

LINEAR ALGEBRAIC SOLUTIONS:-

CSS-2017 Q# 7(c):-

Two bus tickets from -----
----- from Rawalpindi?

GIVEN:-

Cost of 2 tickets from Rawalpindi to Islamabad and 3
tickets from Rawalpindi to Murree = Rs. 770

Cost of 3 tickets from Rawalpindi to Islamabad and 2 tickets from Rawalpindi to Murree = Rs. 730

REQUIRED:-

- a) Fare from Rawalpindi to Islamabad = ?
- b) Fare from Rawalpindi to Murree = ?

SOLUTION:- 1 ticket

Let fare from Rawalpindi to Islamabad = x and
Fare from Rawalpindi to Murree = y .

→ According to first statement of the Question:

$$2x + 3y = 770 - (1)$$

→ According to second statement of the Question:

$$3x + 2y = 730 - (2)$$

→ Solving for x and y :-

Multiplying eq (1) with 3, so eq (1) implies:

$$6x + 9y = 2310 - (3)$$

Multiplying eq (2) with 2, so eq (2) implies:

$$6x + 4y = 1460 - (4)$$

Subtracting eq (4) from eq (3):

$$\begin{array}{r} 6x + 9y = 2310 \\ - 6x + 4y = 1460 \\ \hline 5y = 850 \end{array}$$

R.H

$$\begin{array}{r} 770 \\ \times 3 \\ \hline 2310 \\ 730 \\ \times 2 \\ \hline 1460 \\ \hline 2310 \\ - 1460 \\ \hline 850 \end{array}$$

Result from subtraction: $5y = 850$

Dividing 5 on both sides:

$$\frac{5y}{5} = \frac{850}{5}$$

$$y = 170$$

Putting value of y in eq (1), we get:

$$2x + 3(170) = 770$$

$$2x + 510 = 770$$

Subtracting 510 on both sides:

$$2x + 510 - 510 = 770 - 510$$

$$2x = 260$$

Dividing 2 on both sides:

$$\frac{2x}{2} = \frac{260}{2}$$

$$x = 130$$

$$x = 130$$

RESULT:-

(a) Fair from Rawalpindi to Islamabad = Rs. 130

R.W

$$\begin{array}{r} 170 \\ 5 \overline{) 850} \\ \underline{5} \\ 350 \\ \underline{35} \\ 0 \end{array}$$

$$\begin{array}{r} 170 \\ 510 \\ \underline{170} \\ 510 \\ \underline{510} \\ 0 \end{array}$$

b) Fair from Rawalpindi to Murree = Rs. 160

Error Check:

Putting values of x and y in eq (1), we get:

$$2(130) + 3(170) = 770$$

$$260 + 510 = 770$$

$$770 = 770 \text{ proved.}$$

CS-2019 Q#7 (b):-

A farmer keeps

rabbits does he have?

GIVEN:-

Total counted heads = 70 heads

Total counted legs = 196 legs.

REQUIRED:-

No. of ~~horses~~ hens more than rabbits = ?

KNOWN FACTS REGARDING HENS & RABBITS:-

Hen has one head and two legs.

Rabbit has one head and four legs.

SOLUTION:-

let 1 hen = x and 1 rabbit = y

To find number of hens more than rabbit, first we have to find total number of hens and rabbits.

According to first statement i.e., no. of heads:

$$x + y = 70 \text{ --- (1)}$$

According to second statement i.e., no. of legs:

$$2x + 4y = 196 \text{ --- (2)}$$

Solving for x and y :

Eq (2) implies that: $2(x + 2y) = 196$ (3)

Dividing 2 on both sides, we get:

$$\frac{2(x+2y)}{2} = \frac{196}{2}$$

$$x + 2y = 98 \quad \text{--- (3)}$$

Subtracting eq (1) from eq (3), we get:

$$\begin{array}{r} x + 2y = 98 \\ - x + y = -70 \\ \hline y = 28 \end{array}$$

Hence, no. of rabbits, $y = 28$

Put value of y in eq (1):

$$x + 28 = 70$$

Subtracting 28 on both sides, we get:

$$x + 28 - 28 = 70 - 28$$

$$\boxed{x = 42}$$

Hence, no. of hens, $x = 42$.

$$\begin{aligned} \text{Now, No. of rabbits more than hens} &= \text{No. of hens} - \text{No. of rabbits} \\ &= 42 - 28 \end{aligned}$$

$$\text{No. of hens more than rabbits} = 14$$

RESULT:-

$$\text{No. of hens more than rabbits} = 14 \text{ hens}$$

$$\begin{array}{r} 70 \\ - 28 \\ \hline 42 \\ \hline 42 \\ - 28 \\ \hline 14 \end{array}$$