5.8.11

EE25BTECH11013 - Bhargav

Question:
The coach of a cricket team buys 3 bats and 6 balls for ₹3900. Later, she buys another bat and 3 more balls of the same kind for ₹3300. Find the cost of a bat and ball.
Solution:

Let the cost of the bat, ball be ₹x and ₹y respectively.

$$\begin{pmatrix}3 & 6\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = 3900 \tag{0.1}$$

$$\begin{pmatrix}1 & 3\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = 3300 \tag{0.2}$$

These can be combined to give the matrix equation

$$\begin{pmatrix}3 & 6\\1 & 3\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = \begin{pmatrix}3900\\3300\end{pmatrix} \tag{0.3}$$

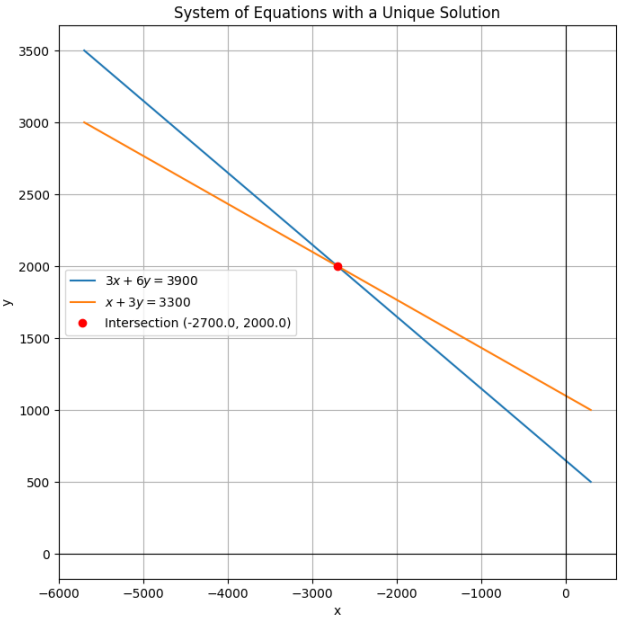
This gives the augmented matrix

$$\left(\begin{array}{cc|c}3 & 6 & 3900\\1 & 3 & 3300\end{array}\right) \xleftrightarrow{R_2 \leftarrow R_2 - \frac{1}{3}R_1} \left(\begin{array}{cc|c}3 & 6 & 3900\\0 & 1 & 2000\end{array}\right) \tag{0.4}$$

This gives the following values of x and y:

$$\begin{pmatrix}x\\y\end{pmatrix} = \begin{pmatrix}-2700\\2000\end{pmatrix} \tag{0.5}$$

Thus, the cost of one ball is ₹2000 and the cost of one bat is - ₹2700


System of Equations with a Unique Solution
3500
3000
2500
2000
1500
1000
500
0
y
−6000
−5000
−4000
−3000
−2000
−1000
0
x
3x + 6y = 3900
x + 3y = 3300
Intersection (-2700.0, 2000.0)