

A1 S2 w9d3 9-6 Discriminant

Algebra 1 Week 9 Block Warm Up

1. Skill 14: Factor completely:

$$20p^2 - 115p - 30$$

2. Skill 15: Factor special cases completely:

A) $9x^2 - 24x + 16$

B) $36n^3 - 27n^2 - 8n + 6$

3. Skill 16: Solve quadratic equation using factoring.

$$5p^2 - 9p = 2$$

4. Skill 17 : Solve by Completing the Square

$$x^2 + 8x + 15 = 0$$

5. Skill 18: Solve by using the Quadratic Formula. Give your answers as decimals rounded to the nearest hundredth, AND in simplified radical form.

$$2x^2 - x = 5$$

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Alg 1 Week 8 Block

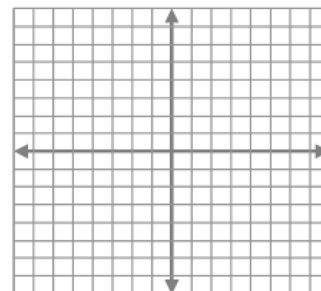
Does It Always Work?



The quadratic formula seems to produce two solutions in most problems. We know from experience, though, that it is possible to have only one solution, or even no solutions. How does the quadratic formula work in those situations? Let's investigate.

1. a. Graph $y = x^2 + 2x + 1$ (Hint: find $x = \frac{-b}{2a}$ to determine what values to use in your table.)

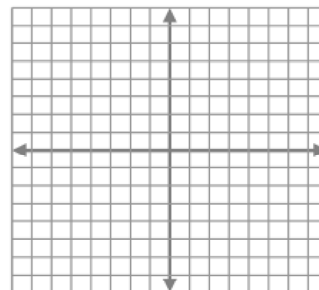
x	y



- b. Where does $x^2 + 2x + 1 = 0$?

2. a. Graph $y = x^2 + 4$ (Hint: find $x = \frac{-b}{2a}$ to determine what values to use in your table.)

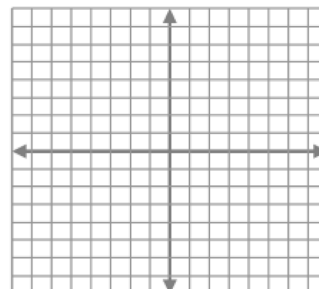
x	y



- b. Where does $x^2 + 4 = 0$?

3. a. Graph $y = x^2 - 8x + 7$ (Hint: find $x = \frac{-b}{2a}$ to determine what values to use in your table.)

x	y



- b. Where does $x^2 - 8x + 7 = 0$?

The Discriminant

The discriminant is the portion of the quadratic formula located UNDER the square root, or $b^2 - 4ac$. Notice there is NO square root in the discriminant!!!!

Find the discriminant for each of the following quadratic equations we graphed on the preceding page:

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

2) $x^2 + 4 = 0$

3) $x^2 - 8x + 7 = 0$

The discriminant tells us how many solutions a quadratic equation has (1, 2, or none). Using the graphs on the front of the page, and the discriminants above, decide how many solutions each type of discriminant has, and complete the table below:



Using the Discriminant to Identify the Number of Solutions

In the quadratic formula, $b^2 - 4ac$ is called the **discriminant**.

When $b^2 - 4ac > 0$, there is/are _____ solution(s).

When $b^2 - 4ac = 0$, there is/are _____ solution(s).

When $b^2 - 4ac < 0$, there is/are _____ solution(s).

Use the above principles to identify the number of solutions to each equation. Remember, only find the discriminant, not the whole quadratic formula, and then describe how many solutions the quadratic equation has based on whether the discriminant is positive, negative or equal to zero.

Show your work.



1. $x^2 + 4x - 3 = 0$



2. $2x^2 + x + 5 = 0$

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

4. $3x^2 + 5x = 1$

★ 5. $x^2 = -3$

6. $x^2 + 4x = 0$

7. $x^2 + x + 1 = 0$

★ 8. $6x + 9 = -x^2$

9. $2x^2 + 5 = 7x$

10. $5x^2 + 2x - 3 = 0$

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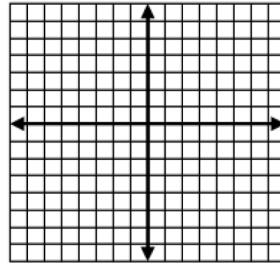
Alg 1 Week 8 Block

Solving Quadratics 4 ways # 1

1. Solve by graphing:

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

What is the vertex _____



Solutions: _____

2. Solve by completing the square.

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

Solutions: _____

3. Solve using the quadratic formula.

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

Solutions: _____

4. Solve by factoring and the zero product property.

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

Check:

Solutions: _____