

Date: \_\_\_\_\_

## 6.4 The Quadratic Formula

We can find roots of a quadratic equation that cannot be factored directly using the **quadratic formula**.

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

Where a, b, and c are the coefficients from a quadratic equation in **standard form**.



This formula allows us to find roots (or solve equations) without having to partial factor and write in vertex form.

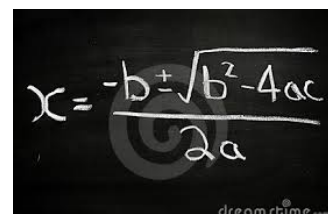
### Warnings About the Formula:

- Sign errors are common. Use brackets to substitute!
- Factoring is often more efficient, so don't forget how to do it.
- You should get two answers! Don't forget to add and subtract the root.
- BEDMAS errors are common. Be careful and make sure you know how to work your calculator!!

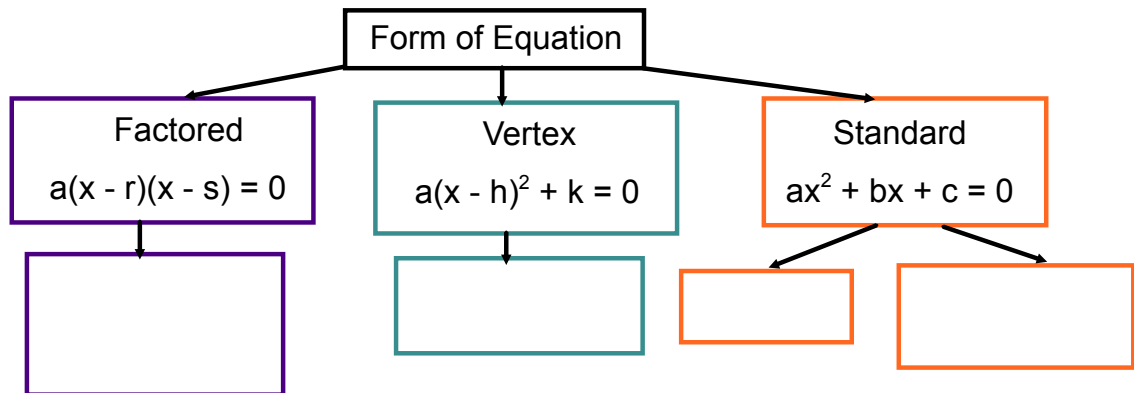


Example: Solve  $5x^2 - 4x - 3 = 0$  using the quadratic formula. Round your solutions to two decimal places.

Now solve  $x^2 - x - 6 = 0$  by factoring and by using the formula. Which was more efficient?


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

When you are solving quadratic equations, always choose the most appropriate/efficient method.



More Practice:

1) Find the roots of  $y = 2x^2 - 6x + 2$  when  $y = -1.5$ .

2) Determine the roots of  $(x + 4)^2 = 2(x + 5)$ . Round to two decimal places.



3) Solve  $-2(x + 4)^2 + 12 = 0$ . Report your answers as exact values.

4) A triangle's height is 5 cm longer than its base. The area of the triangle is  $53 \text{ cm}^2$ . Determine the dimensions of the triangle.

5) A ball is thrown from a building. Its path is modelled by  $h = -5t^2 + 8t + 10$ , where  $h$  is height in m and  $t$  is time in seconds. Determine the length of time that the ball spends above 12 m.

