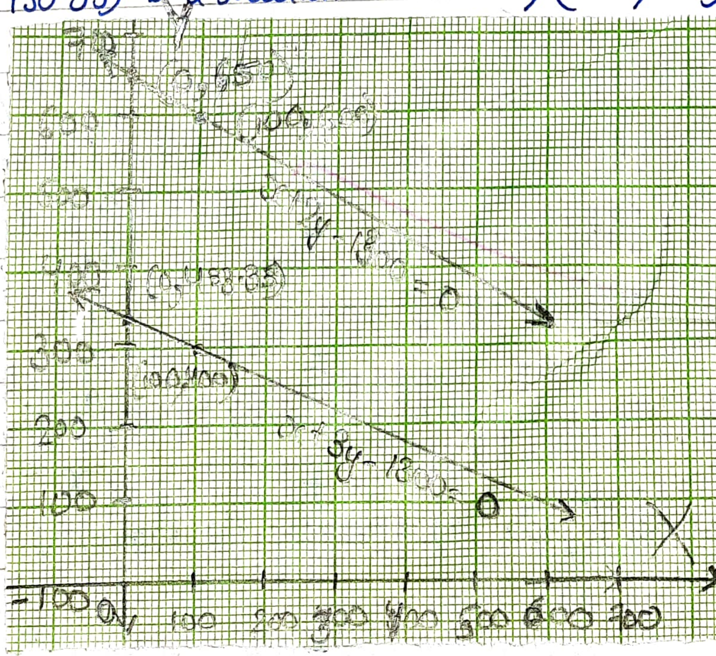
So, $(0, 433.33)$ is a solution

Let $x=100$

$y=\frac{1300-100}{3}$

$y=400$

So, $(100, 400)$ is a solution



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Q3) The cost of 2 kg of apples and 1 kg of grapes on a day was found to be Rs. 160. After a month, the cost of 4 kg of apples and 2 kg of grapes is Rs. 300. Represent the situation algebraically and geometrically.

So Let the cost of 1 kg of apples be = Rs. x
and, Cost of 1 kg of grapes = Rs. y
According the algebrical representation
2kg apples and 1 kg grapes = Rs. 160
$2x + y = 160$
$2x + y - 160 = 0$ — (1)

Also, 4 kg apples and 2 kg grapes = Rs. 300
$4x + 2y = 300$
$4x + 2y - 300 = 0$
$2(2x + y - 150) = 0$
$2x + y - 150 = 0$ — (2)

Now Solving eq. (1)
$2x + y - 160 = 0$
$y = 160 - 2x$
Let $x = 50$
$y = 160 - 2(50)$
$y = 60$
So, (50, 60) is a solution

Let $x = 60$
$y = 160 - 2(60)$
$y = 40$
So, (60, 40) is a solution

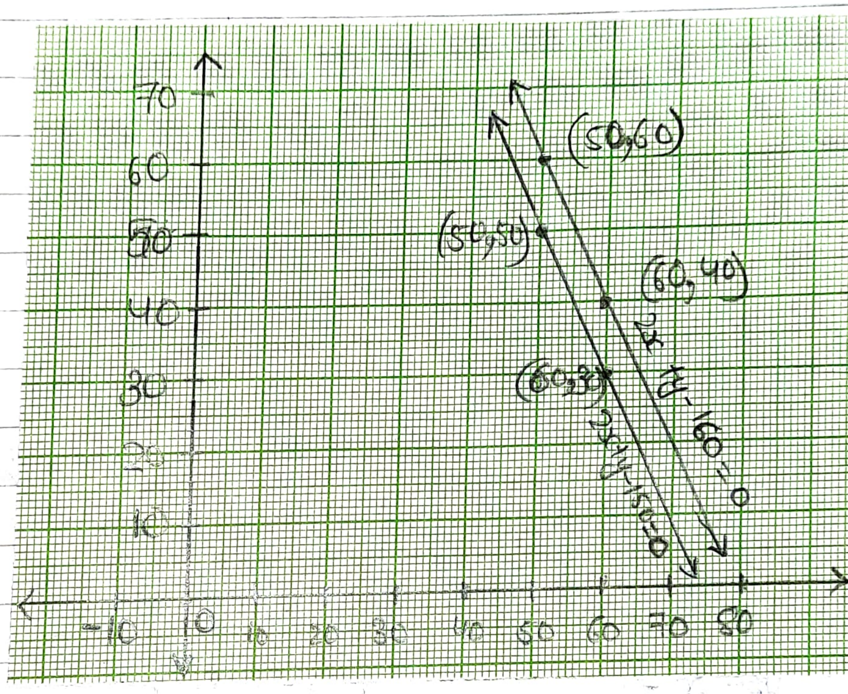
x	50	60
$y = 160 - 2x$	60	40

Now Solving eq. (2)
$2x + y - 150 = 0$
$y = 150 - 2x$

x	50	60
$y = 150 - 2x$	50	30

Let $x = 50$
$y = 150 - 2(50)$
$y = 50$
So, $(50, 50)$ is a solution

Let $x = 60$
$y = 150 - 2(60)$
$y = 30$
So, $(60, 30)$ is a solution.



EXERCISE 3·2

Q1) From the pair of linear equations in the following problems and find their solutions graphically

i) 10 students of Class X took part in a mathematics quiz. If the number of girls is 4 more than the number of boys, find the number of boys and girls who took part in the quiz.

→ Let the number of girls who took part in the quiz be x
" " " " " boys who took part in quiz be y

Total 10 students took parts in the quiz.

No. of girls + No. of boys = 10
$x + y = 10$
$x + y - 10 = 0$ — (1)

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Also number of girls is more than boys

No. of girls = 4 + No. of boys

$x = 4+y$

$x-y-4=0$ —②

Now solving eq ①

$x+y-10=0$

$y = 10-x$

x	5	6
$y=10-x$	5	4

Let $x=5$

$y = 10-5$

$y=5$

So, (5,5) is a solution

Let $x=6$

$y = 10-6$

$y = 4$

So, (6,4) is a solution

Solving eq ②

$x-y-4=0$

$y = x-4$

x	4	5
$y=x-4$	0	1

Let $x=4$

$y = 4-4$

$y=0$

So, (4,0) is a solution

Let $x=5$

$y=5-4$

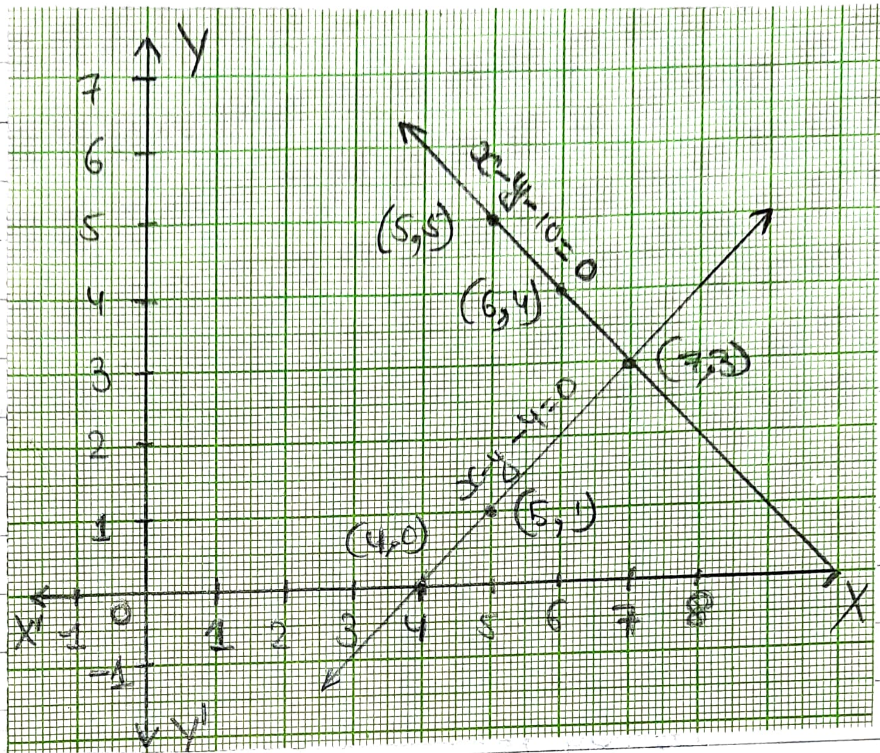
$y=1$

So, (5,1) is a solution

So, $x=7$, $y=3$ is the solution of equations,

The number of girls, $x=7$

The number of boys, $y=3$



ii) # 5 pencils and 7 pens together cost Rs. 50, where as 7 pencils and 5 pens together cost Rs. 46. Find the cost of one pencil and that of one pen.

→ Let the cost of one pencil be x

" " " " one pen be y

5 pencils and 7 pens = Rs. 50

$5x + 7y = 50$

$5x + 7y - 50 = 0$ — (1)

Also, 7 pencils and 5 pens = Rs. 46

$7x + 5y = 46$

$7x + 5y - 46 = 0$ — (2)

Solving eq (1)

$5x + 7y - 50 = 0$

$7y = 50 - 5x$

$y = \frac{50 - 5x}{7}$

x	3	0
$y = \frac{50-5x}{7}$	5	7.143

Let $x = 3$.

$y = \frac{50-5(3)}{7}$

$y = \frac{50-15}{7}$

$y = \frac{35}{7}$

$y = 5$

$(3,5)$ is a solution

Let $x = 0$

$y = 50-5(0)$

$y = \frac{50}{7}$

$y = 7.143$

So, $(0, 7.143)$ is a solution

Solving eq②

$7x + 5y - 46 = 0$

$5y = 46 - 7x$

$y = \frac{46-7x}{5}$

x	3	5
$y = \frac{46-7x}{5}$	5	2.2

Let $x = 3$

$y = \frac{46-7(3)}{5}$

$y = \frac{46-21}{5}$

$y = \frac{25}{5}$

$y = 5$

$(3,5)$ is a solution

Let $x = 5$

$y = \frac{46-7(5)}{5}$

$y = \frac{46-35}{5}$

$y = \frac{11}{5}$

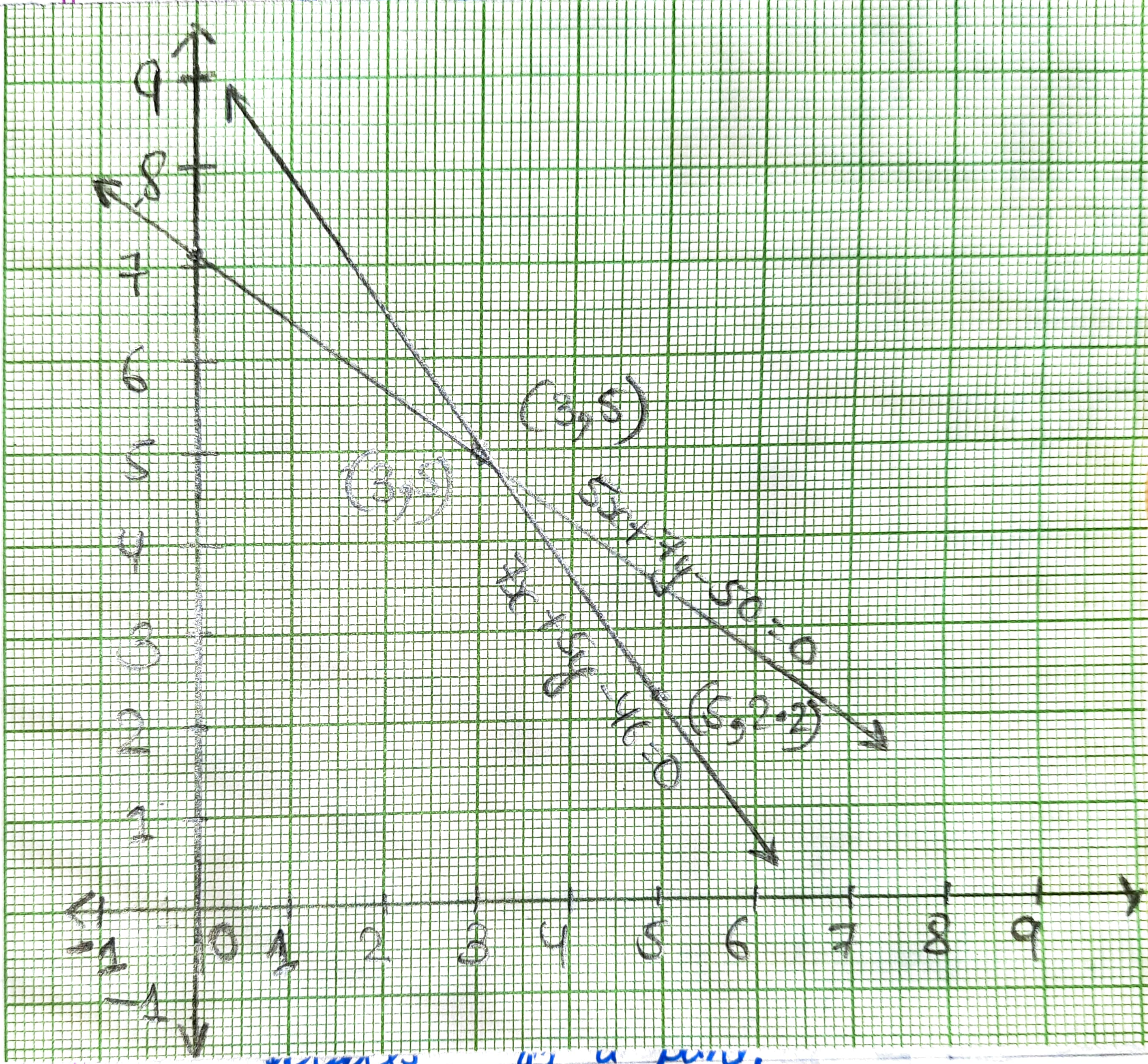
$y = 2.2$

$(5, 2.2)$ is a solution.

So, $x = 3$, $y = 5$ is the solution of the equations

The cost of pencil, $x = ₹3$

The cost of pen, $y = ₹5$


(3,5)
(5,2.2)

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Q2) On comparing the ratio $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersects at a point, parallel or coincident.

i) $5x-4y+8=0$, $7x+6y-9=0$

⇒ Let $5x-4y+8=0$ —①
$7x+6y-9=0$ —②

$5x-4y+8=0$
Comparing with $a_1x+b_1y+c_1=0$
∴ $a_1=5$, $b_1=-4$, $c_1=8$

$7x+6y-9=0$
Comparing with $a_2x+b_2y+c_2=0$
∴ $a_2=7$, $b_2=6$, $c_2=-9$

∴ $a_1=5$, $b_1=-4$, $c_1=8$
and $a_2=7$, $b_2=6$, $c_2=-9$

$\frac{a_1}{a_2}$	$\frac{b_1}{b_2}$	$\frac{c_1}{c_2}$
$\frac{a_1}{a_2}=\frac{5}{7}$	$\frac{b_1}{b_2}=\frac{-4}{6}$	$\frac{c_1}{c_2}=\frac{8}{-9}$
	$\frac{b_1}{b_2}=\frac{-2}{3}$	$\frac{c_1}{c_2}=\frac{-9}{8}$

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

So, have a unique solution
Therefore, the lines represent the linear equations intersects at a point.

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ii) $9x + 3y + 12 = 0$, $18x + 6y + 24 = 0$

$\Rightarrow$ $9x + 3y + 12 = 0$

Comparing with $a_1x + b_1y + c_1 = 0$

$\therefore a_1 = 19$, $b_1 = 3$, $c_1 = 12$

$18x + 6y + 24 = 0$

Comparing with $a_2x + b_2y + c_2 = 0$

$\therefore a_2 = 18$, $b_2 = 6$, $c_2 = 24$

$\frac{a_1}{a_2}$	$\frac{b_1}{b_2}$	$\frac{c_1}{c_2}$
$\frac{a_1}{a_2} = \frac{\cancel{9}}{\cancel{18}} = \frac{1}{2}$	$\frac{b_1}{b_2} = \frac{8}{6} = \frac{1}{2}$	$\frac{c_1}{c_2} = \frac{\cancel{12}}{\cancel{24}} = \frac{1}{2}$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

So, we have infinite solutions.

Therefore, the lines that represents the linear equations are coincident.

iii) $6x - 3y + 10 = 0$, $2x - y + 9 = 0$

$6x - 3y + 10 = 0$

Comparing with $a_1x + b_1y + c = 0$

$\therefore a_1 = 6$, $b_1 = -3$, $c_1 = 10$

$2x - y + 9 = 0$

Comparing with $a_2x + b_2y + c = 0$

$\therefore a_2 = 2$, $b_2 = -1$, $c_2 = 9$

$\frac{a_1}{a_2} = \frac{6}{2} = 3$

$\frac{b_1}{b_2} = \frac{-3}{-1} = 3$

$\frac{c_1}{c_2} = \frac{10}{9}$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

So, we have no solution

The lines represent the linear equation are parallel.

Q3) On comparing the ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}$ & $\frac{c_1}{c_2}$, find out whether the following pair of linear equations are consistent, or inconsistent.

i) $3x+2y=5$, $2x-3y=7$

$3x+2y-5=0$

Comparing $a_1x+b_1y+c_1=0$

$\therefore a_1=3,\ b_1=2,\ c_1=-5$

$2x-3y-7=0$

Comparing with $a_2x+b_2y+c_2=0$

$\therefore a_2=2,\ b_2=-3,\ c_2=-7$

$\frac{a_1}{a_2}=\frac{3}{2}$ | $\frac{b_1}{b_2}=\frac{2}{-3}=\frac{-3}{2}$ | $\frac{c_1}{c_2}=\frac{-5}{-7}=\frac{5}{7}$

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

We have a unique solution

Therefore, our system is consistent

ii) $2x-3y=8$, $4x-6y=9$

$2x-3y-8=0$

Comparing with $a_1x+b_1y+c_1=0$

$\therefore a_1=2,\ b_1=-3,\ c_1=-8$

$4x-6y-9=0$

Comparing with $a_2x+b_2x+c_2=0$

$\therefore a_1=4,\ b_2=-6,\ c_2=-9$

$\frac{a_1}{a_2}=\frac{2}{4}=\frac{1}{2}$ | $\frac{b_1}{b_2}=\frac{-3}{-6}=\frac{1}{2}$ | $\frac{c_1}{c_2}=\frac{-8}{-9}=\frac{8}{9}$

Since $\frac{a_1}{a_2}=\frac{b_1}{b_2}\neq\frac{c_1}{c_2}$

We have no solution

Therefore, our system is inconsistent.

iii) $\frac{3}{2}x+\frac{5}{3}y=7$, $9x-10y=14$

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$\frac{3}{2}x + \frac{5}{2}y - 7 = 0$

Comparing with $a_1x + b_1y + c_1 = 0$

$\therefore a_1 = \frac{3}{2}$, $b_1 = \frac{5}{3}$, $c_1 = -7$

$9x - 10y - 14 = 0$

Comparing with $a_2x + b_2y + c_2 = 0$

$\therefore a_2 = 9$, $b_2 = -10$, $c_2 = -14$

$\frac{a_1}{a_2} = \frac{3/2}{9} = \frac{1}{6}$ | $\frac{b_1}{b_2} = \frac{5/3}{-10} = \frac{-1}{6}$ | $\frac{c_1}{c_2} = \frac{-7}{-14} = \frac{1}{2}$

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

We have a unique solution

Therefore, our system is consistent.

iv) $5x - 3y = 11$, $-10x + 6 = -22$

$\Rightarrow$ $5x - 3y - 11 = 0$

Comparing with $a_1x + b_1y + c_1 = 0$

$\therefore a_1 = 5$, $b_1 = -3$, $c_1 = -11$

$-10x + 6 + 22 = 0$

Comparing with $a_2x + b_2y + c_2 = 0$

$\therefore a_2 = -10$, $b_2 = 6$, $c_2 = 22$

$\frac{a_1}{a_2} = \frac{5}{-10} = \frac{-1}{2}$ | $\frac{b_1}{b_2} = \frac{-3}{6} = \frac{-1}{2}$ | $\frac{c_1}{c_2} = \frac{-11}{22} = \frac{-1}{2}$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

We have infinitely many solutions

Therefore, our system is consistent.

v) $\frac{4}{3}x + 2y = 8$, $2x + 3y = 12$

$\frac{4}{3}x + 2y - 8 = 0$

Comparing with $a_1x + b_1y + c_1 = 0$

$\therefore a_1 = \frac{4}{3}$, $b_1 = 2$, $c_1 = -8$

$2x + 3y - 12 = 0$

Comparing with $a_2x + b_2y + c_2 = 0$

$\therefore a_2 = 2$, $b_2 = 3$, $c_2 = -12$

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$\frac{a_1}{a_2} = \frac{4/3}{2} = \frac{2}{3}$ | $\frac{b_1}{b_2} = \frac{2}{3}$ | $\frac{c_1}{c_2} = \frac{+8}{+12} = \frac{2}{3}$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

We have infinitely many solutions
Therefore, our system is consistent.

Q4) Which of the following pairs of linear equation are consistent/inconsistent? If consistent, obtain the solution graphically:

i) $x+y=5$, $2x+2y=10$
$\Rightarrow$ $x+y-5=0$, $2x+2y-10=0$

$x+y-5=0$ —①
Comparing with $a_1x+b_1y+c_1=0$
$\therefore a_1=1, b_1=1, c_1=-5$

$2x+2y-10=0$ —②
Comparing with $a_2x+b_2y+c_2=0$
$\therefore a=2, b_2=2, c_2=-10$

$\frac{a_1}{a_2} = \frac{1}{2}$ | $\frac{b_1}{b_2} = \frac{1}{2}$ | $\frac{c_1}{c_2} = \frac{-5}{-10} = \frac{1}{2}$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

We have infinitely many solutions
So, its consistent.

Solving eq ①
$x+y-5=0$
$y=5-x$

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

Let $x=0$
$y=5-0$
$y=5$
So, $(0,5)$ is a solution

Let $x=2$
$y=5-2$
$y=3$
So, $(2,3)$ is a solution.

Solving eq (2)

$2x+2y-10=0$

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

$y = \frac{\cancel{2}(5-x)}{\cancel{2}}$

x	0	5
$y=5-x$	5	0

Let $x=0$

$y = 5-0$

$y = 5$

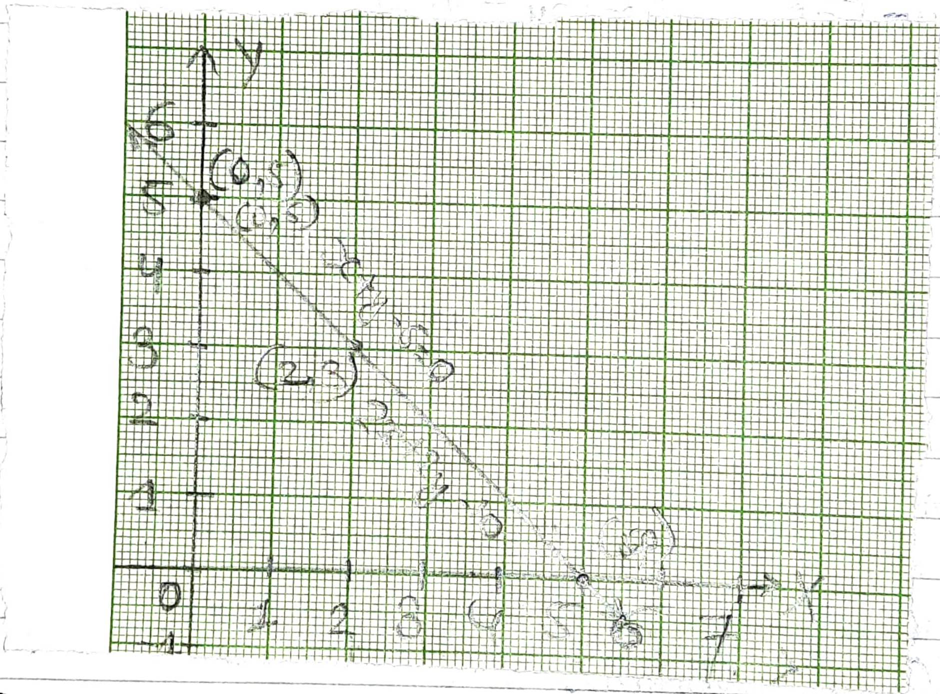
So $(0,5)$ is a Solution

Let $x=5$

$y=5-5$

$y=0$

So $(5,0)$ is a solution



ii) $x-y=8$, $3x-3y=16$

$\Rightarrow$ $x-y-8=0$, $3x-3y-16=0$

Comparing with $a_1x+b_1y+c_1=0$

$\therefore a_1=1, b_1=-1, c_1=-8$

Comparing with $a_2x+b_2y+c_2=0$

$\therefore a_2=3, b_2=-3, c_2=-16$

$\frac{a_1}{a_2} = \frac{1}{3}$ | $\frac{b_1}{b_2} = \frac{-1}{-3} = \frac{1}{3}$ | $\frac{c_1}{c_2} = \frac{-8}{-16} = \frac{1}{2}$

Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

We have no solution.
So, its is inconsistent.

iii) $2x+y-6=0$, $4x-2y-4=0$

$2x+y-6=0$, $2(2x-y-2)=0$

$2x-y-2=0$

Comparing with $a_1x+b_1y+c_1=0$
$\therefore a_1=2,\ b_1=1,\ c_1=-6$

Comparing with $a_2x+b_2y+c_2=0$
$\therefore a_2=2,\ b_2=-1,\ c_2=-2$

$\frac{a_1}{a_2} = \frac{2}{2} = 1$ | $\frac{b_1}{b_2} = \frac{1}{-1} = -1$ | $\frac{c_1}{c_2} = \frac{-2}{-6} = \frac{1}{3}$

Since $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

We have unique solution.
So, its is consistent.

Solving eq (1)
$2x+y-6=0$
$y=6-2x$

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

Let $x=0$
$y=6-2(0)$
$y=6$
So, $(0,6)$ is a solution

Let $x=2$
$y=6-2(2)$
$y=6-4$
$y=2$
So, $(2,2)$ is a solution

Solving eq (2)
$2x-y-2=0$
$y=2x-2$

Let $x = 0$

$y = 2x - 2$

$y = 2(0) - 2$

$y = -2$

So, $(0, -2)$ is a solution

Let $x = 1$

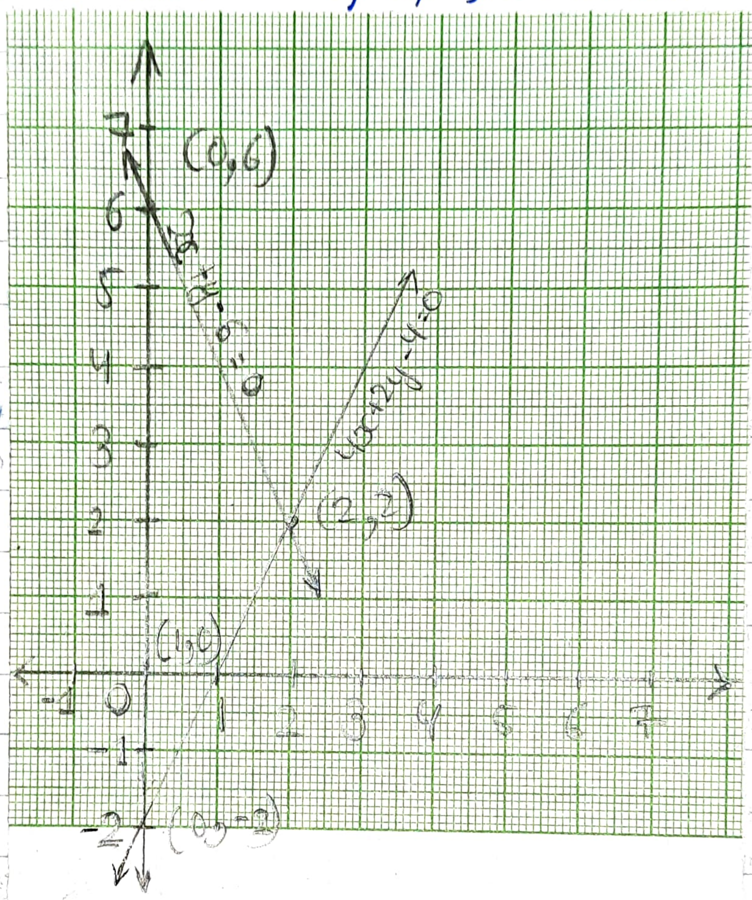
$y = 2(1) - 2$

$y = 2 - 2$

$y = 0$

So, $(1, 0)$ is a solution

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



iv) $2x - 2y - 4 = 0$, $4x - 4y - 5 = 0$

$2x - 2y - 4 = 0$

$2(x - y - 2) = 0$

$x - y - 2 = 0$

Comparing with $a_1x + b_1y + c_1 = 0$

$\therefore a_1 = 2,\ b_1 = 1,\ c_1 = -6$

$4x - 4y - 5 = 0$

Comparing with $a_2x + b_2y + c_2 = 0$

$\therefore a_2 = 4,\ b_2 = -4,\ c_2 = -5$

$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$ | $\frac{b_1}{b_2} = \frac{-2}{-4} = \frac{1}{2}$ | $\frac{c_1}{c_2} = \frac{-2}{-5} = \frac{2}{5}$

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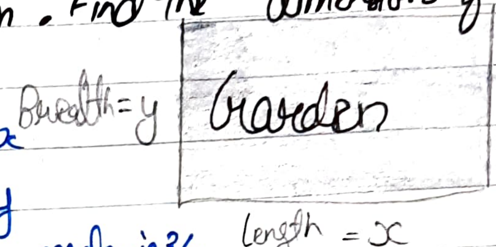
Since $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

We have no solution.
So, ~~are~~ it is inconsistent

Q5) Half perimeter of a rectangular garden, whose length is 4m more than its width, is 36m. Find the dimensions of the garden.



→ Let the length of rectangular garden = x
" " " " " breadth " " = y
Give half perimeter of rectangular garden is 36m
$\frac{1}{2} \times 2(\text{Length} + \text{breadth}) = 36$

$x + y = 36$
$x + y - 36 = 0$ — ①

Also, length is 4m more than its width
$x = 4 + y$
$x - y - 4 = 0$ — ②

Solving eq ①
$x + y - 36 = 0$
$y = 36 - x$
let $x = 12$
$y = 36 - 12$
$y = 24$
So, (12, 24) is a solution

x	12	16
$y = 36 - x$	24	20

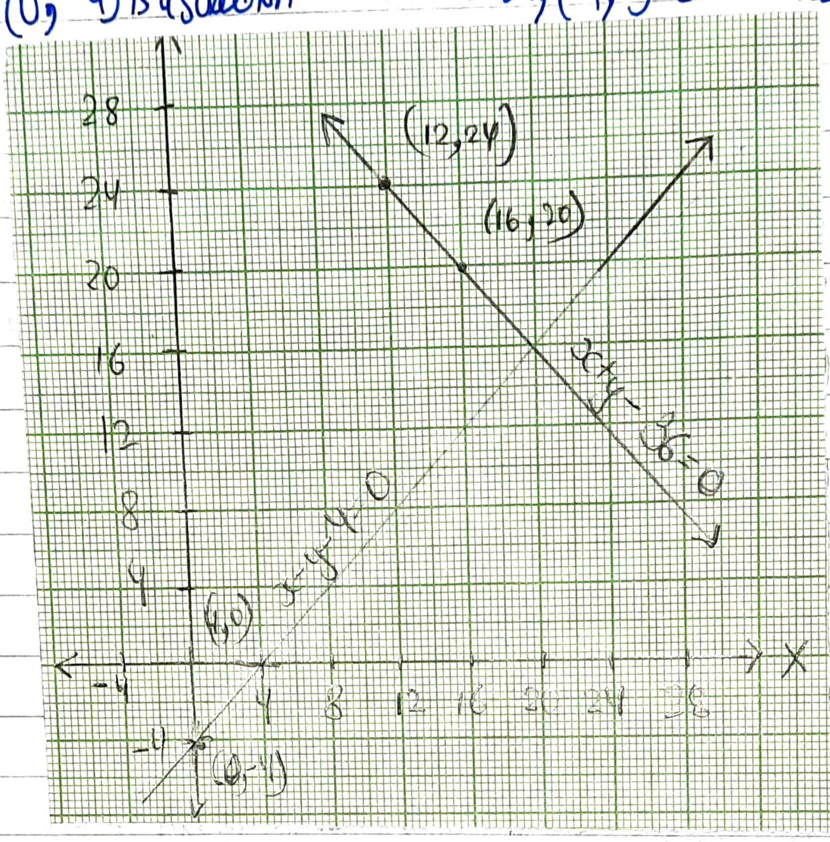
let $x = 16$
$y = 36 - 16$
$y = 20$
So, (16, 20) is a solution

Solving eq ②
$x - y - 4 = 0$

x	0	4
$y = x - 4$	−4	0

Let $x = 0$
$y = 0 - 4$
$y = -4$
So, $(0, -4)$ is a solution

Let $x = 4$
$y = 4 - 4$
$y = 0$
So, $(4, 0)$ is a solution.



The equations intersects at $(20, 16)$
So, the solutions of our equation is $(20, 16)$
Length of garden, $x = 20m$
Breadth of garden, $y = 16m$

Q6) Given the linear equations $2x + 3y - 8 = 0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is:

i) intersecting lines

Equation of first line : $2x + 3y - 8 = 0$
Let eq. of 2nd line be $ax + by + c = 0$
For intersecting lines $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

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Here, $a_1 = 2 \quad b_1 = 3$
$a_2 = a \quad b_2 = b$

So, $\frac{2a}{a} \neq \frac{3}{b}$ — ①

So, we assume value of a and b such that eq① is satisfied
Let eq of second line be
$3x + 2y + 4 = 0$
Here, $a = 3,\ b = 2,\ c = 4$
Equation is satisfied $\frac{2}{3} \neq \frac{3}{2}$

ii) Parallel lines.
→ Equation of first line : $2x + 3y - 8 = 0$
Let eq 2nd line be $ax + by + c = 0$
For parallel lines, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

Here, $a_1 = 2,\ b_1 = 3,\ c_1 = -8$
$a_2 = a,\ b_2 = b,\ c_2 = c$
So, $\frac{2}{a} = \frac{3}{b} \neq \frac{-8}{c}$ — ①

So, we assume value of and and b such that eq① is satisfied
Let equation of line be
$2x + 3y + 4 = 0$
Here, $a = 2,\ b = 6,\ c = 4$
Equation is satisfied $\frac{2}{3} = \frac{3}{3} \neq \frac{-8}{4}$

iii) Coincident lines
→ Equation of first line : $2x + 3y - 8 = 0$
Let eq of 2nd line be $ax + by + c = 0$

For a pair of parallel lines:-

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

Here, $a_1 = 2$, $b_1 = 3$, $c_1 = -8$
$a_2 = a$, $b_2 = b$, $c_2 = C$

So, $\frac{2}{a} = \frac{3}{b} = \frac{-8}{c}$ —(1)

So, we assume a value of a and b such that eq (1) is satisfied
Let eq of line be
$4x + 6y - 16 = 0$
Here, $a = 4$, $b = 6$, $c = -16$
Equation is satisfied, $\frac{2}{4} = \frac{3}{6} = \frac{-8}{-16}$

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

Q7) Draw the graphs of the equation $x - y + 1 = 0$ and $3x + 12y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

$\Rightarrow$ $x - y + 1 = 0$ —(1)
$3x + 2y - 12 = 0$ —(2)

Solving eq (1)
$x - y + 1 = 0$
$y = x + 1$

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

Let $x = 0$
$y = 0 + 1$
$y = 1$
So, $(0, 1)$ is a solution

Let $x = 1$
$y = 1 + 1$
$y = 2$
So, $(1, 2)$ is a solution

Solving eq ②

$3x + 2y - 12 = 0$

$2y = 12 - 3x$

$y = \dfrac{12 - 3x}{2}$

x	0	2
$y = \dfrac{12-3x}{2}$	6	3

Let $x = 0$

$y = \dfrac{12 - 3(0)}{2}$

$y = \dfrac{12 - 0}{2}$

$y = 6$

So, $(0, 6)$ is a solution

Let $x = 2$

$y = \dfrac{12 - 3(2)}{2}$

$y = \dfrac{12 - 6}{2}$

$y = 3$

So, $(2, 3)$ is a solution