

5.8,18

EE25BTECH11020 - Darsh Pankaj Gajare

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Question:

Five years hence, the age of Rahul will be three times that of his son. Five years ago, Rahul's age was seven times that of his son. What are their present ages? **Solution:** Let the age of Rahul and his son be  $a$  and  $b$  respectively

$$\mathbf{A} = \begin{pmatrix} a \\ b \end{pmatrix} \quad (0.1)$$

Given Equations,

$$a + 5 = 3(b + 5) \implies a - 3b = 10 \quad (0.2)$$

$$a - 5 = 7(b - 5) \implies a - 7b = -30 \quad (0.3)$$

$$\begin{pmatrix} 1 & -3 \\ 1 & -7 \end{pmatrix} \mathbf{A} = \begin{pmatrix} 10 \\ -30 \end{pmatrix} \quad (0.4)$$

Using Gaussian elimination,

$$\left( \begin{array}{cc|c} 1 & -3 & 10 \\ 1 & -7 & -30 \end{array} \right) \quad (0.5)$$

$$R_1 = \frac{R_1 - R_2}{4}$$

$$\left( \begin{array}{cc|c} 0 & 1 & 10 \\ 1 & -7 & -30 \end{array} \right) \quad (0.6)$$

$$R_2 = R_2 + 7R_1$$

$$\left( \begin{array}{cc|c} 0 & 1 & 10 \\ 1 & 0 & 40 \end{array} \right) \quad (0.7)$$

$$\mathbf{A} = \begin{pmatrix} 40 \\ 10 \end{pmatrix} \quad (0.8)$$