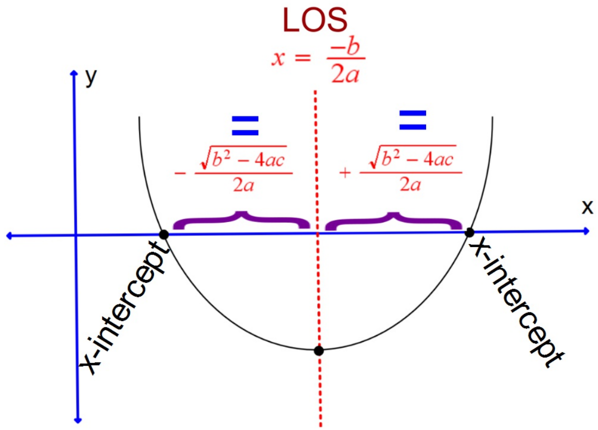
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Can be written as:

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

LOS

?



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

Can be written as:

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

LOS

Distance from LOS to both x-intercepts.

Find all real solutions to the nearest hundredth.

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

$$6x^2 + 7x - 20 = 0$$

$b^2 - 4ac = 529$

$$x = \frac{-7 \pm \sqrt{529}}{12} = 1.33, \ -2.5$$

Find all EXACT Real Solutions.

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

$$x^2 + 3 = 5x \rightarrow x^2 - 5x + 3 = 0$$

$-5x \quad -5x$

$b^2 - 4ac = 13$

$$\frac{5 \pm \sqrt{13}}{2} = \boxed{\frac{5 \pm \sqrt{13}}{2}}$$

Find all EXACT Real Solutions.

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

$$x^2 - 8x - 2 = 0$$

$b^2 - 4ac = 72$

$$\frac{8 \pm \sqrt{72}}{2} \quad \sqrt{36 \cdot 2} \quad = \frac{8 \pm 6\sqrt{2}}{2}$$

$$= \boxed{4 \pm 3\sqrt{2}}$$

Find all EXACT Real Solutions.

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

$$4x^2 - 20x + 7 = 0$$

$b^2 - 4ac = 288$

$$\sqrt{144 \cdot 2}$$

$$\frac{20 \pm \sqrt{288}}{8} = \frac{20 \pm 12\sqrt{2}}{8} = \boxed{\frac{5 \pm 3\sqrt{2}}{2}}$$

Find all EXACT Real Solutions.

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

$$3x^2 - 2x - 9 = 0$$

$b^2 - 4ac = 112$

$$\frac{2 \pm \sqrt{112}}{6} \quad 16 \cdot 7 \quad = \frac{2 \pm 4\sqrt{7}}{6} = \boxed{\frac{1 \pm 2\sqrt{7}}{3}}$$

Find all Exact Real Solutions.

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

$$16x^2 - 56x + 49 = 0$$

$b^2 - 4ac = 0$

$$\frac{56 \pm \sqrt{0}}{32} = \frac{56}{32} = 1.75$$

Find all Exact Real Solutions.

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

$$7x^2 + 3x + 4 = 0$$

$b^2 - 4ac = -103$

NO Real Sol

You can now finish Hwk #13 Sec 5-8

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Problems 7-9, 22-24, 28

Due Tomorrow

7-9: Find exact solutions only.

22-24, 28: Find exact solutions and solutions rounded to the nearest hundredth.

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

What part of the Quadratic Formula determines if there are Real solutions or not?

$b^2 - 4ac$ → This is called the DISCRIMINANT

Depending on the value of the DISCRIMINANT you can determine how many and what kind of solutions there will be.

Discriminate: recognize a distinction; differentiate

What are the only three values the DISCRIMINANT can be?

POS

NEG

Zero

Discriminant	# and kind of solutions
$b^2 - 4ac > 0$	2 Real Solutions
$b^2 - 4ac = 0$	1 Real Solution
$b^2 - 4ac < 0$	0 Real Solutions or 2 Imaginary Solutions

Tell the number of solutions each quadratic equation has and if they are real or imaginary.

1. $x^2 + 8x - 3 = 0$
   $b^2 - 4ac = 76$
   2 real

2. $2x^2 - 7x + 8 = 0$
   $b^2 - 4ac = -15$
   No Real

3. $-3x^2 - 4x + 5 = 0$
   $b^2 - 4ac = 76$
   2 real

4. $2x^2 - 20x + 50 = 0$
   $b^2 - 4ac = 0$
   1 real

5. $-4x^2 + 7x - 2 = 0$
   $b^2 - 4ac = 17$
   2 real

For some of these equations you can tell that there will be 2 Real solutions without doing anything. Which ones?

You can tell that #'s 1 and 3 have two real solutions without finding the Discriminant.

A Quadratic Equation always has two real solutions if: $b^2 - 4ac$ is POSITIVE

$b^2 - 4ac$ will ALWAYS be Positive if:

Either a OR c is negative.

How many x-intercepts does this Quadratic Function have? Real Sol

$$y = 4x^2 - 6x + 3$$

$b^2 - 4ac$

$36 - 4(4)(3) = -12$

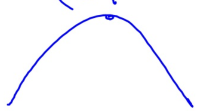
$b^2 - 4ac < 0$

This equation has no real solution, therefore, the graph has NO x-intercepts

An object is shot into the air from the top of a 100 foot tall building. The following equation models the height (ft) of the object as a function of time (sec).

$$h(t) = -16t^2 + 200t + 100$$

(t, h)



a) Find the max height and the time to reach it. (vertex)

LOS: $t = \frac{-200}{-32} = 6.25$ sec

$h(6.25) = 725$ ft

b) Find the time to reach the ground

$h = 0$

$0 = -16t^2 + 200t + 100$

$b^2 - 4ac$

solve this with the quadratic formula.