October 25, 2024

Solving Quadratics

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

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FACTORING

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

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

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

F O+I L

$x^2-8x=-12$ $\frac{1}{3}$ $\frac{12}{4}$

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

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

$-2x$

$-6x$

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

$x=2$ $x=6$

$2x^2 = 7x + 15$ $\quad 1 \cdot 15,\ 3 \cdot 5$

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

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

$+3x$

$-10x$

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

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

$x=-3/2$

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

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

$2 \cdot 1,\ 4 \cdot 2 \qquad 2 \cdot 10,\ 5 \cdot 5$

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

$-5x$

$+8x$

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

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

$x=5/4$

$4c^2 = 20c$

$4c^2 - 20c = 0$

$4c(c-5) = 0$

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

$c = 0$ $\quad c = 5$

$x^2 - 25 = 0$

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

$5x$ $\quad -5x$

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

$x = -5$ $\quad x = 5$

$x^2 = 81$

$(x+9)(x-9)$

$x^2 - 4$

$(x+2)(x-2)$

Solve

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

$-1 \quad -1$

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

$\sqrt{(x+5)^2} = \sqrt{20}$

$4 \cdot 5$

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

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

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

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

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

$x = \pm 5$

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

Find eq. – Work factoring problem backwards.

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

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

$3x - 2 = 0$

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

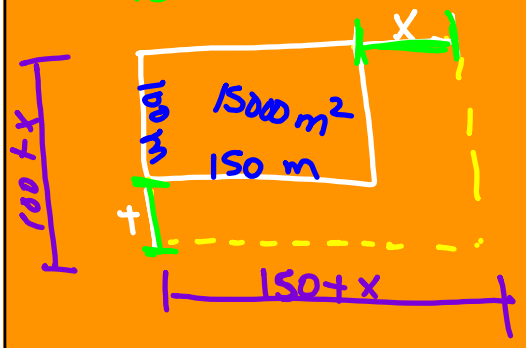
$3x^2 - 2x + 21x - 14 = 0$

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

Parking Lot – Add on to one side & one end.
– Double existing area

How wide is the strip?

$A = 150 \cdot 100$
$= 15000$



New Lot = 30,000 m²

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

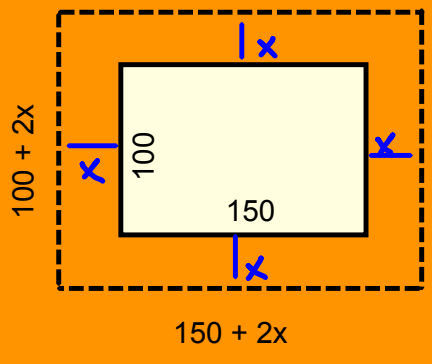
$15,000 + 150x + 100x + x^2 = 30,000$
$-30,000$

$x^2 + 250x - 15,000 = 0$

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

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

~~$x = -300$~~ $\quad x = 50$ m



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