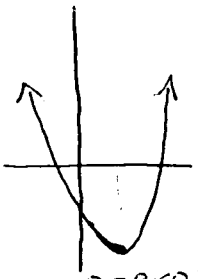
[redacted]

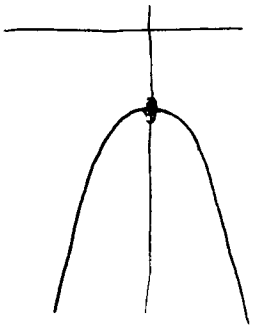
Zeros of a Quadratic Function

Nov 1st

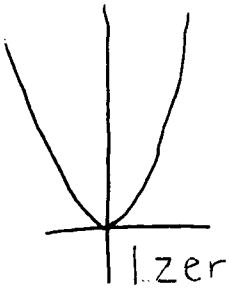
A "zero" is another way of saying x-intercept.
So finding the zeros of a quadratic function is simply finding x-intercepts



2 zeros



0 zeros



1 zero

Determine the x-intercepts for each of the following quadratic functions

① $f(x) = -2x^2 + 12x - 18$

$$x = \frac{-12 \pm \sqrt{12^2 - 4(-2)(-18)}}{2(-2)}$$

$$= \frac{-12 \pm \sqrt{144 - 144}}{-4}$$

$$= \frac{-12 \pm \sqrt{0}}{-4}$$

$$= \frac{-12 \pm 0}{-4}$$

$x = 3$

1 root

② $f(x) = 2x^2 + 6x - 8$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(2)(-8)}}{2(2)}$$

$$= \frac{-6 \pm \sqrt{36 + 64}}{4}$$

$$= \frac{-6 \pm \sqrt{100}}{4}$$

$x = \frac{-6 + 10}{4}$ $\quad x = \frac{-6 - 10}{4}$

$x = 1$ $\quad x = -4$

2 roots

③ $x^2 - 4x + 7$

$$x = \frac{4 \pm \sqrt{-4^2 - 4(1)(7)}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{16 - 28}}{2}$$

$$x = \frac{4 \pm \sqrt{-12}}{2}$$

no roots

1) $b^2 - 4ac = 0$
$\Rightarrow$ 1 root

2) $b^2 - 4ac = > 0$
$\Rightarrow$ 2 roots

3) $b^2 - 4ac = < 0$ (negative under square root)
$\Rightarrow$ no roots