Bell Work

$\text{"}c\text{"} = \left(\frac{b}{2}\right)^2$

You will need your own paper today for the homework.

Convert to vertex form by completing the square.

1. $y = 2x^2 + 8x - 9$

$y = 2x^2 + 8x \quad -9$

$y = 2(x^2 + 4x + \underline{4}) - 9 + \underline{-8}$

$y = 2(x+2)^2 - 17$

STOP

Solve by completing the square

2. $2x^2 - 12x + 7 = 0$

$2x^2 - 12x = -7$

$2(x^2 - 6x + \underline{9}) = -7 + \underline{18}$

$2(x-3)^2 = 11$

$\sqrt{(x-3)^2} = \sqrt{\frac{11}{2}}$

$x - 3 = \pm \frac{\sqrt{11}}{\sqrt{2}} \frac{\sqrt{2}}{\sqrt{2}}$

$x = 3 \pm \frac{\sqrt{22}}{2}$

$\left(\frac{1}{2}\right)^2$

$(1/2)(1/2)$

3. $3x^2 - 3x + 8 = 0$

$3x^2 - 3x = -8$

$3(x^2 - x + \underline{1/4}) = -8 + \underline{3/4}$

$3(x - 1/2)(x - 1/2)$

$\frac{3}{3}(x - 1/2)^2 = \frac{-29}{4} \cdot \frac{1}{3}$

$\sqrt{(x - 1/2)^2} = \sqrt{\frac{-29}{12}}$

$x - \frac{1}{2} = \pm \frac{\sqrt{-29}}{\sqrt{12}}$

$x = \frac{1}{2} \pm \frac{i\sqrt{29}}{2\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}}$

$x = \frac{1}{2} \pm \frac{i\sqrt{87}}{6}$

Complete the square

$ax^2 + bx + c = 0$

$\left(\frac{b}{2a}\right)^2 \Rightarrow \frac{b^2}{4a^2} \quad \left(\frac{b^2}{4a^2}\right)a = \frac{b^2}{4a}$

Full

$ax^2 + bx = -c$

$a\left(x^2 + \frac{b}{a}x + \underline{\frac{b^2}{4a^2}}\right) = -c + \underline{\frac{b^2}{4a}}$

$= \frac{-4ac + b^2}{4a}$

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

$a\left(x + \frac{b}{2a}\right)^2$

$\sqrt{\left(x + \frac{b}{2a}\right)^2} = \sqrt{\frac{b^2 - 4ac}{4a^2}}$

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

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

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

Videos

pop goes the weasel students repeat

http://www.youtube.com/watch?v=O8ezDEk3qCg

pop goes the weasel with weasel

http://www.youtube.com/watch?v=2lbABbfU6Zc

rolling in the roots

http://www.youtube.com/watch?v=jNrgTVPPaR4&safe=active

Pull

https://www.youtube.com/watch?v=z6hCu0EPs-o

quad dance

http://www.youtube.com/watch?v=jGJrH49Z2ZA

QUADRATIC FORMULA

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

$$ax^2 + bx + c = 0$$

where a, b, and c come from any quadratic equation.

Plug them in!

factor
"square root both sides" x^2 only $(\ )^2$

Solve: CTS → quadratic Formula

$x^2 + 3x = 2$ Make the equation =0

$\underset{a}{1}x^2 + \underset{b}{3}x - \underset{c}{2} = 0$ a = 1 b = 3 c = -2

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

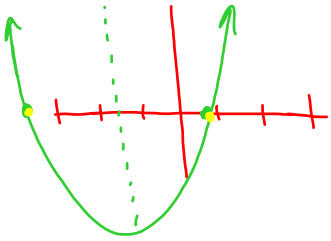
$$x = \frac{-3 \pm \sqrt{9 - 4(1)(-2)}}{2(1)}$$

$$x = \frac{-3 \pm \sqrt{17}}{2}$$

$$x = \frac{-3 \pm \sqrt{17}}{2}$$

$$x = -\frac{3}{2} + \frac{\sqrt{17}}{2}$$

$$x = -\frac{3}{2} - \frac{\sqrt{17}}{2}$$



Solve: $25x^2 - 18x = 12x - 9$ Set = 0

$25x^2 - 30x + 9 = 0$

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

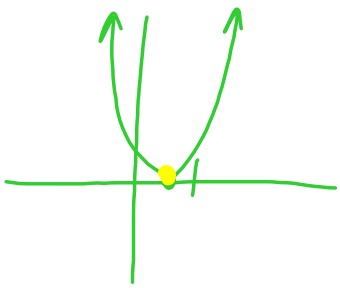
$x = 3/5$

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

$$x = \frac{30 \pm \sqrt{900 - 4(25)(9)}}{2(25)}$$

$$x = \frac{30 \pm \sqrt{0}}{50}$$

$$x = \frac{30}{50} = \frac{3}{5}$$



Solve: $-x^2 + 4x = 5$

Set = 0

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

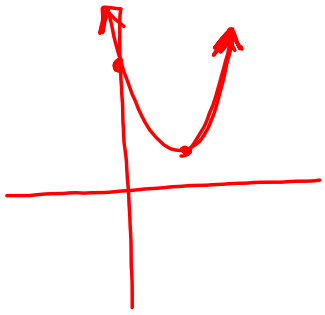
$x^2 - 4x + 5 = 0$

$$x = \frac{4 \pm \sqrt{16 - 4(1)(5)}}{2(1)}$$

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

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

$x = 2 \pm i$



Solve: $4x^2 - 10x = 2x - 6$

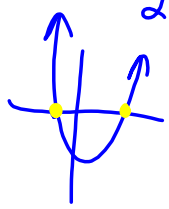
$4x^2 - 12x + 6 = 0$

$2(2x^2 - 6x + 3) = 0$

a b c

$$x = \frac{6 \pm \sqrt{36 - 4(2)(3)}}{2(2)} = \frac{6 \pm \sqrt{12}}{4} = \frac{6 \pm 2\sqrt{3}}{4}$$

$$x = \frac{3 \pm \sqrt{3}}{2}$$



Discriminant

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

$b^2 - 4ac$ is called the discriminant
this tells you how many solutions you have.

if $b^2 - 4ac > 0$ then you have 2 real solutions.
if $b^2 - 4ac < 0$ then you have 2 imaginary solutions.
if $b^2 - 4ac = 0$ then you have 1 real solution.