

1.5: Quadratic Formula (Part 2)

Ex 1) $9x^2 - 4x - 11 = 2x$

Step 1: $9x^2 - 6x - 11 = 0$

Step 2: $a: 9 \quad b: -6 \quad c: -11$

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

Step 3: $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(9)(-11)}}{2(9)}$

Step 4: $x = \frac{6 \pm \sqrt{432}}{18}$ $\longrightarrow \sqrt{432}$

Step 5: simplify radical

$$x = \frac{6 \pm 12\sqrt{3}}{18}$$

Prime factorization of 432:

$$432 = 2^4 \cdot 3^3 = (2^2)^2 \cdot (3^2)^2 \cdot 3$$

Grouping factors into squares:

$$432 = (2^2 \cdot 3)^2 \cdot 3 = 12^2 \cdot 3$$

Therefore:

$$\sqrt{432} = \sqrt{12^2 \cdot 3} = 12\sqrt{3}$$

Ex 2) Solve: $8m^2 + 6m + 1 = 0$

$a: 8 \quad b: 6 \quad c: 1$

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

$$m = \frac{-(6) \pm \sqrt{(6)^2 - 4(8)(1)}}{2(8)}$$

$$m = \frac{-6 \pm \sqrt{4}}{16}$$

$$m = \frac{-6 \pm 2}{16}$$

$$m = \frac{-6 + 2}{16}$$

$$m = -\frac{1}{4}$$

$$m = \frac{-6 - 2}{16}$$

$$m = -\frac{1}{2}$$

Ex 3) Solve: $x^2 + 8 = 5x$
 ~~$-5x$~~ ~~$-5x$~~

$$x^2 - 5x + 8 = 0$$

$a: 1 \quad b: -5 \quad c: 8$

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

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(8)}}{2(1)}$$

$$x = \frac{5 \pm \sqrt{-7}}{2}$$

$$x = \frac{5 \pm i\sqrt{7}}{2}$$

$$\sqrt{-7} = i\sqrt{7}$$