Solve Quadratics Using the Quadratic Formula

There are three ways to solve a quadratic (to determine the zeros of a quadratic): Factoring, Completing the Square, and using the **Quadratic Formula**. Of these three options, Factoring sometimes works, completing the square always works (but not always easily), and the Quadratic Formula always works.

Today, we are going to use the Quadratic Formula:

Steps for using the Quadratic Formula:

1st: Determine *a, b & c*

2nd: Plug them into the Formula

3rd: Simplify each part as much as possible

4th: Divide all three terms by the same value (if they have a common factor – if not, skip this step)

5th: Split into two problems

6th: Simplify as much as you can

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| **EXAMPLE**  *Numbers only!*Copy the formula:Plug in *a*, *b*, & *c,* then solve:Zeros: ~~&~~  | **EXAMPLE** *Numbers only!*Copy the formula:Plug in *a*, *b*, & *c,* then solve:***Divide, if possible, from ALL parts:******SPLIT in two:***Zeros: &  | **EXAMPLE** *Numbers only!*Copy the formula:Plug in *a*, *b*, & *c,* then solve:***Divide, if possible, from ALL parts:******SPLIT in two:***Zeros: &  |
| 1. *Numbers only!**Copy the formula:**Plug in a, b, & c, then solve:**Zeros:*&  | 2. *Numbers only!**Copy the formula:**Plug in a, b, & c, then solve:**Zeros:*&  | 3. *Numbers only!**Copy the formula:**Plug in a, b, & c, then solve:**Zeros:*&  |
| 4. *Numbers only!**Copy the formula:**Plug in a, b, & c, then solve:**Zeros:*&  | 5. *Numbers only!**Copy the formula:**Plug in a, b, & c, then solve:**Zeros:*&  | 6. *Numbers only!**Copy the formula:**Plug in a, b, & c, then solve:**Zeros:*&  |

The Quadratic Formula’s purpose is to determine the zeros of a quadratic, but it can actually be used to find the vertex, as well. If you remove the discriminant, , from the formula, you are left with , which is the x-value of the vertex. From Standard Form: , you can find the **y-intercept** , the **vertex** , & plug in to get . and the **zeros** .

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| **EXAMPLE**  **Y-intercept:** Formula to find the vertex:*Numbers only!**Plug in a & b, then solve:*Plug in *x*, and solve for *y*:**Vertex:** | **EXAMPLE** **Y-intercept:** Formula to find the vertex:*Numbers only!**Plug in a & b, then solve:*Plug in *x*, and solve for *y*:**Vertex:** | **EXAMPLE** **Y-intercept:** Formula to find the vertex:*Numbers only!**Plug in a & b, then solve:*Plug in *x*, and solve for *y*:**Vertex:** |
| 7. **Y-intercept:** Formula to find the vertex:*Numbers only!**Plug in a & b, then solve:*Plug in *x*, and solve for *y*:**Vertex:** | 8. **Y-intercept:** Formula to find the vertex:*Numbers only!**Plug in a & b, then solve:*Plug in *x*, and solve for *y*:**Vertex:** | 9. **Y-intercept:** Formula to find the vertex:*Numbers only!**Plug in a & b, then solve:*Plug in *x*, and solve for *y*:**Vertex:** |
| 10. **Y-intercept:** Formula to find the vertex:*Numbers only!**Plug in a & b, then solve:*Plug in *x*, and solve for *y*:**Vertex:** | 11. **Y-intercept:** Formula to find the vertex:*Numbers only!**Plug in a & b, then solve:*Plug in *x*, and solve for *y*:**Vertex:** | 12. **Y-intercept:** Formula to find the vertex:*Numbers only!**Plug in a & b, then solve:*Plug in *x*, and solve for *y*:**Vertex:** |

Now that you know how to use the quadratic formula, determine all 3 important parts of a quadratic:

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|  | Formulas**Y-intercept:** The last number in the standard form (c) equation is the *y*-intercept. **Vertex:**and solve for *y*.**Zeros:** |
| Y-intercept: Vertex:Zeros: |