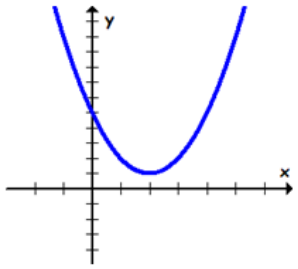
NotesAA7-3 Using the quadratic equation to find complex roots

When our quadratic equation has three terms, we need to use the quadratic ~~equation~~ formula to find complex roots

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

Find the roots of: $y = x^2 - 4x + 5$. Notice that it does not factor nicely because it has two complex and no real roots.



We need to solve $0 = 1x^2 - 4x + 5 = 0$

a = 1 b= -4 c= 5

Plug those into the equation: $x = \frac{-(-4) \pm \sqrt{(-4)^2-4(1)(5)}}{2(1)}$ and solve for x.

$$= \frac{4 \pm \sqrt{16-20}}{2}$$

$$= \frac{4 \pm \sqrt{-4}}{2}$$

$$= \frac{4 \pm 2i}{2}$$

$$= \frac{4}{2} \pm \frac{2i}{2}$$

$$= 2 \pm i$$

two complex roots

$2 + i$ $2 - i$

$y = (x - (2 + i))(x - (2 - i))$ complex conjugates

standard to factored
factored to standard,

How do we factor (x^2 + *positive number*)?

<u>example: $x^2 + 25$</u>

step 1: Set it = 0 $x^2 + 25 = 0$

step 2: Solve for x $\sqrt{x^2} = \sqrt{-25}$

$x = \pm 5i$

plus or fricking minus

step 3: These are the roots, now write the factors $(x-5i)(x- -5i)$

$x^2 + 25 = (x-5i)(x+5i)$