RH 1.2

MATH 5, Jones

Tejas Patel

3,7,14,21,24,35,37

3: Convert matrix to RREF

$\left[\begin{array}{ccc|c} 1 & 2 & 3 & 4 \\ 4 & 5 & 6 & 7 \\ 6 & 7 & 8 & 9 \end{array}\right]$ Subtract $4R_1$ from R_2 and $6R_1$ from $R_3 \rightarrow \left[\begin{array}{ccc|c} 1 & 2 & 3 & 4 \\ 0 & -3 & -6 & -9 \\ 0 & -5 & -10 & -15 \end{array}\right]$

Scale R_2 by $-\frac{1}{3}$ and R_3 by $-\frac{1}{5} \rightarrow \left[\begin{array}{ccc|c} 1 & 2 & 3 & 4 \\ 0 & 1 & 2 & 3 \\ 0 & 1 & 2 & 3 \end{array}\right]$

Subtract R_2 from $R_3 \rightarrow \left[\begin{array}{ccc|c} 1 & 2 & 3 & 4 \\ 0 & 1 & 2 & 3 \\ 0 & 0 & 0 & 0 \end{array}\right]$

Subtract $2R_2$ from $R_1 \rightarrow \boxed{\left[\begin{array}{ccc|c} 1 & 0 & -1 & -2 \\ 0 & 1 & 2 & 3 \\ 0 & 0 & 0 & 0 \end{array}\right]}$ is the resultant matrix in RREF

7: Find the general solution to the system

$\left[\begin{array}{ccc|c} 1 & 3 & 4 & 7 \\ 3 & 9 & 7 & 6 \end{array}\right] \rightarrow$ Subtract $3R_1$ from $R_2 \rightarrow \left[\begin{array}{ccc|c} 1 & 3 & 4 & 7 \\ 0 & 0 & -5 & -15 \end{array}\right]$

Scale R_2 by $-\frac{1}{5} \rightarrow \left[\begin{array}{ccc|c} 1 & 3 & 4 & 7 \\ 0 & 0 & 1 & 3 \end{array}\right]$

Subtract $4R_2$ from $R_1 \rightarrow \left[\begin{array}{ccc|c} 1 & 3 & 0 & -5 \\ 0 & 0 & 1 & 3 \end{array}\right]$

Free variable: $X_2 = t$
$X_1 = -5 - 3t$
$X_2 = t$
$X_3 = 3$
$\boxed{(-5 - 3t, t, 3)}$

14: Find the general solution to the system

$$\left[\begin{array}{ccccc|c} 1 & 2 & -5 & -4 & 0 & -5 \\ 0 & 1 & -6 & -4 & 0 & 2 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right] \rightarrow \text{Subtract } 2R_2 \text{ from } R_1 \rightarrow \left[\begin{array}{ccccc|c} 1 & 0 & 7 & 4 & 0 & -9 \\ 0 & 1 & -6 & -4 & 0 & 2 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

Free Variables $X_3 = s,\ X_4 = t$
Solution: $X_1 = -9 - 7s - 4t,\ X_2 = 2 + 6s + 4t,\ X_3 = s,\ X_4 = t,\ X_5 = 0$

$\boxed{-9 - 7s - 4t,\ 2 + 6s + 4t,\ s,\ t,\ 0}$

21

24

35

37