LINEAR ALGEBRAIC SOLUTIONS:-

CSS-2017 Q#7(c):-

Two bus tickets from - from Rawalpindi?

GIVEN:-

Cost of 2 tickets from Rawalpindi to Islambad 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:

$$2x + 3y = 770 \quad — ①$$

→ According to second statement of the Question:

$$3x + 2y = 730 \quad — ②$$

→ Solving for x and y:-

Multiplying eq ① with 3, So eq ① implies:

$$6x + 9y = 2310 \quad — ③$$

Multiplying eq ② with 2, So eq ② implies:

$$6x + 4y = 1460 \quad — ④$$

Subtracting eq ④ from eq ③:

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

R.H
  170
× 3
2310

730
× 2
1460

2310
-1460
850

Result from subtraction: $5y = 850$

Dividing 5 on both sides:

$$\frac{8y}{8} = \frac{850}{5} \quad \overset{170}{\cancel{850}}$$

$$\boxed{y = 170}$$

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:

$$\frac{2x}{2} = \frac{260}{2} \quad \overset{130}{\cancel{260}}$$

$$\boxed{x = 130}$$

RESULT:-

a) Fair from Rawalpindi to Islamabad = Rs. 130

R.W

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

$$\begin{array}{r} 170 \quad 770 \\ \times 3 \quad -510 \\ \overline{510} \quad \overline{260} \end{array}$$

b) Fair from Rawalpindi to Murree = P. 110

<u>Error Check:</u>

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

$$2(130) + 3(170) = 770$$
$$260 + 480 = 770$$
$$770 = 770 \quad \text{proved.}$$

CSS-2019 Q#7 (b):-

A farmer keeps - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - rabits does he have?

<u>GIVEN:-</u>
Total counted heads = 70 heads
Total counted legs = 196 legs.

<u>REQUIRED:-</u>
No. of ~~ke~~ hens ~~horses~~ more than rabbits = ?

<u>KNOWN FACTS REGARDING HENS & RABBITS:-</u>
Hen has one head and two legs.
Rabbit has one head and four legs.

<u>SOLUTION:-</u>
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:

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

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

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

Solving for x and y:
Eq (2) implies that: $2(x + 2y) = 196 \quad \text{---(3)}$

Dividing 2 on both sides, we get:

$$\frac{\cancel{2}(x+2y)}{\cancel{2}} = \frac{\overset{98}{\cancel{196}}}{\cancel{2}}$$

$$x + 2y = 98 \quad - \text{③}$$

Subtracting eq ① from eq ③, we get:

$$x + 2y = 98$$
$$- x \oplus y = -70$$
$$\overline{ y = 28}$$

Hence, no. of rabbits, $\boxed{y = 28}$

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, $x = 42$.

now, No. of rabbits more than hens = No. of hens − No. of rabbits

$$= 42 - 28$$

No. of hens more than rabbits = 14

RESULT:−

No. of hens more than rabbits = 14 hens

good answers!! and the attempting strategy is good too.

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

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

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