# Mathematics

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(Chapter 3) (Pair of Linear Equations in two variables)

(Class 10)

## Exercise 3.1

### Question 1:

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 as old as you will be." (Isn't this interesting?) Represent this situation algebraically and graphically.

### Answer 1:

Let Aftab's age be $x$ years

Let, daughter's age be $y$ years

Seven years ago,

Aftab's age = $x - 7$ years

Daughter's age = $y - 7$ years

According to question,

$x - 7 = 7(y - 7) \quad \Rightarrow x - 7 = 7y - 49 \quad \Rightarrow x - 7y = -42 \quad \ldots (1)$

After 3 years,

Aftab's age = $x + 3$ years

Daughter's age = $y + 3$ years

According to question,

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

Hence, the following is the algebraic representation of the situation:

$7x - y = 42$

$3x - y = -6$

Now, for graphical representation, the three solutions of each equations are as follows:

From equation (1), we get

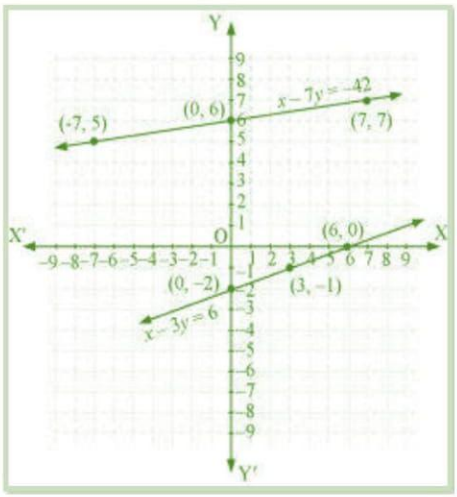
$x = 7y - 42$

| $x$ | $-7$ | 0 | 7 |
|---|---|---|---|
| $y$ | 5 | 6 | 7 |

From the equation (2), we get

$x = 3y + 6$

| $x$ | 6 | 3 | 0 |
|---|---|---|---|
| $y$ | 0 | $-1$ | $-2$ |




### Question 2:

The coach of a cricket team buys 3 bats and 6 balls for ₹ 3900. Later, she buys another bat and 2 more balls of the same kind for ₹ 1300. Represent this situation algebraically and geometrically.

### Answer 2:

Let the cost of one bat = ₹ $x$

Let the cost of one ball = ₹ $y$

According to first condition,

$3x + 6y = 3900 \quad \ldots (1)$

According to second condition,

$x + 2y = 1300 \quad \ldots (2)$

Hence, the following is the algebraic representation of the situation:

$3x + 6y = 3900$

$x + 2y = 1300$

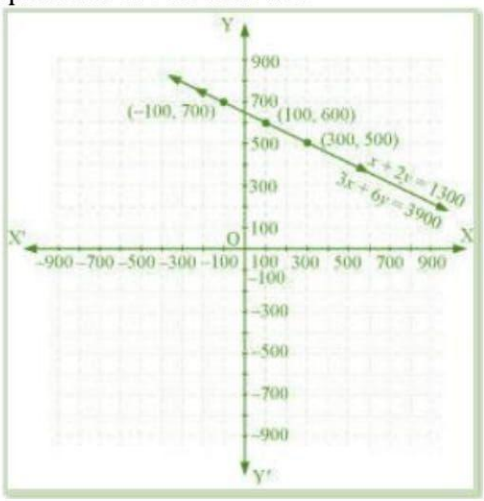
Now, for graphical representation, the three solutions of each equations are as follows:
From the equation (1), we get

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

| $x$ | 300 | 100 | −100 |
|---|---|---|---|
| $y$ | 500 | 600 | 700 |

From the equation (2), we get
$x = 1300 - 2y$

| $x$ | 300 | 100 | −100 |
|---|---|---|---|
| $y$ | 500 | 600 | 700 |




## Question 3:

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

## Answer 3:

Let the cost of 1 kg of apple = ₹ $x$
Let the cost of 1 kg of grapes = ₹ $y$

According to first condition,
$2x + y = 160$ ... (1)

According to second condition,
$4x + 2y = 300$ ... (2)

Hence, the following is the algebraic representation of the situation:
$2x + y = 160$
$4x + 2y = 300$

Now, for graphical representation, the three solutions of each equations are as follows:

From the equation (1), we get
$y = 160 - 2x$

| $x$ | 50 | 60 | 70 |
|---|---|---|---|
| $y$ | 60 | 40 | 20 |

From the equation (2), we get

$$y = \frac{300 - 4x}{2}$$

| $x$ | 70 | 80 | 75 |
|---|---|---|---|
| $y$ | 10 | −10 | 0 |