Methods to Solve Quadratic Equations

Always works!
1) Completing the Square
2) Quadratic Formula
3) Factoring
4) Finding zeros (calc)
5 Taking square roots of each side

Today we will focus in Method #5

Sep 18-8:35 PM

$x^2 = 25$

Take Square root for both Sides

$\sqrt{x^2} = \sqrt{25}$

$x = \pm 5$

$x = 5$ | $x = -5$

$x^2 = 5^2 = 25$ | $x^2 = (-5)^2$

$x^2 = 25$

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$x^2 = 49$

$\sqrt{x^2} = \sqrt{49}$

$(x^2)^{\frac{1}{2}} = \pm 7$

$x^{2(\frac{1}{2})} = \pm 7$

$x = \pm 7 \rightarrow x = 7$ | $x = -7$

$3x^2 + 12 = 0$

$-12 \quad -12$

$\frac{3x^2}{3} = \frac{-12}{3}$

$x = \pm 2i$

$x = 2i$ or $x = -2i$

$5^2 = 64$

$\sqrt{5^2} = \sqrt{64}$

$s = \pm 8$

$s = 8$

$s = -8$

$\sqrt{x^2} = \sqrt{-4}$

$x = \pm 2i$

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Warm-up

Solve by completing the square

1) $x^2 - 14x = -101$

$x^2 - 14x + 49 = -101 + 49$

$\sqrt{(x-7)^2} = \pm\sqrt{-52}$

$x - 7 = \pm 2i\sqrt{13}$

$+7 \quad +7$

$x = 7 \pm 2i\sqrt{13}$

$x = 7 + 2i\sqrt{13}$

$x = 7 - 2i\sqrt{13}$

2) Write an equation of a line through points (-1, 5) and (7, -10)

$m = \frac{-10-5}{7+(+1)}$

$m = \frac{-15}{8}$

$y - y_1 = m(x - x_1)$

$y - 5 = -\frac{15}{8}(x + 1)$

$y - 5 = -\frac{15}{8}x - \frac{15}{8}$

$+5 \quad +5$

$y = -\frac{15}{8}x + \frac{25}{8}$

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8) $a = 3 \quad b = -4 \quad c = -4$

$3a^2 - 4a - 4 = 0$

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

$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(3)(-4)}}{2(3)}$

$x = \frac{4 \pm \sqrt{64}}{6}$

$x = \frac{4 \pm 8}{6}$

$x = \frac{4+8}{6}$ | $x = \frac{4-8}{6}$

$x = 2$ | $x = -\frac{2}{3}$

$x = -0.67$

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Method 3: Solve by Factoring

Works as long as the quadratic expression is ***factorable***

zero product property:

If $ab = 0$, then $a = 0$ or $b = 0$

$(3x+1)(x-4) = 0$

$3x + 1 = 0$ | $x - 4 = 0$

$-1 \quad -1$ | $+4 \quad +4$

$\frac{3x}{3} = \frac{-1}{3}$ | $x = 4$

$x = -1/3$

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Solve by Factoring : *Move to one side first!*

1) $6x^2 = 12x$

2) $6n^2 - 11n = 2$

Mar 11-8:03 AM

3) $4x^2 = 4x + 15$

5) $4x^2 - 25 = 0$

Sum & Product Method

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4) $x^2 - 12x + 35 = 0$

When $a = 1$, sum & prod has a short-cut.

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5) $7m^2 - 14m = 0$

6) $x^2 - 4x - 12 = 0$

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7) $4x^2 = 121$

8) $2x^2 - x - 7 = 0$

No shortcut!

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