

NAME:

Key

DATE:

A2.Q2.BERMELLEMO: QUADRATIC FORMULA REVISITED

**DAY EQ4
(EQUATIONS)**

NOTES

The discriminant is $b^2 - 4ac$

If the discriminant is:

Positive

Zero

Negative

Then there are:

two real solutions

one real repeated
solution

two imaginary solutions
(no real solutions)

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

1. GIVEN: $5x^2 - 3x + 4 = 0$

$a = 5$ $b = -3$ $c = 4$

A. Find the value of the **discriminant**.

$$\begin{aligned} & b^2 - 4ac \\ & (-3)^2 - 4(5)(4) \\ & 9 - 80 \\ & \boxed{-71} \end{aligned}$$

B. Use the value of the discriminant to determine the number of type of solutions.

Since -71 is negative, there are
two imaginary solutions
(no real solutions)

C. Solve the given quadratic formula equation using the quadratic formula. Express your final answer in simplified form (no decimals).

$$x = \frac{-(-3) \pm \sqrt{-71}}{2(5)}$$

$$x = \frac{3 \pm \sqrt{-71}}{10}$$

$$x = \frac{3 + i\sqrt{71}}{10} \quad \text{OR} \quad x = \frac{3 - i\sqrt{71}}{10}$$

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

2. GIVEN: $3x^2 - x - 5 = 0$ $a = 3$ $b = -1$ $c = -5$

A. Find the value of the **discriminant**.

$$\begin{aligned} & b^2 - 4ac \\ & (-1)^2 - 4(3)(-5) \\ & 1 + 60 \\ & \boxed{61} \end{aligned}$$

B. Use the value of the discriminant to determine the number of type of solutions.

Since 61 is positive, there are
two real solutions

C. Solve the given quadratic formula equation using the quadratic formula. Express your final answer in simplified form (no decimals).

$$x = \frac{-(-1) \pm \sqrt{61}}{2(3)}$$

$$x = \frac{1 \pm \sqrt{61}}{6}$$

$$\boxed{x = \frac{1 + \sqrt{61}}{6} \quad \text{OR} \quad x = \frac{1 - \sqrt{61}}{6}}$$

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

3. GIVEN: $2x^2 + 5x - 3 = 0$ $a=2$ $b=5$ $c=-3$

A. Find the value of the **discriminant**.

$$\begin{aligned} & b^2 - 4ac \\ & (5)^2 - 4(2)(-3) \\ & 25 + 24 \\ & \boxed{49} \end{aligned}$$

B. Use the value of the discriminant to determine the number of type of solutions.

Since 49 is positive, there are
two real solutions.

C. Solve the given quadratic formula equation using the quadratic formula. Express your final answer in simplified form (no decimals).

$$x = \frac{-(5) \pm \sqrt{49}}{2(2)}$$

$$x = \frac{-5 \pm 7}{4}$$

$$x = \frac{-5 + 7}{4}$$

$$x = \frac{2}{4}$$

$$x = \frac{-5 - 7}{4}$$

$$x = \frac{-12}{4}$$

$$\boxed{x = \frac{1}{2} \quad \text{OR} \quad x = -3}$$

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

4. GIVEN: $4x^2 + 4x + 1 = 0$ $a=4$ $b=4$ $c=1$

A. Find the value of the discriminant.

$$b^2 - 4ac$$
$$(4)^2 - 4(4)(1)$$

$$16 - 16$$

$$\boxed{0}$$

B. Use the value of the discriminant to determine the number of type of solutions.

Since 0 is neither + or -, there is
one real solution

C. Solve the given quadratic formula equation using the quadratic formula. Express your final answer in simplified form (no decimals).

$$x = \frac{-(4) \pm \sqrt{0}}{2(4)}$$

$$x = \frac{-4 + 0}{8}$$

$$\text{OR } x = \frac{-4 - 0}{8}$$

$$x = \frac{-4}{8}$$

$$\text{OR } x = \frac{-4}{8}$$

$$\boxed{x = -\frac{1}{2} \quad \text{OR} \quad x = -\frac{1}{2}}$$