# In-Class Assignment #3
## Applied Math
## Electronics Engineering
## Solutions
Sep. 14th 2012

Solve the following systems of equations

① $4x - y = 8$ Ⓐ

$-8x + 2y = -5$ Ⓑ

Isolate $y$ in Ⓐ

$y = 4x - 8$

Sub. in Ⓑ

$-8x + 2(4x - 8) = -5$

$-8x + 8x - 16 = -5$

$-16 = -5$ impossible

**There are no solutions**

② $y = x^2 + 6x + 6$ Ⓐ

$y - 1 = 0$ Ⓑ

Isolate $y$ in Ⓑ:

$y = 1$

Sub. in Ⓐ

$1 = x^2 + 6x + 6$

$0 = x^2 + 6x + 5$

$= (x+5)(x+1)$ $x = -5$ & $x = -1$

**The solutions are $(x, y) = (-1, 1)$ & $(-5, 1)$**

$$a - 3b + 3c = -4 \quad (A)$$
$$2a + 3b - c = 15 \quad (B)$$
$$4a - 3b - c = 19 \quad (C)$$

ISOLATE $a$ in (A): $a = -4 + 3b - 3c$

SUB in (B):

$$2(-4 + 3b - 3c) + 3b - c = 15$$
$$-8 + 6b - 6c + 3b - c = 15$$
$$9b - 7c = 23 \quad (B_2)$$

SUB in (C):

$$4(-4 + 3b - 3c) - 3b - c = 19$$
$$-16 + 12b - 12c - 3b - c = 19$$
$$9b - 13c = 35 \quad (C_2)$$

NOW WE SOLVE THE SYSTEM $(B_2)$ & $(C_2)$

ISOLATE $b$ in $(B_2)$:

$$9b = 23 + 7c$$
$$b = \frac{23 + 7c}{9}$$

SUB in $(C_2)$

$$9\left(\frac{23 + 7c}{9}\right) - 13c = 35$$
$$23 + 7c - 13c = 35$$
$$-6c = 12$$
$$c = -2$$

SUB $c = -2$ INTO $b = \frac{23 + 7c}{9}$:

$$b = \frac{23 + 7(-2)}{9} = \frac{9}{9} = 1$$

SUB $b = 1, c = -2$ INTO $a = -4 + 3b - 3c$:

$$a = -4 + 3(1) - 3(-2)$$
$$= -4 + 3 + 6 = 5$$

SOLUTION IS $\boxed{(a, b, c) = (5, 1, -2)}$