

Math 214

Section 1.1

1A

$$x_1 - 3x_2 = 2 \quad (1)$$

$$2x_2 = 6 \quad (2)$$

From Equation 2 we get,

$$2x_2 = 6$$

$$x_2 = 6/2$$

$$x_2 = 3$$

We can now plug in that value,

$$x_1 - 3(3) = 2$$

$$x_1 - 9 = 2$$

$$x_1 = 11$$

Thus the final answer (s) are,

$$x_1 = 11$$

$$x_2 = 3$$

1B

$$x_1 + x_2 + x_3 = 8 \quad (1)$$

$$2x_2 + x_3 = 5 \quad (2)$$

$$3x_3 = 9 \quad (3)$$

$$(4)$$

From Equation 3 we get,

$$3x_3 = 9$$

$$x_3 = 9/3$$

$$x_3 = 3$$

We can now plug in $x_3 = 3$ into Equation 2

$$2x_2 + 3 = 5$$

$$2x_2 = 2$$

$$x_2 = 1$$

Plug in $x_3 = 3$ and $x_2 = 1$ into Equation 1,

$$x_1 + 1 + 3 = 8$$

$$x_1 + 4 = 8$$

$$x_1 = 4$$

Thus your final answer is,

$$x_1 = 4$$

$$x_2 = 1$$

$$x_3 = 3$$

1C

$$x_1 + 2x_2 + 2x_3 + x_4 = 5 \tag{1}$$

$$3x_2 + x_3 - 2x_4 = 4 \tag{2}$$

$$-x_3 + 2x_4 = -1 \tag{3}$$

$$4x_4 = 4 \tag{4}$$

$$\tag{5}$$

From Equation 4 we get,

$$4x_4 = 4$$

$$x_4 = 1$$

We can now plug in $x_4 = 1$ into Equation 3

$$-x_3 + 2(1) = -1$$

$$x_3 = 2 + 1$$

$$x_3 = 3$$

Plug in $x_4 = 1$ and $x_3 = 3$ into Equation 2,

$$3x_2 + 3 - 2(1) = 1$$

$$3x_2 + 1 = 1$$

$$3x_2 = 0$$

$$x_2 = 0$$

Finally plug in $x_4 = 1$, $x_3 = 3$ and $x_2 = 0$ into Equation 1,

$$x_1 + 2(0) + 2(3) + 1 = 5$$

$$x_1 + 0 + 6 + 1 = 5$$

$$x_1 + 7 = 5$$

$$x_1 = -2$$

Thus your final results are,

$$x_4 = 1$$

$$x_3 = 3$$

$$x_2 = 0$$

$$x_1 = -2$$

1D

$$x_1 + x_2 + x_3 + x_4 + x_5 = 5 \tag{1}$$

$$2x_2 + x_3 - 2x_4 + x_5 = 1 \tag{2}$$

$$4x_3 + x_4 - 2x_5 = 1 \tag{3}$$

$$x_4 - 3x_5 = 0 \tag{4}$$

$$2x_5 = 2 \tag{5}$$

$$\tag{6}$$

From Equation 5 we get,

$$2x_5 = 2$$

$$x_5 = 1$$

Plug in $x_5 = 1$ into Equation 4

$$x_4 - 3(1) = 0$$

$$x_4 - 3 = 0$$

$$x_4 = 3$$

Now, plug in $x_4 = 3$ and $x_5 = 1$ into Equation 3,

$$4x_3 + 3 - 2(1) = 1$$

$$4x_3 + 1 = 1$$

$$4x_3 = 0$$

$$x_3 = 0$$

With these, plug in $x_3 = 0$, $x_4 = 3$ and $x_5 = 1$ into Equation 2,

$$2x_2 + 0 - 2(3) + 1 = 1$$

$$2x_2 - 5 = 1$$

$$2x_2 = 4$$

$$x_2 = 2$$

Finally, plug in $x_2 = 2$, $x_3 = 0$, $x_4 = 3$ and $x_5 = 1$ into Equation 1,

$$x_1 + 2 + 0 + 3 + 1 = 5$$

$$x_1 + 6 = 5$$

$$x_1 = -1$$

Thus, your final answers are:

$$x_1 = -1$$

$$x_2 = 2$$

$$x_3 = 0$$

$$x_4 = 3$$

$$x_5 = 1$$