Often, the simplest way to solve "*ax*2 + *bx* + *c* = 0" for the value of *x* is to factor the quadratic, set each factor equal to zero, and then solve each factor.

**Factor: *x*2 + 5*x* + 6**

Find factors of 6 that add up to 5.

1. **x2 + 2x + 3x + 6**
2. **x(x+2) + 3(x+2)**
3. **(x+2)(x+3)**
4. **x = -2, -3**

But sometimes the quadratic is too messy, or it doesn't factor at all, or you just don't feel like factoring! (***Who doesn’t feel like factoring??***)

While factoring may not always be successful, the Quadratic Formula can ***always***find the solution.



**Note**: You will be GIVEN this formula on all quizzes and tests, but you are responsible for learning how to use it!

**Factor: *x*2 + 5*x* + 6 (using Quadratic Formula)**

1. **Find a, b, c: a = 1 b = 5 c= 6**
2. **Plug into the Quadratic Formula**

****

1. **Solve for BOTH the positive and negative**
2. **x = -2, -3**

In other words, don't be sloppy and don't try to take shortcuts, because it will only hurt you in the long run. Trust me on this!

**Solve *x*2 + 3*x* – 4 = 0 Using the quadratic formula** 

**The Discriminant** is the number underneath the square root sign in the quadratic formula

* ***b2 – 4ac***
* discriminant **positive**? 🡪 **two (real) roots,** and **two x-intercepts**
* discriminant **zero**? 🡪 **one (repeated) root,** and **one x-intercept**
* discriminant **negative? 🡪 zero (real) roots** and **no x-intercepts**

**Examples**: Complete the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| Equation: | ***x2 – 2x – 3 = 0*** | ***x2 – 6x + 9 = 0*** | ***x2 + 3x + 3 = 0*** |
| Discriminant?  (b2 – 4ac) |  |  |  |
| Solve:  (quadratic formula) |  |  |  |
| Graph:  (vertex, x-int) | H:\grid2020.JPG | H:\grid2020.JPG | H:\grid2020.JPG |
| Number of x-intercepts? |  |  |  |