

Solving Quadratics

11/9

What are the solutions to a quadratic equation?

zeros

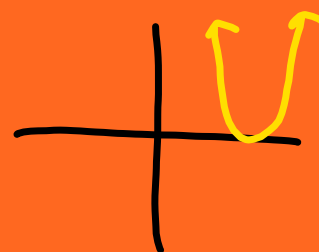
How many solutions can a quadratic have?



2 solutions



no real
sol'n
(2 imaginary)



one
solution

Methods for Solving Quadratics

finding
zeros

- Graphing *find Zeros*
- Factoring */ Square Rt Method*
- Completing the Square
- Quadratic Formula



Solve by Factoring



Multiplication Property of Zero
If the answ. is zero, then at least
one factor equals zero



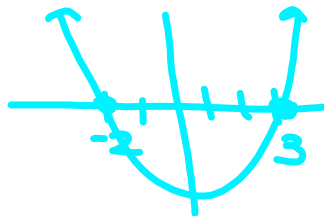
$$(x+2)(x-3) = 0$$

$$x+2=0$$

$$x=-2$$

$$x-3=0$$

$$x=3$$



Solve: $(x-5)(x+7) = 0$

$$\begin{array}{c} x-5 = 0 \\ +5 \quad +5 \end{array} \quad \begin{array}{c} x+7 = 0 \\ -7 \quad -7 \end{array}$$

$$x=5 \quad x=-7$$

① Std. form = 0

② Factor

③ Set each factor equal to zero

④ Solve



$$\begin{array}{r} -6 \\ -3 \quad 2 \\ -1 \end{array}$$


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

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

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

+3 -2

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

- ① Standard Form
- ② Factor
- ③ Set factors = 0
- ④ Solve
- 

Solve: by factoring

$$x^2 = x + 30$$

$$x^2 - x = \cancel{30}$$

$$x^2 - x - 30 = 0$$

$$(x - 6)(x + 5) = 0$$

$$\begin{array}{r} \cancel{30} \\ -6 \quad 5 \\ \hline -1 \end{array}$$

$$x - \cancel{6} = 0 \quad x + \cancel{5} = 0$$

$$x = 6 \quad x = -5$$

1. Standard form



② Factor

③ Set each factor = to zero

④ Solve



Solve: $x^2 + 6x = 0$

$$\underbrace{x}(\underbrace{x+6})=0$$

$$x=0 \quad x+6=0$$

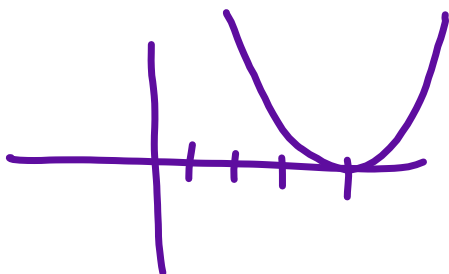
$$x=-6$$

$$x=0, -6$$

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

$$x-4=0 \quad x-4=0$$

$$x=4 \quad x=4$$





Solve:

$$8x^2 + 3 = 14x$$

$$8x^2 - 14x + 3 = 0$$

$$(8x^2 - 12x)(2x + 3)$$

$$4x(2x - 3) - 1(2x - 3)$$

Factor

$$(4x - 1)(2x - 3)$$

Solve
by
factoring:

$$4x - 1 = 0$$

$$2x - 3 = 0$$

$$\frac{4x}{4} = \frac{1}{4}$$

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

$$x = \frac{1}{4}$$

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

Solve: $(x^3 - 3x^2)(-4x + 12) = 0$
by factoring

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



11/12

Square Root Method

$$3x^2 = 10$$

mult of 10

$$x^2 = 100$$

$$x^2 + 24 = 0$$

$$x^2 - 64 = 0$$

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

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

a=1

$$\text{mult } 4 = 0$$



Square root method

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

$$x = \pm 8$$

① Isolate x^2

② Sq. root BOTH Sides



Solve: $\sqrt{x^2} = \sqrt{24}$

$$x = \pm \sqrt{24}$$

$$x = \pm 2\sqrt{6}$$



Solve: $x^2 - 5 = 23$

$$\sqrt{x^2} = \sqrt{28}$$

$$x = \pm \sqrt{28}$$

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





Solve:

$$x^2 - 4 = 0$$

Solve by
factoring

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

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

$$x = -2, x = 2$$

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

$$x = \pm 2$$

$$x^2 + \cancel{8} = 4$$

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

$$x = \pm 2i$$



Solve:

$$\sqrt{(x+3)^2} = \sqrt{32}$$

$$x+3 = \pm \sqrt{32}$$

$\textcircled{16 \cdot 2}$

$$x+3 = \pm 4\sqrt{2}$$

$$x = -3 \pm 4\sqrt{2}$$

$-3+4\sqrt{2}$ and $-3-4\sqrt{2}$
crosses x-axis twice

29)

$$5(x+4)^2 - 7 = 18$$

$$\frac{5(x+4)^2}{5} = \frac{25}{5}$$

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

$$x+4 = \pm\sqrt{5}$$

$$x = -4 \pm \sqrt{5}$$