

Take out yesterday's notes...

**WARM - UP**

Level 1 Problem!

Solve this system by the substitution method.

$$\begin{cases} 2x + y = -5 \\ -6x + y = x^2 + 7 \end{cases} \rightarrow y = -2x - 5$$

$$-6x - 2x - 5 = x^2 + 7$$

$$-8x - 5 = x^2 + 7$$

$$0 = x^2 + 8x + 12$$

$$0 = (x + 6)(x + 2)$$

$$x = -6 \quad x = -2$$

$$(-6, 7)$$

$$(-2, -1)$$

✓ Check Point 2 Solve by the substitution method:

$$\begin{cases} x + 2y = 0 \\ (x - 1)^2 + (y - 1)^2 = 5 \end{cases} \rightarrow x = -2y$$

$$(-2y - 1)^2 + (y - 1)^2 = 5$$

$$4y^2 + 4y + 1 + y^2 - 2y + 1 = 5$$

$$5y^2 + 2y + 2 = 5$$

$$5y^2 + 2y - 3 = 0 \text{ factor.}$$

$$(5y - 3)(y + 1) = 0$$

$$y = \frac{3}{5} \quad y = -1$$

$$x = -2y$$

$$(2, -1)$$

$$\left(-\frac{6}{5}, \frac{3}{5}\right) \quad -2\left(\frac{3}{5}\right)$$

One more example! --- Solve by substitution.

$$\begin{cases} -4x + y = 12 \\ y = x^3 + 3x^2 \end{cases}$$

$$-4x + x^3 + 3x^2 = 12$$

$$x^3 + 3x^2 - 4x - 12 = 0$$

$$x^2(x+3) - 4(x+3) = 0$$

$$(x^2 - 4)(x+3) = 0$$

$$(x+2)(x-2)(x+3) = 0$$

$$x = -2, x = 2, x = -3$$

$$y = x^3 + 3x^2$$

$$(-2, 4) \quad -8 + 12$$

$$(2, 20) \quad 8 + 12$$

$$(-3, 0) \quad -27 + 27$$

