B) $\begin{bmatrix} 1 & -2 & 1 & -4 & 1 \\ 1 & 3 & 7 & 2 & 2 \\ 1 & -12 & -11 & -16 & 5 \end{bmatrix}$ SUB ② FROM ①, SUB ① FROM ③ $\begin{bmatrix} 1 & -2 & 1 & -4 & 1 \\ 0 & 5 & 6 & 6 & 1 \\ 0 & -10 & -12 & -12 & 4 \end{bmatrix}$

ADD 2 ② TO ③ $\begin{bmatrix} 1 & -2 & 1 & -4 & 1 \\ 0 & 5 & 6 & 6 & 1 \\ 0 & 0 & 0 & 0 & 6 \end{bmatrix}$ MULT ③ BY $\frac{1}{6}$, MULT ③ BY $\frac{1}{6}$ $\begin{bmatrix} 1 & -2 & 1 & -4 & 1 \\ 0 & 1 & 6/5 & 6/5 & 1/5 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$

ADD 2 ② TO ① $\begin{bmatrix} 1 & 0 & 17/5 & -8/5 & 7/5 \\ 0 & 1 & 6/5 & 6/5 & 1/5 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$ SUB $\frac{7}{5}$ ③ FROM ①, SUB $\frac{1}{5}$ ③ FROM ② $\begin{bmatrix} 1 & 0 & \frac{17}{5} & -\frac{8}{5} & 0 \\ 0 & 1 & 6/5 & 6/5 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$

INCONSISTENT SINCE LAST EQUATION SAYS $0 = 1$!

C) $\begin{bmatrix} 0 & 0 & 1 & 2 & -1 & 4 \\ 0 & 0 & 0 & 1 & -1 & 3 \\ 0 & 0 & 1 & 3 & -2 & 7 \\ 2 & 4 & 1 & 7 & 0 & 7 \end{bmatrix}$ INTERCHANGE ①↔④, THEN MULT NEW ① BY $\frac{1}{2}$ $\begin{bmatrix} 1 & 2 & 1/2 & 7/2 & 0 & 7/2 \\ 0 & 0 & 0 & 1 & -1 & 3 \\ 0 & 0 & 1 & 3 & -2 & 7 \\ 0 & 0 & 1 & 2 & -1 & 4 \end{bmatrix}$

INTERCHANGE ② AND ③ $\begin{bmatrix} 1 & 2 & 1/2 & 7/2 & 0 & 7/2 \\ 0 & 0 & 1 & 3 & -2 & 7 \\ 0 & 0 & 0 & 1 & -1 & 3 \\ 0 & 0 & 1 & 2 & -1 & 4 \end{bmatrix}$ SUB ② FROM ④ $\begin{bmatrix} 1 & 2 & 1/2 & 7/2 & 0 & 7/2 \\ 0 & 0 & 1 & 3 & -2 & 7 \\ 0 & 0 & 0 & 1 & -1 & 3 \\ 0 & 0 & 0 & -1 & 1 & -3 \end{bmatrix}$

ADD ③ TO ④, SUB $\frac{1}{2}$ ② FROM ① $\begin{bmatrix} 1 & 2 & 0 & 2 & 1 & 0 \\ 0 & 0 & 1 & 3 & -2 & 7 \\ 0 & 0 & 0 & 1 & -1 & 3 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ SUB 2 ③ FROM ①, SUB 3 ③ FROM ② $\begin{bmatrix} 1 & 2 & 0 & 0 & 3 & -6 \\ 0 & 0 & 1 & 0 & 1 & -2 \\ 0 & 0 & 0 & 1 & -1 & 3 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

$V = 5$, $Y = T$, $U = -6 - 2S - 3T$, $W = -2 - T$, $X = 3 + T$

1.2 # 12 A) ∞ MANY SOLUTIONS SINCE MORE VARIABLES THAN EQUATIONS. THUS, THERE ARE NONTRIVIAL SOLNS!

B) $X_3 = 0 \Rightarrow X_2 = 0 \Rightarrow X_1 = 0$ SO ONLY TRIVIAL SOLN.

C) NONTRIVIAL SOLNS FOR SAME REASON AS IN A).

D) NONTRIVIAL SOLNS, FOR EXAMPLE $X_1 = 2$, $X_2 = 3$.