Determining the **Zeros** of a Quadratic

*…aka the “****roots****,” “****zeros****,” “****solutions****,” or “****x-intercepts****”*

The **zeros** *(roots/solutions/x-intercepts)* of a quadratic are simply the *x*-values when . This means that to find them, you have to plug in .

 **EXAMPLE**: Determine the solutions of .

Okay, we did that…now how do we solve for *x*? Well, there are three options:

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| FACTORING***(Sometimes works)****What #’s multiply to c and add to b?* | COMPLETING THE SQUARE***(Sometimes works easily)****Use the magic step* | QUADRATIC FORMULA***(ALWAYS works)*** |
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| Steps: |  |
|  | 1. If is not 1,  factor out ***(If not easily divisible, STOP!!! Use an easier way)***2. Puzzle out what 2 numbers multiply to a*c* and add to *b****(If not possible, STOP!!! You have to use another way)***3. Group & factor4. Set it equal to zero5. Set up two equations: *or* 6. Solve for your two *x*’s |

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| Steps: |  |
|  | 1. Set the problem = 0 2. Kick out *c* 3. If is not 1,  factor out ***(If not divisible, STOP!!! Use another easier way)***4. Insert ***(If b is not divisible by 2, STOP!!! Use an easier way)***5. Simplify.6. MAGIC FACTORING!!!7. Solve for *x* |

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| Steps: |  |
|  | 1. Determine *a*, *b*, & *c*.2. Plug them into the equation:3. Simplify to determine *x*. |

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| **EXAMPLE:** Determine the **solutions** of .(-2)(-4) = 12 & -2 + -4 = -7 *Use -2x & -4x* 🡨FACTORS *or*  *or*  🡨SOLUTIONS | **EXAMPLE:** Determine the **zeros** of .  *or*   *or*  🡨SOLUTIONS | **EXAMPLE:** Determine the **x-intercepts** of .*SO…split it into two equations!* 🡨SOLUTIONS |
| **EXAMPLE:** Determine the **roots** of .  (1)(-5) = -5, but 1 + -52(-1)( 5) = -5, but -1 + 52**NOT POSSIBLE—STOP!** | **EXAMPLE:** Determine the **solutions.** .    | **EXAMPLE:** Determine the **zeros** of . |
| 1a. Determine the **roots** of | 1b. Determine the **x-intercepts** of | 1c. Determine the **solutions** of |
| 2a. Determine the **zeros** of | 2b. Determine the **roots** of | 2c. Determine the **x-intercepts** of |
| 3a. Determine the **solutions** of | 3b. Determine the **zeros** of | 3c. Determine the **roots** of |
| 4a. Determine the **x-intercepts** of | 4b. Determine the **solutions** of | 4c. Determine the **zeros** of |
| 5a. Determine the **roots** of | 5b. Determine the **x-intercepts** of | 5c. Determine the **solutions** of |
| 6a. Determine the **zeros** of | 6b. Determine the **roots** of | 6c. Determine the **x-intercepts** of |
| 7a. Determine the **solutions** of | 7b. Determine the **zeros** of | 7c. Determine the **roots** of |
| 8a. Determine the **x-intercepts** of | 8b. Determine the **solutions** of | 8c. Determine the **zeros** of |
| 9a. Determine the **roots** of | 9b. Determine the **x-intercepts** of | 9c. Determine the **solutions** of |
| 10a. Determine the **zeros** of | 10b. Determine the **roots** of | 10c. Determine the **x-intercepts** of |

You can also determine solutions (zeros/roots/x-intercepts) in vertex form: . All you have to do is set the problem equal to 0 and solve for *x*.

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| **EXAMPLE:** Determine the **roots** of  | 11. Determine the **solutions** of  | 12. Determine the **zeros** of  |
| **EXAMPLE:** Determine the **x-intercepts** of  | 13. Determine the **zeros** of  | 14. Determine the **x-intercepts** of  |