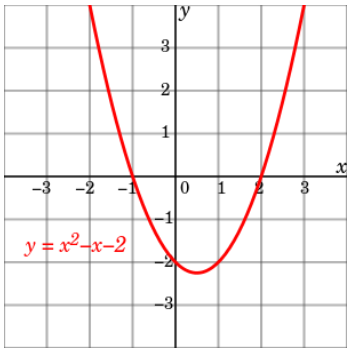
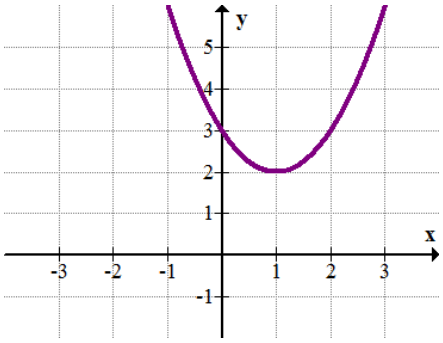
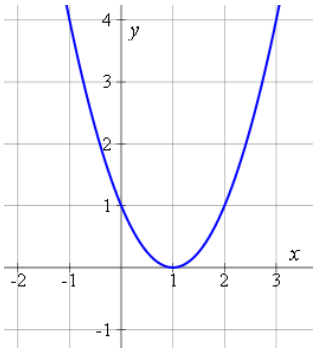
Quadratic Formula and the Discriminant

Remember, solutions to quadratic functions are also known as **zeroes, roots, and x-intercepts.**

How many solutions does each graph below have? *(think about the sentence above)*







The Discriminant

The discriminant is part of the quadratic formula. When you simplify the discriminant, it becomes a number that will tell you the number of solutions a quadratic function has.

Before finding the discriminant, you must make sure your equation is equal to zero

discriminant: $\boldsymbol{b^2 - 4ac}$

If the discriminant is negative, there is/are _____

If the discriminant is zero, there is/are _____

If the discriminant is positive, there is/are _____

For each equation below, determine the number of solutions.

1) $x^2 + 6x + 4 = 0$

2) $-3x^2 + 17x - 2 = 3$

3) $3x + 7 = -5x^2 - 4$

4) $x^2 - 5x - 34 = 0$

5) $2x^2 - 3x + 2 = 0$

6) $9x^2 + 24x + 10 = -6$

The Quadratic Formula

You can use the quadratic formula anytime that a quadratic equation is in general form. The quadratic formula is one method that will always work when solving quadratics.

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

Example: $4x^2 - 13x + 3 = 0$

Steps	Example
1) Find a, b, and c **make sure equation is set equal to zero**	
2) Plug a, b, and c into the quadratic formula	
3) Simplify the discriminant and denominator	
4) Separate into two equations and simplify	

Practice:

1) $x^2 + 11x + 10 = 0$

Discriminant: _____ which means _____

Root(s): _____

2) $7x^2 + 8x + 1 = 0$

Discriminant: _____

# of solutions: _____

Root(s): _____

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

Discriminant: _____

# of solutions: _____

Root(s): _____

4) $9x^2 + 6x + 1 = 0$

Discriminant: _____

# of solutions: _____

Root(s): _____

5) $y = 9x^2 + 14x + 3$

Discriminant: _____

# of solutions: _____

Root(s): _____

What is a Metaphor?

Solve each equation below using the quadratic formula. Cross out the box that contains the solution set. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

1) $x^2 + 4x + 3 = 0$

2) $x^2 - 7x + 10 = 0$

3) $x^2 + 5x + 6 = 0$

4) $x^2 - 3x - 4 = 0$

5) $y^2 + 2y - 8 = 0$

6) $x^2 - 5x + 2 = 0$

7) $d^2 + 3d - 7 = 0$

8) $2x^2 - 5x + 2 = 0$

9) $2n^2 - 3n - 5 = 0$

10) $3x^2 + 5x + 1 = 0$

11) $3y^2 - 2y - 8 = 0$

ONE $\{5, 2\}$	ATH $\left\{\frac{-5 \pm \sqrt{13}}{6}\right\}$	TOK $\left\{-4, \frac{1}{2}\right\}$	ING $\left\{\frac{5}{2}, -1\right\}$	ICK $\left\{\frac{-3 \pm \sqrt{37}}{2}\right\}$
ASL $\{-2, -3\}$	EEP $\left\{\frac{3 \pm \sqrt{15}}{2}\right\}$	MET $\{2, -4\}$	BOW $\left\{2, -\frac{4}{3}\right\}$	COW $\left\{\frac{2 \pm \sqrt{30}}{6}\right\}$
BOY $\left\{2, \frac{1}{2}\right\}$	RIT $\{-1, -3\}$	SIN $\{6, 1\}$	GLE $\left\{\frac{5 \pm \sqrt{17}}{2}\right\}$	ING $\{4, -1\}$

Remaining Letters:
