

Method #3: Quadratic Formula

Quadratic Formula

$$ax^2 + bx + c = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4(a)(c)}}{2(a)}$$

ex1) $x^2 + 4x + 2 = 0$

$a=1$ $b=4$ $c=2$

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

$$x = \frac{-4 \pm \sqrt{16 - 8}}{2}$$

$$x = \frac{-4 \pm \sqrt{8}}{2}$$

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

$$x = -2 \pm \sqrt{2}$$

$$\boxed{\begin{array}{l} x = -2 + \sqrt{2} \\ \text{or} \\ x = -2 - \sqrt{2} \end{array}}$$

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#10)

$$36x^2 + 12x - 9 = 0$$

$a=36$ $b=12$ $c=-9$

$$x = \frac{-12 \pm \sqrt{12^2 - 4(36)(-9)}}{2(36)}$$

$$x = \frac{-12 \pm \sqrt{144 + 1296}}{72}$$

$$x = \frac{-12 \pm \sqrt{1440}}{72}$$

$$\boxed{\begin{array}{l} x = \frac{-12 + \sqrt{1440}}{72} \\ \text{or} \\ x = \frac{-12 - \sqrt{1440}}{72} \end{array}}$$

#11) $3x + 4x^2 - 3 = 0$

$$4x^2 + 3x - 3 = 0$$

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

$$x = \frac{-3 \pm \sqrt{9 - 4(4)(-3)}}{2(4)} = \frac{-3 \pm \sqrt{9 + 48}}{8} = \frac{-3 \pm \sqrt{57}}{8}$$

$$\boxed{\begin{array}{l} x = \frac{-3 + \sqrt{57}}{8} \\ \text{or} \\ x = \frac{-3 - \sqrt{57}}{8} \end{array}}$$

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The discriminant and its implications.

↓
 $b^2 - 4ac = \text{a number}$

If:

- 1) Positive \rightarrow 2 real numbers solutions
- 2) Zero \rightarrow 1 real number solution, repeated
- 3) Negative \rightarrow 0 Real # solutions, (2 "i") solutions)