

Essential Question: What is the discriminant?

Do Now: Using the quadratic formula, find the solution(s) to the following equations

a. $x^2 - 3x - 4 = 0$

b. $-x^2 + 2x - 1 = 0$

c. $2x^2 - 2x + 3 = 0$

How many solutions can a quadratic equation have?

Before solving a quadratic equation, the discriminant can be used to determine the number of real solutions.

The discriminant is the expression under the radical in the quadratic formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \leftarrow \quad \text{the discriminant}$$

To determine the number of solutions:

If $b^2 - 4ac > 0$, there are _____ solutions.

If $b^2 - 4ac = 0$, there is _____ solution.

If $b^2 - 4ac < 0$, there are _____ solutions.



To determine the type of solutions:

If $b^2 - 4ac$ is a perfect square, the solutions are _____ numbers.

If $b^2 - 4ac$ is not a perfect square, the solutions are _____ numbers.

For each quadratic equation below:

a) Find the value of the discriminant and determine how many solutions the equation has.

b) Determine if the solution(s) are rational or irrational.

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

2. $-3x^2 + 5x - 1 = 0$

3. $-x^2 - 10x - 25 = 0$

4. $2x^2 + 10x = -12$

5. $3x^2 - 2x = -5$

6. $x^2 + 14 = -9x$