# Contents

# 1   Section 3.2

## 1.1   3.2.1

The following linear system is in echelon form. Solve the linear system by back substitution.

$$\begin{cases} x_1 + x_2 + 2x_3 = 2 \\ x_2 + 3x_3 = 4 \\ x_3 = 3 \end{cases}$$

$$x_2 + 3(3) = 4$$
$$x_2 = -5$$
$$x_1 + (-5) + 2(3) = 2$$
$$x_1 = 1$$

$$\boxed{x_1 = 1, x_2 = -5, x_3 = 3}$$

## 1.2   3.2.3

The following linear system is in echelon form. Solve the linear system by back substitution.

$$\begin{cases} x_1 - 9x_2 + x_3 = 18 \\ x_2 + x_3 = 2 \end{cases}$$

$$x_2 = 2 - x_3$$
$$x_1 - 9(2 - x_3) + x_3 = 18$$
$$x_1 = -10x_3 + 36$$

$$\boxed{x_1 = -10t + 36, x_2 = 2 - t}$$

## 1.3   3.2.7

$$\begin{cases} x_1 + 6x_2 + 5x_3 - 4x_4 = 9 \\ x_2 - 6x_3 + 5x_4 = 6 \end{cases}$$

$$x_2 = 6 + 6x_3 - 5x_4$$
$$x_1 + 6(6 + 6x_3 - 5x_4) + 5x_3 - 4x_4 = 9$$
$$x_1 = 34x_4 - 41x_3 - 27$$

$$\boxed{x_1 = 34t - 41s - 27, x_2 = 6 + 6s - 5t}$$

## 1.4   3.2.9

$$\begin{cases} 2x_1 + 4x_2 + x_3 + 3x_4 = 2 \\ -3x_2 - 18x_3 - 6x_4 = -24 \\ -5x_3 - 5x_4 = -10 \\ 4x_4 = 12 \end{cases}$$

$$x_4 = 3$$
$$-5x_3 - 5(3) = -10$$
$$x_3 = -1$$
$$-3x_2 - 18(-1) - 6(3) = -24$$
$$x_2 = 8$$
$$2x_1 + 4(8) + (-1) + 3(3) = 2$$
$$x_1 = -19$$

$$\boxed{x_1 = -19, x_2 = 8, x_3 = -1, x_4 = 3}$$