Warm-up:

Slide over and work with your elbow partner.

1) **Solving a nonlinear system by substitution**

$x^2 + x - y = -1$

$x + y = 4$

$\rightarrow$ $x^2 + x - y = -1$

$y = (-x + 4)$

Step 1: Solve one equation for either x or y

Step 2: Replace the letter you solved for in the other equation

Step 3: Solve your "new" one variable equation

$x^2 + x - (-x + 4) = -1$

$x^2 + x + x - 4 = -1$

$x^2 + 2x - 4 = -1$

$+1 \quad +1$

$x^2 + 2x - 3 = 0$ 3.1

$(x + 3)(x - 1) = 0$

$x + 3 = 0 \quad x - 1 = 0$

$x = -3 \quad x = 1$

Y-parts

$y = -x + 4$

$x = -3 \qquad x = 1$

$y = -(-3) + 4$

$y = 3 + 4$

$y = 7$

$(-3, 7)$

$y = -(1) + 4$

$y = -1 + 4$

$y = 3$

$(1, 3)$

Agenda:

1) **Warm-up**
2) **Homework Questions**
3) **In-class review of chapter 3 (w/elbow partner)**
4) **Practice test (review)**

Algebra 2: Chapter 3 Review

3.1 Solving Quadratic Equations by Graphing

Solve the equation by graphing.

1) $-2x^2 - 2 = 4x$

Step 1: Set equal to $-2x^2 - 4x - 2 = 0$

Step 2: $a =$ $b =$ $c =$ $a = -2$ $b = -4$ $c = -2$

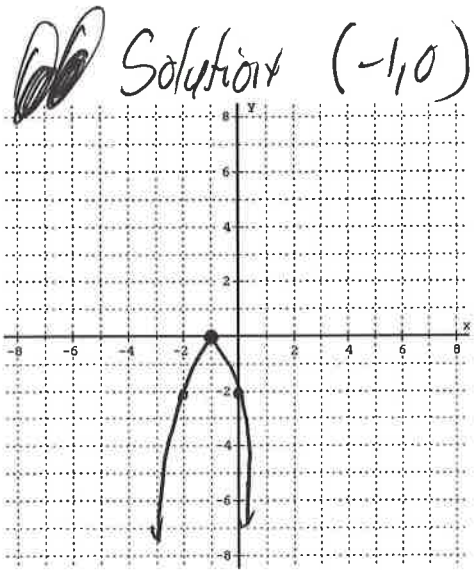
Step 3: Vertex $\frac{-b}{2a}$ $\frac{4}{2(-2)} = \frac{4}{-4} = -1$

Step 4: Y-part $-2(-1)^2 - 4(-1) - 2$

$-2 + 4 - 2$

$2 - 2 = 0$

Step 5: a-value $a = -2/1$



Vertex $(-1, 0)$

Solving Quadratic Equations by the Square Root Method:

Step 1: isolate the "squared" part [move all numbers out-side the squared-part to the other side]

Step 2: Take the square-root of both sides

***Should get two answers**

1) $2x^2 + 1 = 17$

$-1 \quad -1$

$\frac{2x^2}{2} = \frac{16}{2}$

$\sqrt{x^2} = \sqrt{8} \rightarrow x = \pm\sqrt{8}$

$\sqrt{8} = \sqrt{4} \cdot \sqrt{2} = 2\sqrt{2}$

$x = \pm 2\sqrt{2}$

Solving Quadratic Equations by Factoring:

1) $x^2 - 12x = 28$

28·1
14·2
7·4

$x^2 - 12x - 28 = 0$

$(x - 14)(x + 2) = 0$

$x - 14 = 0 \quad x + 2 = 0$

$x = 14$ & $x = -2$

2) $6x^2 + 12x = 0$

common Term

$6x(x + 2) = 0$

$6x = 0 \quad x + 2 = 0$

$x = 0$ & $x = -2$

3) $3x^2 - 17x + 10 = 0$

grouping

30·1
15·2
10·3
6·5

$(3x^2 - 15x - 2x + 10) = 0$

$3x \quad -2 \quad -2$

$3x(x - 5) - 2(x - 5) = 0$

$(x - 5)(3x - 2) = 0$

$x - 5 = 0 \quad 3x - 2 = 0$

$x = 5 \quad x = 2/3$

3.2 Complex Numbers:

1) Add/Subtract $(7-5i)-(1-5i)$

$7-5i-1+5i$

6

2) Multiply $(7-4i)(-1+2i)$

Foil

$i^2=-1$

$-7+14i+4i-8i^2$

$-7+18i+8$

$1+18i$

3) Solve $2x^2+9=-41$

$-9 \quad -9$

$\frac{2x^2}{2}=\frac{-50}{2}$

$x^2=-25$

$x=\pm\sqrt{-25}$

$x=\pm 5i$

3.3 Completing the Square:

Step 1: The leading coefficient must be 1. (if it is not, then divide by the number in front of the x^2)

Step 2: Write your equation in the correct form:

$a(x^2 + bx\ \ \ \ \ \ \ \ \ \ \ \ ) + c$

Step 3: Take half of b...then "square" it....add & subtract it

Step 4: Move the negative one outside of the ( )

Step 5: Factor the ( )

Solve: $X^2 - 10x - 3 = 0$

$(x^2 - 10x + 25 - 25) - 3 = 0$ (−25)

$(5)^2 = 25$

$(x^2 - 10x + 25) - 28 = 0$

$(x - 5)^2 - 28 = 0$

$\sqrt{(x-5)^2} = \sqrt{28}$

$x - 5 = \pm\sqrt{28}$

$\sqrt{28}$ → 28·1, 14·2, 4·7 → $\sqrt{4}\sqrt{7}$ → $2\sqrt{7}$

$x = 5 \pm 2\sqrt{7}$

3.4 The Quadratic Formula:

***Used for find x-intercepts to quadratics: $ax^2+bx+c = 0$**

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Step 1: Set your equation equal to zero

Step 2: list a= b= c=

Step 3: Plug a, b, c into the formula

Step 4: Simplify

***This finds x-intercepts or solutions to quadratic equations!**

Solve by the quadratic formula: $2x^2 + x = 5$

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

$a=2 \quad b=1 \quad c=-5$

$$\frac{-1 \pm \sqrt{1-4(2)(-5)}}{2(2)} \rightarrow \frac{-1 \pm \sqrt{1+40}}{4} \rightarrow \boxed{\frac{-1 \pm \sqrt{41}}{4}}$$

3.5 Solving Nonlinear Systems:

Solving a nonlinear system by graphing

$y = x^2 - 2x - 1$

$y = -2x - 1$

$y = -2x - 1$

Slope $= \frac{-2}{1}$

y-int $= -1$

$y = x^2 - 2x - 1$

$a = 1 \quad b = -2 \quad c = -1$

$\frac{-b}{2a} = \frac{2}{2(1)} = \frac{2}{2} = 1$

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

$1 - 2 - 1$

$-1 - 1$

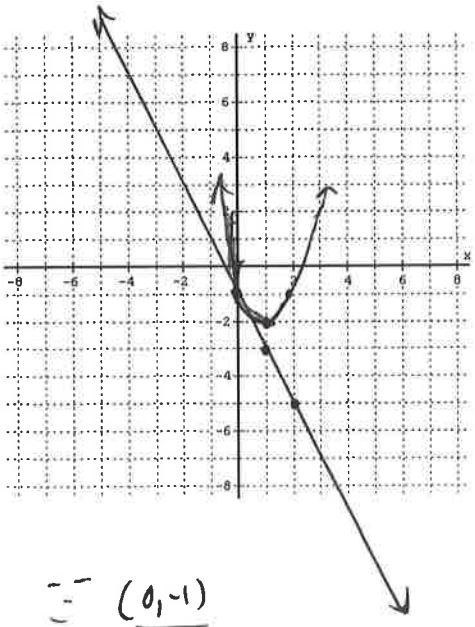
-2

V(1, -2)

"a" value

1/1

$= (0, -1)$



Solving a nonlinear system by elimination

$2x^2 - 5x - y = -2$

$x^2 + 2x + y = 0$

Step 1: Line your equations up (x above x, y above y, x^2 above x^2...)

Step 2: Eliminate all x's or all y's (so your equation only has one variable0

- You might need to multiply an equation by a number to make them add to zero

Step 3: Solve the remaining one-variable equation

$2x^2 - 5x - y = -2$

$x^2 + 2x + y = 0$

$3x^2 - 3x = -2 \quad 6 \cdot 1 \quad 3 \cdot 2$

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

$a = 3$

$b = -3$

$c = 2$

$$\frac{3 \pm \sqrt{9 - 4(3)(2)}}{2(3)}$$

$$\frac{3 \pm \sqrt{9 - 24}}{6}$$

$$\frac{3 \pm \sqrt{-15}}{6}$$

imaginary

NO SOL