

See 1.1

$$1b) \quad 3x_3 = 9 \rightarrow x_3 = 3$$

$$2x_2 + x_3 = 5 \rightarrow 2x_2 + 3 = 5$$

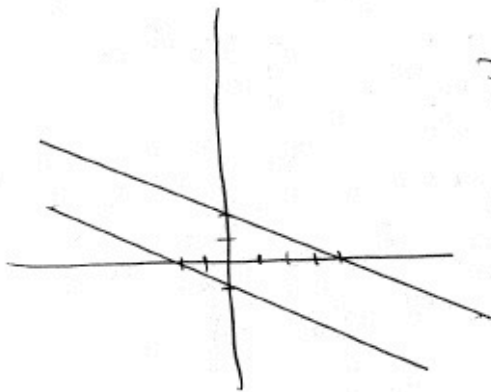
$$\rightarrow 2x_2 = 2 \rightarrow x_2 = 1$$

$$x_1 + x_2 + x_3 = 8 \rightarrow x_1 + 1 + 3 = 8$$

$$\rightarrow x_1 = 4$$

$$3b) \quad x_1 + 2x_2 = 4 \quad \xrightarrow{\text{points}} \quad (0, 2) \quad (4, 0)$$

$$-2x_1 - 4x_2 = 4 \quad \longrightarrow \quad (-2, 0) \quad (0, -1)$$



parallel lines

no intersection

no common points

no solutions to equations

See 1.1

$$5b) \begin{array}{ccc|c} x_1 & x_2 & x_3 & \\ \hline 5 & -2 & 1 & 3 \\ 2 & 3 & -4 & 0 \end{array} \quad \begin{array}{l} 5x_1 - 2x_2 + x_3 = 3 \\ 2x_1 + 3x_2 - 4x_3 = 0 \end{array}$$

$$6a) \begin{array}{cc|c} 1 & -2 & 5 \\ 3 & 1 & 1 \end{array} \quad -3R_1 + R_2 \rightarrow R_2 \quad \begin{array}{cc|c} 1 & -2 & 5 \\ 0 & 7 & -14 \end{array}$$

$$7x_2 = -14 \rightarrow x_2 = -2$$

$$x_1 - 2(-2) = 5 \rightarrow x_1 + 4 = 5 \rightarrow x_1 = 1$$

$$6c) \begin{array}{cc|c} 4 & 3 & 4 \\ \frac{2}{3} & 4 & 3 \end{array} \quad -6R_2 + R_1 \rightarrow R_1 \quad \begin{array}{cc|c} 0 & -21 & -14 \\ \frac{2}{3} & 4 & 3 \end{array}$$

$$-21x_2 = -14 \quad x_2 = \frac{2}{3}$$

$$\frac{2}{3}x_1 + 4\left(\frac{2}{3}\right) = 3 \rightarrow \frac{2}{3}x_1 = \frac{1}{3} \quad x_1 = \frac{1}{2}$$

See 1.1

$$\text{(6h)} \left[\begin{array}{cccc|c} 0 & 1 & 1 & 1 & 0 \\ 3 & 0 & 3 & -4 & 7 \\ 1 & 1 & 1 & 2 & 6 \\ 2 & 3 & 1 & 3 & 6 \end{array} \right] \begin{array}{l} \textcircled{1} -3R_3 + R_2 \rightarrow R_2 \\ \textcircled{2} -2R_3 + R_4 \rightarrow R_4 \\ \textcircled{3} R_1 \leftrightarrow R_3 \end{array} \rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 1 & 2 & 6 \\ 0 & -3 & 0 & -10 & -11 \\ 0 & 1 & 1 & 1 & 0 \\ 0 & 1 & -1 & -1 & -6 \end{array} \right]$$

$$\begin{array}{l} 3R_3 + R_2 \rightarrow R_2 \\ -R_3 + R_4 \rightarrow R_4 \\ R_2 \leftrightarrow R_3 \end{array} \left[\begin{array}{cccc|c} 1 & 1 & 1 & 2 & 6 \\ 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 3 & -7 & -11 \\ 0 & 0 & -2 & -2 & -6 \end{array} \right] \rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 1 & 2 & 6 \\ 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & -10 & -20 \\ 0 & 0 & 1 & 1 & 3 \end{array} \right]$$

$$\begin{array}{l} \frac{3}{2}R_4 + R_3 \rightarrow R_3 \\ -\frac{1}{2}R_4 \rightarrow R_4 \end{array}$$

$$-10x_4 = -20 \rightarrow x_4 = 2$$

$$x_3 + 2 = 3 \rightarrow x_3 = 1$$

$$x_2 + 1 + 2 = 0 \rightarrow x_2 = -3$$

$$x_1 + (-3) + 1 + 2(2) = 6 \rightarrow x_1 + 2 = 6$$

$$x_1 = 4$$

- ④ A linear equation in 3 unknowns can be graphically represented as a plane. Possible solution to 3 equations in 3 unknowns is a whole plane (an infinite number of solutions), a line (infinite), a point (1 solution), no solutions