Solve for the zeros in any way.
Write the function in vertex form.

1. $f(x) = 4x^2 - 12x - 40$

$x = -2$
$x = 5$
$h = \frac{-b}{2a}$ $\frac{12}{8}$ x-value of vertex
$f(x) = (x-1.5)^2 - \frac{49}{4}$
$4(x^2 - 3x - 10)$
$(x - \frac{3}{2})^2 = \frac{49}{4}$
$x - \frac{3}{2} = \pm\frac{7}{2}$
$x - \frac{3}{2} = \frac{7}{2} \cdot \frac{2}{2} = 5$
$+\frac{3}{2}$

Use completing the square to write the function in vertex form and solve for the zeros

2. $f(x) = x^2 + 8x + 43$

$x = -4 + 3i\sqrt{3}$ or $x = -4 - 3i\sqrt{3}$
$f(x) = (x+4)^2 + 27$
$(x+4)^2 = -27$
$i = \sqrt{-1}$
$x - \frac{3}{2} = -\frac{7}{2} + \frac{3}{2}$
$\frac{-4}{2} = -2$
$+\frac{3}{2}$

Nov 3-2:09 PM

2B - Go over conjugates and review the pattern of imaginary numbers to a power!

Complex Number Activity for 10 minutes

$\frac{9+4i}{8-8i} \cdot \frac{(8+8i)}{(8+8i)}$
$64 + 64i + 64i - 64i^2$
$64 - 64i^2$
$64 - 64(-1)$
$64 + 64$
$128$

$i = i$
$i^2 = -1$
$i^3 = -i$
$i^4 = 1$
$i^5 = i$
$i^6 = -1$

Nov 3-2:11 PM

Conjugate

$(3+i)(3-i)$
$9 - 3i + 3i - i^2$
$9 - (-1) = 10$

$\frac{3(3-i)}{3+i(3-i)}$
$\frac{9-3i}{10}$

$3 + \sqrt{2}$

$(6-i)(6+i)$

$(2+3i)(2-3i)$

Nov 4-10:58 AM

# Quiz

This quiz you will be allowed to take with a group if you like - but you can also take it by yourself. If you agree to take it in a group, then you are agreeing to get one grade for the whole group. When you turn your paper in, one will be randomly selected and that is the quiz that will be graded- everyone in the group will get the same grade.

Max of 3 people in a group.

Oct 31-11:51 AM

## Warm-Up

Use the quadratic formula to find the roots

$2x^2 + 12x - 13 = 0$ $\quad -x^2+16x-64=0$

Nov 6-10:26 AM

(3.5)

| Main Ideas/Questions | Notes/Examples |
|---|---|
| THE QUADRATIC FORMULA $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ | ① Write the equation in **STANDARD FORM**. $ax^2+bx+c=0$ |
| | ② Identify a, b, and c. **SUBSTITUTE** them into the formula. |
| | ③ **SIMPLIFY!** |

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

Oct 30-8:31 AM

| Main Ideas/Questions | Notes/Examples |
|---|---|
| The Discriminant | Formula for the Discriminant of a Quadratic Equation: $d=b^2-4ac$ |

| What information does it provide? | Value of d | Number of Roots | Type of Roots |
|---|---|---|---|
| | $d>0$ (a perfect square) | 2 | real, rational |
| | $d>0$ (NOT a perfect square) | 2 | real, irrational |
| | $d=0$ | 1 | real, rational |
| | $d<0$ | 2 | imaginary (non-real) |

Oct 30-8:32 AM

**Find the value of the discriminant, then determine the number and type of roots.**

1. $2x^2+12x-13=0$ — 248; 2, real, irrational
2. $-x^2+16x-64=0$ — 0; 1 root; real, rational
3. $-4x^2+84=10x$ — 1444; 2 roots, rational
4. $3x^2+24=0$ — $-288$; 2i; imaginary

Oct 30-8:33 AM

**10.** $4x^2 + 76 = 16x$

Nov 6-11:04 AM

| Method | Can be used... | When? |
|---|---|---|
| GRAPHING | Sometimes *time consuming | you have intergers |
| FACTORING | Sometimes | rational roots |
| SQUARE ROOTS | Sometimes | $x^2 - 25$; $(x-3)^2 + 8 = 44$ |
| COMPLETING THE SQUARE | always | best when "a" = 1 ; when b is even |
| QUADRATIC FORMULA | always | when other methods won't work |

Oct 30-8:33 AM

Writing equations given the roots/zeros

Given that the roots of a quadratic are $x = 2$ and $x = 7$, what is the standard form of the function?

$(x-2)=0 \quad (x-7)=0$

$(x-2)(x-7)=0 \rightarrow x^2-7x-2x+14=0$

$x^2-9x+14=0$

Given that the roots of a quadratic are $x = -3$ and $x = 3/4$, what is the standard form of the function?

$x^2+\frac{9}{4}x-\frac{9}{4}$ $\quad x+3=0$ $\quad 4x^2+9x-9=0$

$4 \cdot x = \frac{3}{4} \cdot 4$

$4x=3$

$4x-3=0$

Given that the roots of a quadratic are $x = -5$ and $x = 1/4$, what is the standard form of the function?

$x^2+\frac{19}{4}x-\frac{5}{4}$

$(4x-1)(x+5)$

$4x^2+20x-x-5$

$4x^2+19x-5$

Given that the roots of a quadratic are $x = 3/5$ and $x = -1/2$, what is the standard form of the function?

$10x^2-x-3$ $\quad x^2-\frac{1}{10}x-\frac{3}{10}$

Nov 3-2:24 PM

Nov 6-11:40 AM

Vertex Form h= k=

Standard Form b= c=

Solving Quadratic Functions

1. Factoring: equation must equal 0
Leading coefficient cannot be negative

2. Square Rooting: no b term only an $x^2$ or $(x - h)^2$

3. Completing the square: set equation equal to c value
*a* must equal 1 (divide by *a* value) you are creating a perfect square trinomial so that you can eventually square root to solve

4. Quadratic formula: must be in standard form and equal 0

Nov 8-8:40 AM

## Review Day

In class Review sheet- work on with partners

Nov 3-2:28 PM