Warm Up

Simplify the following

1. $\sqrt{-16x^2}$

2. $\sqrt{-72xy^5}$

3. $(1 + 3i) + (2 + i)$

4. $(7 + 4i)(2 - 3i)$

Objectives   Review Factoring Quadratic Equations

Solve Quadratic Equations using factoring and graphing techniques

Homework   Packet Page 8 all
Packet Page 9 all
Packet Page 10 Sections I and II even only

How about a Quiz on Complex numbers?

Quadratics – Factoring

Factoring is basically FOIL (or the box method) in reverse

$$(x + 2)(x + 7)$$

When we multiply these factors we end up with

$$x^2 + 9x + 14$$

Our objective is to go from Standard form to Factored Form

$$x^2 + 11x + 24$$

Factors of 24	Sum of the factors
1·24	1 + 24 =25
2·12	2 + 12 =14
3·8	3 + 8 =11
4·6	4 + 6 =10

So which factor pair becomes a part of our pair of factors?

$$(x + \underline{3})(x + \underline{8})$$

Our objective is to go from Standard form to Factored Form

$$x^2 - 11x + 24$$

Factors of 24	Sum of the factors
(-1)(-24)	-1 - 24 =-25
(-2)(-12)	-2 - 12 =-14
(-3)(-8)	-3 - 8 =-11
(-4)(-6)	-4 - 6 =-10

So which factor pair becomes a part of our pair of factors?

$$(x - \underline{3})(x - \underline{8})$$

Find factors of a · c that sum up to b.

Factors of a · c = -42	Sum of the factors
$1(-42)$	$1 - 42 = -41$
$2(-21)$	$2 - 21 = -19$
$3(-14)$	$3 - 14 = -11$
$6(-7)$	$6 - 7 = -1$

Set up the function factors with the factors identified in the previous step. Divide each factor by the value of a and simplify.

Swing the denominator of any fractions remaining in front of the x term in the factor.

SWING Method for $a \neq 1$

$$6x^2 - 11x - 7$$

$$\left(x + \frac{3}{6}\right)\left(x + \frac{-14}{6}\right)$$

$$\left(x + \frac{1}{2}\right)\left(x - \frac{7}{3}\right)$$

$$(2x + 1)(3x - 7)$$

In your packet, page 8, work on the example problem $10x^2 + 13x - 3$
If you finish, work on problems 1-3 on that page.

Difference of Squares (see page 3 in your packet)

$$a^2 - b^2 = (a + b)(a - b)$$

$$4x^2 - 36 = (2x + 6)(2x - 6)$$

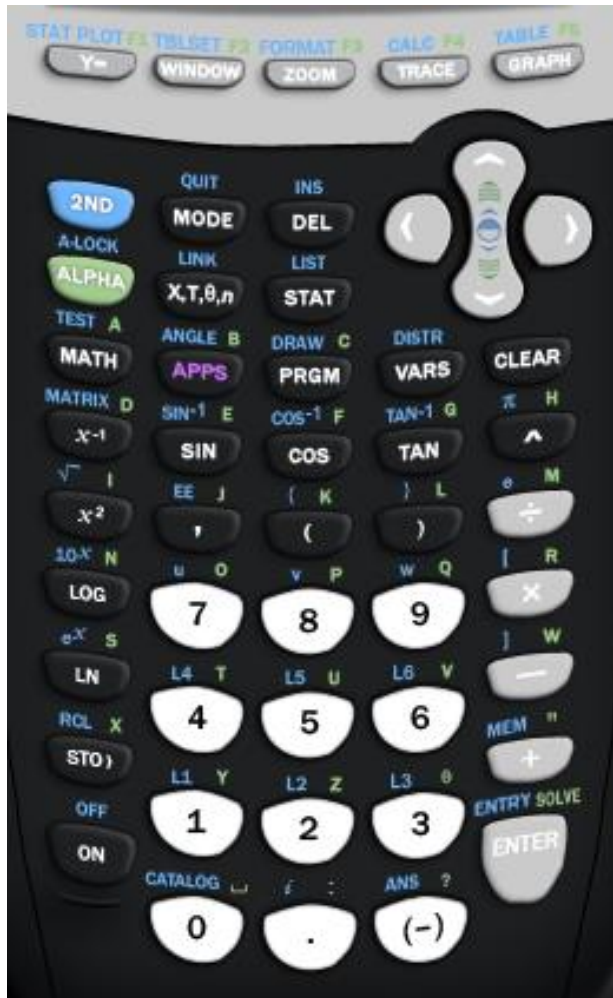This one, you will need to be familiar with. Differences of squares show up a lot.
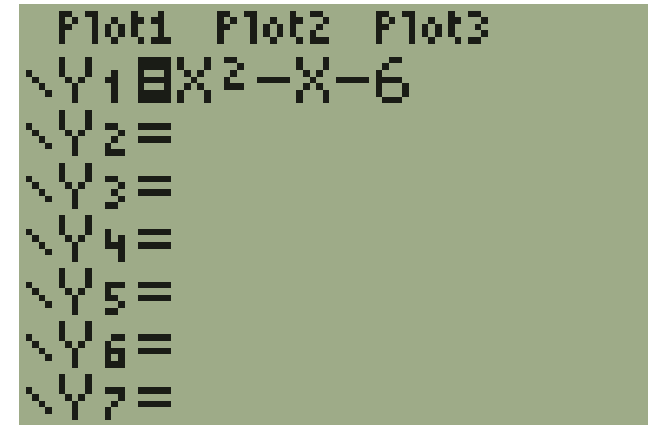
Factor the following

1. $x^2 - 49$

2. $16x^2 - 9y^2$

3. $32x^2 - 18y^2$

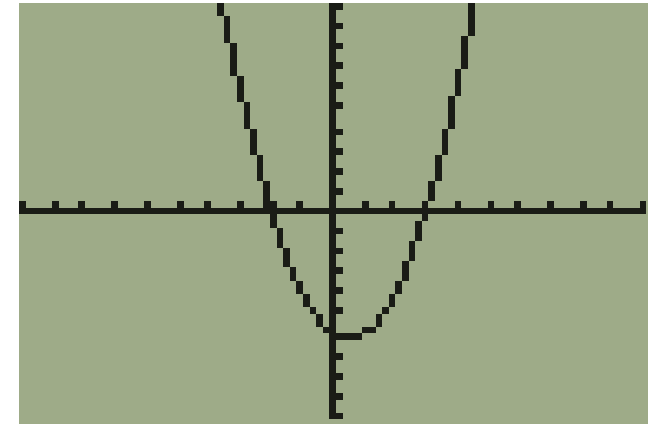**You can use the graphing calculator to find the solutions to a quadratic equation.**

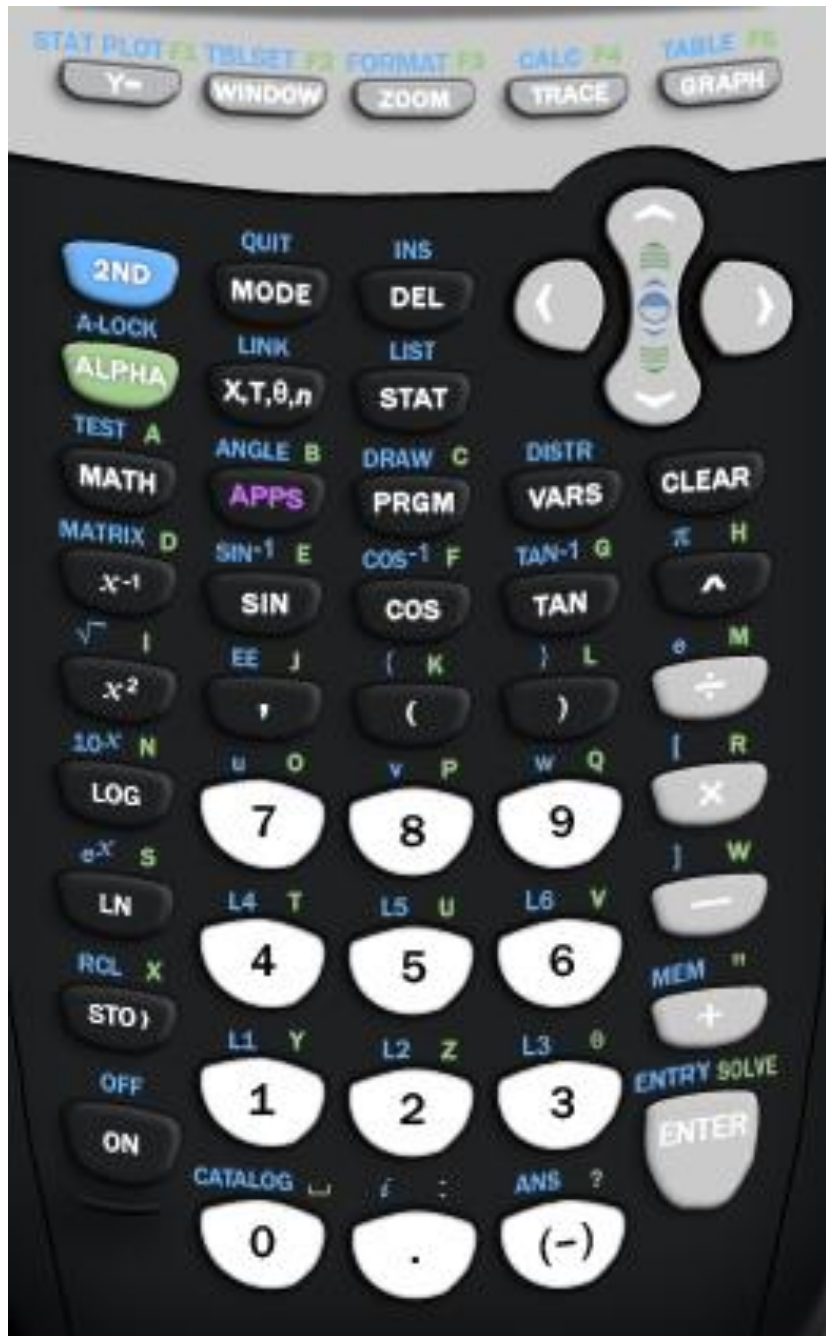Enter the equation $x^2 - x - 6$ into y_1
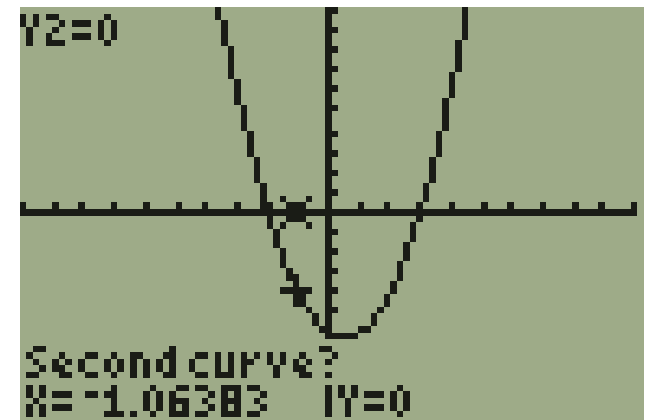
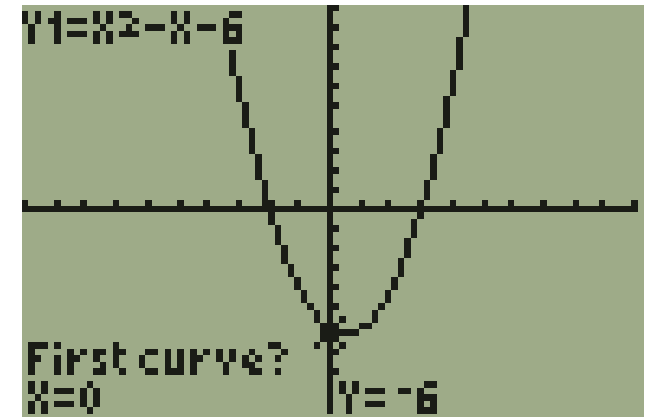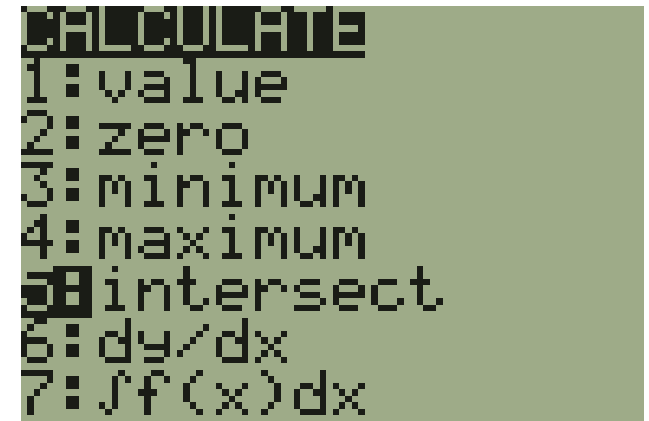Press the graph button.

How many solutions? Type?

Enter 0 in y_2
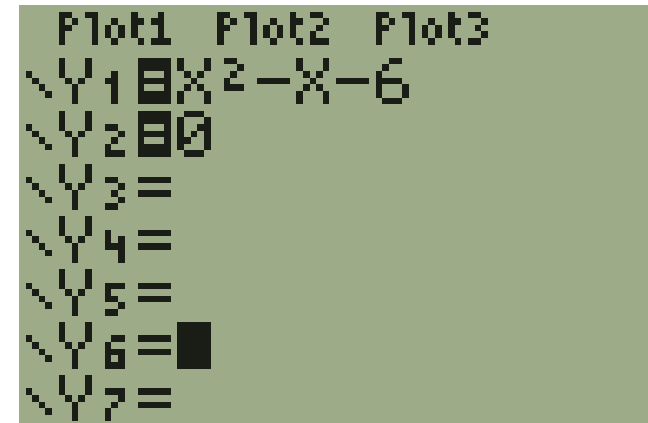
Press 2nd TRACE and select 5:intersect

The cursor will be positioned on y_1. Press enter to select this function.

The cursor will jump to y_2 which is the x axis. Press enter to select this function.


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CALCULATE
1:value
2:zero
3:minimum
4:maximum
5:intersect
6:dy/dx
7:∫f(x)dx
```


Y1=X2-X-6

First curve?
X=0   Y=-6

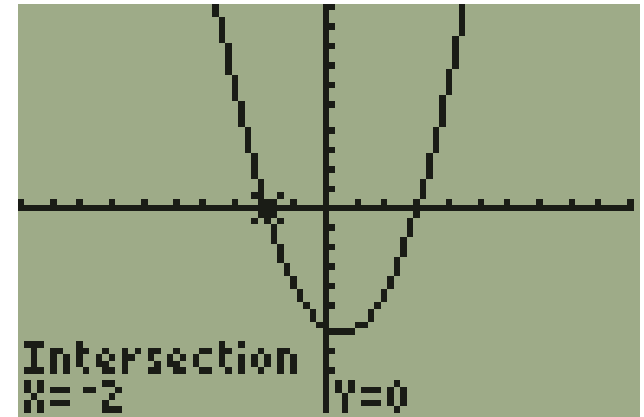Y2=0

Second curve?
X=-1.06383   Y=0

Solving with the Calculator

You will be asked for a guess. Just press enter again.
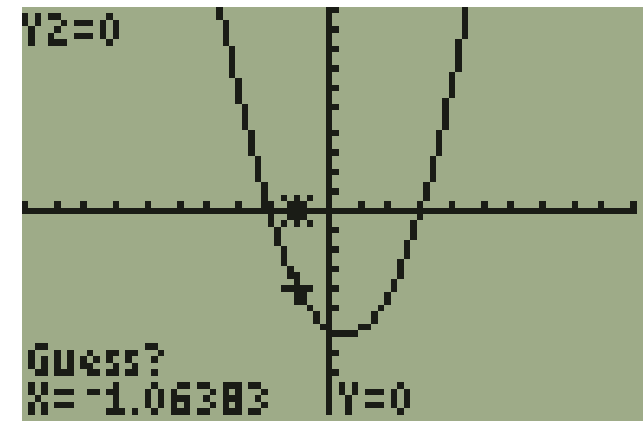
The intersection is one of the solutions. In this case it's $x = -2$

Now we repeat the process to find the other solution.

Solving with the Calculator

2nd TRACE intersection

Y1=X²-X-6

First curve?
X=2.1276596   Y=-3.600724

Move the cursor to the other side of the vertex. Then press enter.

Y2=0

Second curve?
X=2.1276596   Y=0

Press enter twice. This is the second solution to this equation.

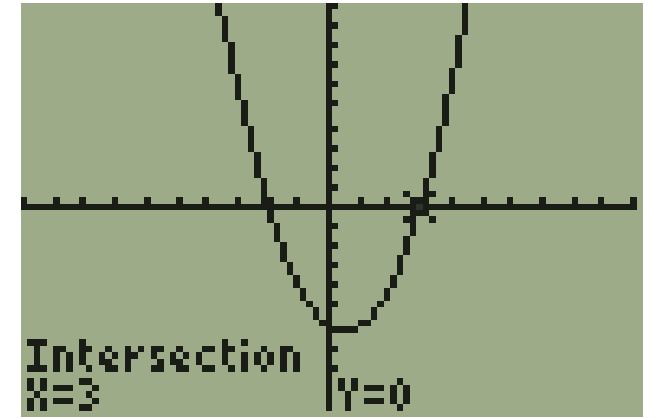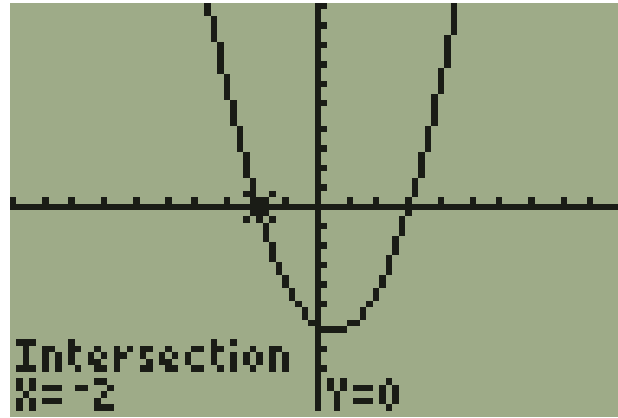Intersection
X=3   Y=0
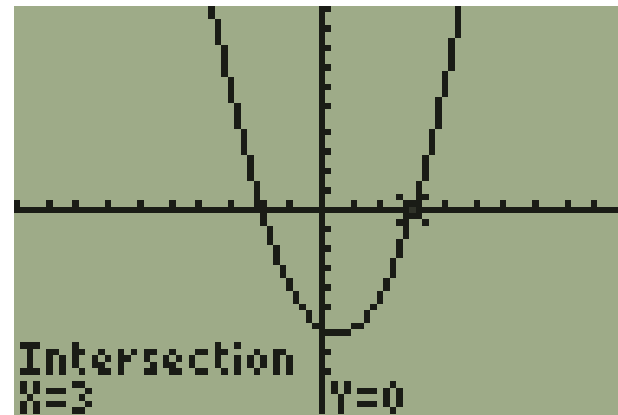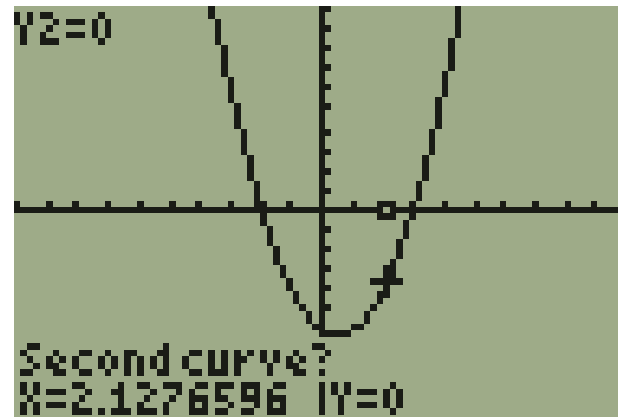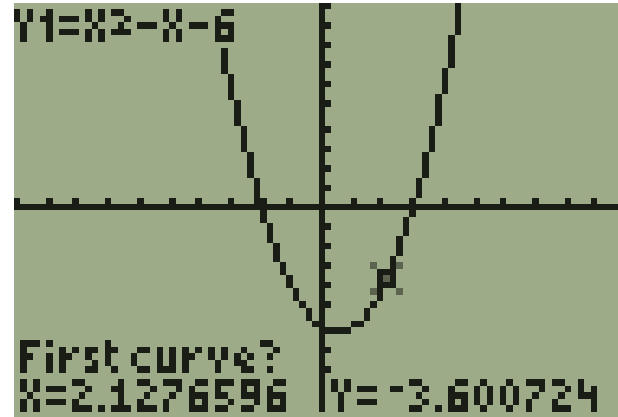
So our two solutions are $x = -2$ and $x = 3$

Just for grins, verify the solutions using the quadratic formula.

$$x^2 - x - 6$$

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

Intersection
X=-2   Y=0

Intersection
X=3   Y=0

$$x = \frac{1 \pm \sqrt{1 - 4(1)(-6)}}{2}$$

$$x = \frac{1 \pm \sqrt{25}}{2} = \frac{1 \pm 5}{2}$$

$$x = \frac{6}{2} = 3 \qquad\qquad x = \frac{-4}{2} = -2$$