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## CBSE Class 10- Mathematics: Chapter – 3 Pair of Linear Equation in Two Variables Part 1

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Like the Crest of a Peacock So is Mathematics at the Head of All Knowledge

### Questions 1:

At a certain time in a deer park, the number of heads and the number of legs of deer and human visitors were counted, and it was found there were 39 heads & 132 legs. Find the number of deer and human visitors in the park.

**Answer:**

Let the no. of deer's be  $x$

And no. of humans be  $y$

ASQ:

$$x + y = 39 \dots (1)$$

$$4x + 2y = 132 \dots (2)$$

Multiply (1) and (2)

On solving, we get ...

$$x = 27 \text{ and } y = 12$$

$$\therefore \text{No. of deers} = 27 \text{ and No. of humans} = 12$$

### Question 2:

Solve for  $x, y$

$$(a) \frac{x + y - 8}{2} = \frac{x + 2y - 14}{3} = \frac{3x + y - 12}{11}$$

**Answer:**

$$\frac{x + y - 8}{2} = \frac{x + 2y - 14}{3} = \frac{3x + y - 12}{11}$$

$$\frac{x + y - 8}{2} = \frac{x + 2y - 14}{3}$$

On solving, we will get ...  $y = 6$

$$\frac{x + y - 8}{2} = \frac{x - 2}{2} = \frac{x + 2y - 14}{3}$$

On solving, we will get ...

$$x = 2$$

$$(b) \quad 7(y + 3) - 2(x + 2) = 14, 4(y - 2) + 3(x - 3) = 2$$

**Answer:**

$$7(y + 3) - 2(x + 2) = 14 \dots (1)$$

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

$$\text{Form (1)} \quad 7y + 21 - 2x - 4 = 14$$

On solving we will get ...

$$2x - 7y - 3 = 0 \dots (3)$$

$$\text{From (2)} \quad 4y - 8 + 3x - 9 = 2$$

On solving we will get ...

$$3x + 4y - 19 = 0 \dots (4)$$

$$2x - 7y - 3$$

$$3x + 4y - 19$$

Substitute this, to get  $y = 1$  and  $x = 5$

$$\therefore x = 5 \text{ and } y = 1$$

$$(c) \quad (a + 2b)x + (2a - b)y = 2, (a - 2b)x + (2a + b)y = 3$$

**Answer:**

$$2ax + 4ay = y,$$

$$\text{We get } 4bx - 2by = -1$$

$$2ax + 4ay = 5 \quad 4bx - 2by = -1$$

$$\text{Solve this, to get } y = \frac{10b + a}{10ab}$$

Similarly, we can solve for ...

$$d. \quad \frac{x}{a} + \frac{y}{b} = a + b, \frac{x}{2} + \frac{y}{b^2} = 2; a \neq 0, b \neq 0$$

**Answer:**

$$\frac{x}{a} + \frac{y}{b} = a + b$$

$$\frac{x}{a^2} + \frac{y}{b^2} = 2$$

$$\frac{xb + ya}{ab} = a + b$$

$$\frac{xb^2 + ya^2}{a^2b^2} = 2$$

On solving, we get ...  $x = a^2$  and  $y = b^2$

**(e)** .  $2^x + 3^y = 17, 2^{x+2} 3^{y+1} = 5$

**Answer:**

$$2^x + 3^y = 17, 2^{x+2} 3^{y+1} = 5$$

Let  $2^x$  be a and  $3^y$  be b

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

$$a + b = 17 \dots (1)$$

$$2^{x+2} 3^{y+1} = 5$$

$$4a - 3b = 5 \dots (2)$$

On solving, we get ...  $a = 8$

From (1)

$$a + b = -17$$

$$\therefore b = 9, a = 8$$

$$\Rightarrow x = 3, y = 221$$

**(f)** If  $\frac{4x - 3y}{7x - 6y} = \frac{4}{13}$ , Find  $\frac{x}{y}$

**Answer:**

$$\frac{4x - 3y}{7x - 6y} = \frac{4}{13}$$

On dividing by , we get  $\frac{x}{y} = \frac{5}{8}$

**(g)**  $41x + 53y = 135, 53x + 41y = 147$

**Answer:**

$$41x + 53y = 135, 53x + 41y = 147$$

And the two equations:

Solve it, to get ...  $x + y = 3 \dots (1)$

Subtract:

Solve it, to get ...  $x - y = 1 \dots (2)$

From (1) and (2)

$$x + y = 3$$

$$x - y = 1$$

On solving we get ...  $x = 2$  and  $y = 1$