

This is a quadratic equation:

$$4x^2 + 18x - 5 = 0$$

There are 4 ways to solve a quadratic equation, although NOT every quadratic can be solved All 4 ways.

Type 1: solve for x over the complex numbers

A. $x^2 + 2x - 63 = 0$

$$(x + 9)(x - 7) = 0$$

$$x + 9 = 0 \quad \text{or} \quad x - 7 = 0$$

$$x = -9, 7$$

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

$$(2x + 3)(x - 1) = 0$$

$$(2x - 1)(x + 3) = 0$$

$$x = \frac{1}{2}, -3$$

$$\begin{array}{c} -6 \\ \wedge \\ 6 \quad -1 \end{array}$$

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

$$2x(x+3) - 1(x+3) = 0$$

$$(x+3)(2x-1) = 0$$

$$x = -3, \frac{1}{2}$$

$$C. \quad 12x^2 + x - 6 = 0$$

$$12x^2 + 9x - 8x - 6 = 0$$

$$3x(4x+3) - 2(4x+3) = 0$$

$$(4x+3)(3x-2) = 0$$

$$x = -\frac{3}{4}, \frac{2}{3}$$

$$\begin{array}{c} -72 \\ \wedge \\ 9 \quad -8 \end{array}$$

Type 2: Solve for x over the complex numbers

$$A. \quad 5x^2 - 180 = 0$$

$$5x^2 = 180$$

$$x^2 = 36$$

$$x = \pm 6$$

B.

$$-3(5x+2)^2 = 12$$

$$(5x+2)^2 = -4$$

$$5x+2 = \pm 2i$$

$$5x = -2 \pm 2i$$

$$x = \frac{-2 \pm 2i}{5}$$