November 1, 2022

Solving Quadratics

1) Finding zeros (x-intercepts) on calculator.
2) Factoring
3) Completing the Square
4) Quadratic Formula

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FACTORING

FOIL $(x+7)(x-4)=0$

$x^2-4x+7x-28=0$

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$x^2+3x-28=0$

$(x-4)(x+7)=0$

$-4x$ $7x$

1 28
2 14
4 7

1 12
2 6
3 4

$x^2-8x=-12$

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

$(x-2)(x-6)=0$

$-2x$ $-6x$

$x-2=0$ $x-6=0$

$x=2$ $x=6$

$2x^2 = 7x + 15$

$2x^2 - 7x - 15 = 0$

$(2x + 3)(x - 5) = 0$

$+3x$

$-10x$

$2x + 3 = 0 \quad x - 5 = 0$

$\frac{2x}{2} = \frac{-3}{2} \quad x = 5$

$x = -3/2$

$1 \quad 15$

$3 \quad 5$

$12x^2 + 9x - 30 = 0$

$3(4x^2 + 3x - 10) = 0$

$3(4x - 5)(x + 2) = 0$

$-5x$

$+8x$

$4x - 5 = 0 \quad x + 2 = 0$

$4x = 5 \quad x = -2$

$x = 5/4$

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$4c^2 = 20c$

$4c^2 - 20c = 0$

$4c(c-5) = 0$

$\frac{4c}{4} = \frac{0}{4}$ $\quad c-5=0$

$\boxed{c=0 \quad c=5}$

$x^2 - 25 = 0$

$(x+5)(x-5) = 0$

$+5x$ $\quad -5x$

$x+5=0 \quad x-5=0$

$\boxed{x=-5 \quad x=5}$

Solve

$4(x+5)^2 + 1 = 81$

$-1 \quad -1$

$\frac{4(x+5)^2}{4} = \frac{80}{4}$

$\sqrt{(x+5)^2} = \sqrt{20}$ ← 4.5

$x+5 = \pm 2\sqrt{5}$

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

Roots: $-7, \frac{2}{3}$

Find eq. – Work factoring problem backwards.

$x = -7$ $\quad x = \frac{2}{3}$

$x + 7 = 0$ $\quad 3x = 2$

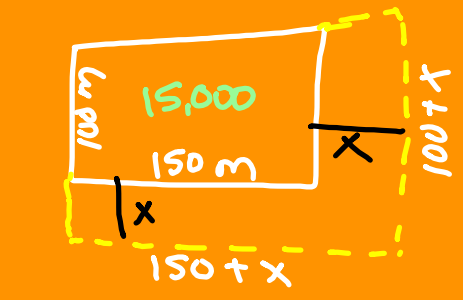
$3x - 2 = 0$

$(x+7)(3x-2) = 0$ FOIL!

$3x^2 - 2x + 21x - 14 = 0$

$\boxed{3x^2 + 19x - 14 = 0}$

Parking Lot
– Double its Area.



How wide is the strip?

$(150+x)(100+x) = 30{,}000$

$15000 + 150x + 100x + x^2 = 30{,}000$

$-30000 \quad\quad -30000$

$x^2 + 250x - 15000 = 0$

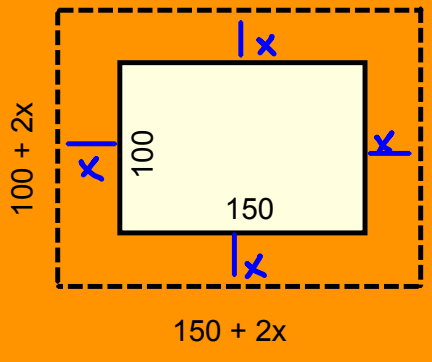
$(x+300)(x-50) = 0$

$+300x \quad -50x$

$300 \cdot 50$
$150 \quad 100$

$x + 300 = 0 \quad\quad x - 50 = 0$

$x = -300 \quad\quad x = 50\text{ m}$



$(150 + 2x)(100 + 2x) = 30{,}000$