

WARMUP

Grab a calculator and graph

$$y = x^3 - x + 1$$

We'll use this graph to solve $x^3 - x + 1 = 0$

$$x = -1.32$$

Linear Equations solve

ex: $3(x-2) = 5(x-1)$

$$\begin{array}{r} 3x - 6 \\ -5x \end{array} = \begin{array}{r} 5x - 5 \\ -5x \end{array}$$

$$\begin{array}{r} -2x - 6 \\ +6 \end{array} = \begin{array}{r} -5 \\ +6 \end{array}$$

$$-2x = 1$$

$$x = -\frac{1}{2}$$

A quadratic equation has the form $ax^2 + bx + c = 0$

It can be solved by:

- 1) Factoring
- 2) Completing the Square
- 3) Quadratic Formula

ex: Solve $x^2 = 12 - x$

$$\underline{x^2 + x - 12 = 0}$$
$$(x-3)(x+4) = 0$$

~~$$\begin{array}{r} -12 \\ -3 \quad 4 \\ 1 \end{array}$$~~

ZPP (zero product property)

$$x-3=0 \quad x+4=0$$

$$x=3, -4$$

Quadratic Formula If $ax^2+bx+c=0$, then

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

ex: $3x^2 - 5x + 1 = 0$

$a=3 \quad b=-5 \quad c=1$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \cdot 3 \cdot 1}}{2 \cdot 3} = \frac{5 \pm \sqrt{25 - 12}}{6}$$

$$= \frac{5 \pm \sqrt{13}}{6}$$

Solve $x^2 = (2\sqrt{x-1})^2$

$$x^2 = 4(x-1)$$

$$x^2 = 4x - 4$$

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

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

$$x = 2$$

$$\begin{array}{r} 4 \\ -2 \quad -2 \\ -4 \end{array}$$

$$2 = 2\sqrt{2-1}$$

$$2 = 2\sqrt{1}$$

$$2 = 2 \cdot 1 \quad \checkmark$$

You must check answer on radical equations because squaring both sides may result in an extraneous solution.

Absolute Value Equations

$$|A| = 10$$

$$A = 10 \text{ or } A = -10$$

$$|x-1| + 6 = 15$$

$$|x-1| = 9$$

$$x-1 = 9 \quad \text{or} \quad x-1 = -9$$

$$x = 10, -8$$

$$25) \quad 21 \left(\frac{x+1}{3} + \frac{x+2}{7} = 5 \right) \quad \text{LCD} = 21$$

$$\cancel{7}x \cdot \frac{(x+1)}{\cancel{3}} + \cancel{3}x \cdot \frac{(x+2)}{\cancel{7}} = 21 \cdot 5$$

$$7x+7 + 3x+6 = 105$$

$$10x + 13 = 105$$

$$10x = 92$$

$$x = 9.2$$