

① Inverse of Matrix

$$\begin{bmatrix} -3 & 4 & -3 \\ 1 & 2 & 3 \\ 5 & 0 & -1 \end{bmatrix}$$

$$\text{Formula} = \frac{1}{\det(A)} \cdot \text{adj } A$$

$$(+6 + 60 + 0) - (-30 - 4) = 100 = \det(A)$$

$$\begin{bmatrix} +(-2) & +16 & +(-10) \\ +4 & +18 & -20 \\ +18 & +12 & (+10) \end{bmatrix}$$

$$\begin{bmatrix} -10 & -20 & -10 \\ 16 & 18 & 12 \\ -2 & 4 & 18 \end{bmatrix} \cdot \frac{1}{100}$$

$$\begin{bmatrix} -\frac{1}{10} & -\frac{1}{5} & -\frac{1}{10} \\ \frac{16}{100} & \frac{18}{100} & \frac{12}{100} \\ -\frac{1}{50} & \frac{1}{25} & \frac{18}{100} \end{bmatrix}$$

Solution

$$\begin{bmatrix} -\frac{1}{10} & -\frac{1}{5} & -\frac{1}{10} \\ \frac{4}{25} & \frac{9}{50} & \frac{3}{25} \\ -\frac{1}{50} & \frac{1}{25} & \frac{9}{50} \end{bmatrix}$$

$$\textcircled{2} \begin{bmatrix} 3 & 2 & -4 & 8 \\ 2 & -5 & 4 & 1 \\ 5 & 6 & -9 & 2 \end{bmatrix}$$

$$\Delta = 3(45-24) + 2(-18-20) - 4(12+25)$$

$$\Delta = -9$$

$$+72 - 108 = -36$$

$$\begin{bmatrix} 8 & 2 & -4 \\ 2 & -5 & 4 \end{bmatrix} = \Delta = 8(45) - 2(-3-8) - 4(6+10)$$

$$360 + 34 - 64 = 330$$

$$\begin{bmatrix} 3 & 8 & -4 \\ 2 & 1 & 4 \\ 5 & 2 & -9 \end{bmatrix} = 3(-9-8) - 8(-18-20) - 4(4-5)$$

$$-51 + 304 + 4 = 257$$

$$\begin{bmatrix} 3 & 2 & 8 \\ 2 & -5 & 1 \\ 5 & 6 & 2 \end{bmatrix} = 3(-10-6) - 2(4-5) + 8(12+25)$$

$$-48 + 2 + 276 = 230$$

$$x_1 = \frac{138}{-9}$$

$$x_2 = \frac{257}{-9}$$

$$x_3 = \frac{230}{-9}$$

$$\begin{aligned}
 & \textcircled{3} \left[\begin{array}{ccccccc} 7 & -9 & -4 & 5 & 3 & -3 & -7 \\ -4 & 6 & 7 & -2 & -6 & -5 & 5 \\ 5 & -7 & -6 & 5 & -6 & 2 & 8 \\ -3 & 5 & 8 & -1 & -7 & -4 & 8 \\ 6 & -8 & -5 & 4 & 4 & 9 & 3 \\ 5 & -7 & -5 & 5 & -6 & 2 & 8 \end{array} \right] \Rightarrow \left[\begin{array}{ccccccc} 7 & -9 & -4 & 5 & 3 & -3 & -7 \\ 0 & 6/7 & 33/7 & 6/7 & -4/7 & 1 & 13 \\ 0 & -4/7 & -22/7 & 6/7 & 23/7 & 5 & 13 \\ 0 & 8/7 & 44/7 & 8/7 & -37/7 & 9 & 13 \\ 0 & -2/7 & -11/7 & 2/7 & 21/7 & 13 & 13 \\ 0 & -4/7 & -18/7 & 10/7 & 28/7 & 13 & 13 \end{array} \right]
 \end{aligned}$$

$$\begin{aligned}
 & \left[\begin{array}{ccccccc} 7 & -9 & -4 & 5 & 3 & -3 & -7 \\ 0 & 6/7 & 33/7 & 6/7 & -4/7 & 1 & 13 \\ 0 & -4/7 & -22/7 & 6/7 & 23/7 & 5 & 13 \\ 0 & 8/7 & 44/7 & 8/7 & -37/7 & 9 & 13 \\ 0 & -2/7 & -11/7 & 2/7 & 21/7 & 13 & 13 \\ 0 & -4/7 & -18/7 & 10/7 & 28/7 & 13 & 13 \end{array} \right] \\
 & \textcircled{1} \quad \textcircled{2} \quad \textcircled{3} \quad \textcircled{4} \quad \textcircled{5} \quad \textcircled{6} \quad \textcircled{7} \\
 & \left[\begin{array}{ccccccc} 7 & -9 & -4 & 5 & 3 & -3 & -7 \\ 0 & 6/7 & 33/7 & 6/7 & -4/7 & 1 & 13 \\ 0 & -4/7 & -22/7 & 6/7 & 23/7 & 5 & 13 \\ 0 & 8/7 & 44/7 & 8/7 & -37/7 & 9 & 13 \\ 0 & -2/7 & -11/7 & 2/7 & 21/7 & 13 & 13 \\ 0 & -4/7 & -18/7 & 10/7 & 28/7 & 13 & 13 \end{array} \right]
 \end{aligned}$$

Rank of matrix (5)