

Solving Quadratic Equations with the Quadratic Formula

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Equations must be in the form: $ax^2 + bx + c = 0$

Examples: use the quadratic formula to solve.

1. $3x^2 - 4x - 9 = 0$

2. $2x^2 + 6x + 3 = 0$

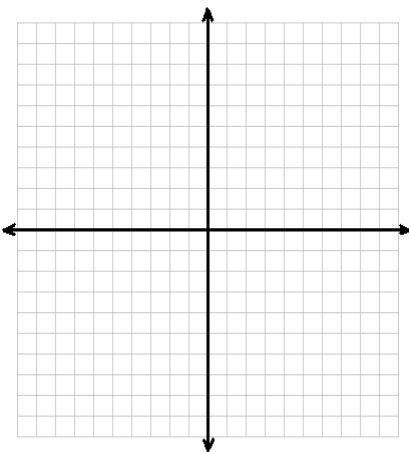
3. $3x^2 - 2x + 7 = 0$

Example: Solve by factoring and using the quadratic formula.

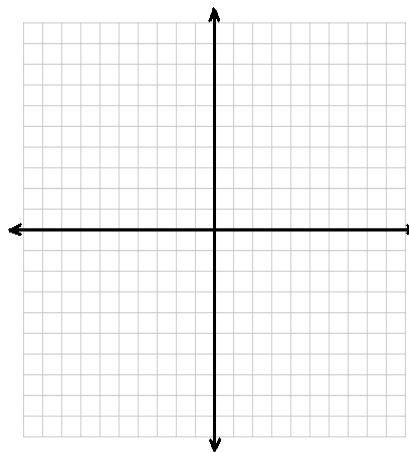
4. $6x^2 + x - 15 = 0$

How are the solutions of a quadratic equation related to the graph of the quadratic? Graph each, then find x-intercepts.

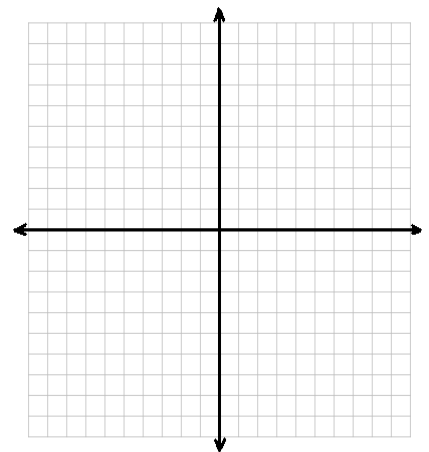
5. $y = 2x^2 - 7x + 3$



6. $y = 4x^2 + 12x + 9$



7. $y = x^2 + 2x + 8$



Discriminant (D): Determines the number and type of Roots (Solutions)

$$D = b^2 - 4ac$$

1. If $D = 0$, then there is 1 real rational repeated root.

2. If $D > 0$, then there are two real roots.

3. If $D < 0$, then there are two non – real roots.

Examples: Describe the number and nature (real, non-real, rational) of the solutions.

8. $16x^2 + 8x + 1 = 0$

9. $2x^2 - 5x + 6 = 0$

Application:

10. Rachel is about to serve and tosses a tennis ball straight up into the air. The height, h , of the ball, in meters, at time t , in seconds is given by $h(t) = -5t^2 + 5t + 2$. Will the ball reach a height of 4 meters?

11. Will the ball tossed in #10 reach a height of 3 meters?