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1 Section 3.3

1.1 3.3.1

Find the reduced echelon form of the given matrix.

$$A = \begin{bmatrix} 1 & 5 \\ 7 & 36 \end{bmatrix}$$

$$A_2 = A_2 - 7A_1$$

$$A = \begin{bmatrix} 1 & 5 \\ 0 & 1 \end{bmatrix}$$

$$A_1 = A_1 - 5A_2$$

$$A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\boxed{A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}}$$

1.2 3.3.3

Find the reduced echelon form of the given matrix.

$$A = \begin{bmatrix} 3 & 10 & 12 \\ 2 & 7 & 9 \end{bmatrix}$$

$$A_2 = 3A_2 - 2A_1$$

$$A = \begin{bmatrix} 3 & 10 & 12 \\ 0 & 1 & 3 \end{bmatrix}$$

$$A_1 = A_1 - 10A_2$$

$$A = \begin{bmatrix} 3 & 0 & -18 \\ 0 & 1 & 3 \end{bmatrix}$$

$$A_1 = \frac{1}{3}A_1$$

$$A = \begin{bmatrix} 1 & 0 & -6 \\ 0 & 1 & 3 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 & -6 \\ 0 & 1 & 3 \end{bmatrix}$$

1.3 3.3.21

Solve using Gauss-Jordan elimination.

$$\left[\begin{array}{ccc|c} 2 & 5 & -12 & 5 \\ 4 & 37 & -85 & 84 \\ 1 & 7 & -16 & 15 \end{array} \right]$$

$$E_2 = E_2 - 2E_1$$

$$E = \left[\begin{array}{ccc|c} 2 & 5 & -12 & 5 \\ 0 & 27 & -61 & 74 \\ 1 & 7 & -16 & 15 \end{array} \right]$$

$$E_3 = 2E_3 - E_1$$

$$E = \left[\begin{array}{ccc|c} 2 & 5 & -12 & 5 \\ 0 & 27 & -61 & 74 \\ 0 & 9 & -20 & 25 \end{array} \right]$$

$$E_1 = \frac{1}{2}E_1$$

$$E = \left[\begin{array}{ccc|c} 1 & \frac{5}{2} & -6 & \frac{5}{2} \\ 0 & 27 & -61 & 74 \\ 0 & 9 & -20 & 25 \end{array} \right]$$

$$E_3 = E_3 - \frac{1}{3}E_2$$

$$E = \left[\begin{array}{ccc|c} 1 & \frac{5}{2} & -6 & \frac{5}{2} \\ 0 & 27 & -61 & 74 \\ 0 & 0 & \frac{1}{3} & \frac{1}{3} \end{array} \right]$$

$$E_2 = \frac{1}{27}E_2$$

$$E = \left[\begin{array}{ccc|c} 1 & \frac{5}{2} & -6 & \frac{5}{2} \\ 0 & 1 & -\frac{61}{27} & \frac{74}{27} \\ 0 & 0 & \frac{1}{3} & \frac{1}{3} \end{array} \right]$$

$$E_3 = 3E_3$$

$$E = \left[\begin{array}{ccc|c} 1 & \frac{5}{2} & -6 & \frac{5}{2} \\ 0 & 1 & -\frac{61}{27} & \frac{74}{27} \\ 0 & 0 & 1 & -\frac{3}{23} \end{array} \right]$$