AMDG

9.1: Review of Radicals and Quadratic Equations

What's a radical? $\sqrt{}$ (2)

$\sqrt{x} = x^{1/2}$

Is there a connection to exponents?

What does quadratic mean? 2nd degree polynomial

I. Radicals

"Simplify" expressions → no $=, <$ or $>$

$\sqrt{4}$ $\quad$ $-\sqrt{4}$

**Use the sign shown in the problem. $\quad$ 2 $\quad$ -2

"Solve" equations → $=$

** Here's where you include $\pm$:

$x^2 = 4 \Rightarrow x = \pm 2$.

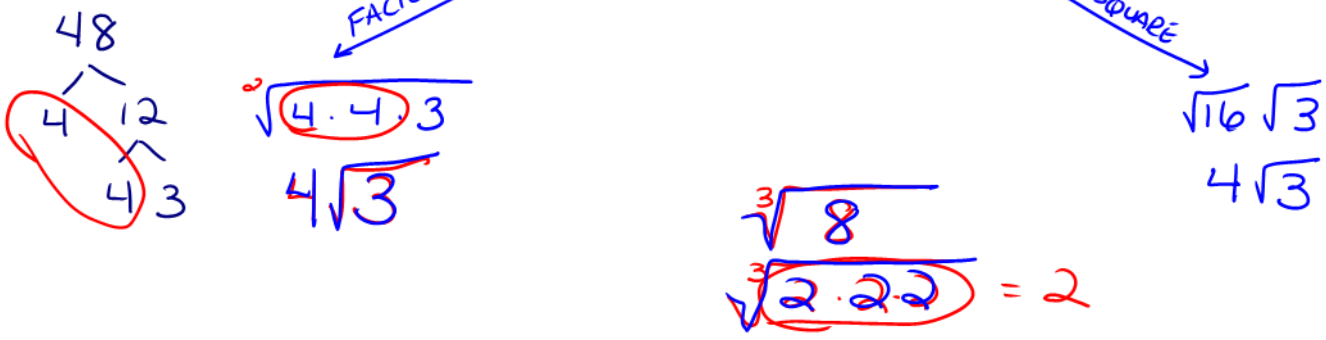
DISCLAIMER: The following notes are provided as an explanation of the math, to show what's going on mathematically. You do NOT need to write all of this for your homework.

NOTE: You need to know how to do this. Your calculator will not help you; you need to write exact answers, not decimal estimates.

If you are struggling with this then review or learn the "Divisibility Rules". You can find these with a web search.

You may use any method. I will show you two.

Ex 1: $\sqrt[2]{48}$



$\sqrt[3]{8}$

$\sqrt[3]{2 \cdot 2 \cdot 2} = 2$

Ex 2: Simplify $\sqrt{200}$

$\sqrt{100}\ \sqrt{2}$

$10\sqrt{2}$

Ex 3: Simplify $\sqrt{72}$ $= \sqrt{36}\sqrt{2} = 6\sqrt{2}$

ORDER OF OP'S

- PEMDAS
- Please excuse my dear aunt Sally

(Parenth
Expon
(Mult
Div
(Add
Subtract

Ex 4: Simplify $\sqrt{(9+16)}$

$\sqrt{25}$

5

Ex 5: Simplify $\sqrt{(3^2+4^2)}$

$\sqrt{(9+16)}$

$\sqrt{25} = 5$

Reminder: Decimal answers will not be accepted. You must provide answers in simplified, reduced, rationalized form.

Connection to prior knowledge of polynomials:

Simplify $12x^2 + 10x - 5x^2$

$7x^2 + 10x$ combine like terms

$\sqrt{32} = \sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}$

$2 \cdot 2\sqrt{2}$

$4\sqrt{2}$

Ex 6: Simplify $\sqrt{18} + \sqrt[2]{32} + \sqrt{75}$

$\sqrt{25}\sqrt{3}$

$3\sqrt{2} + 4\sqrt{2} + 5\sqrt{3}$

$7\sqrt{2} + 5\sqrt{3}$

combine like terms

↗ undo the operation

Rationalize the denominator

Ex 7: Simplify $\sqrt{\frac{5}{3}} \Rightarrow \frac{\sqrt{5}}{\sqrt{3}}\frac{\sqrt{3}}{\sqrt{3}} \Rightarrow \boxed{\frac{\sqrt{15}}{3}}$

$= \cdot 1$

$(\sqrt{3}) = 3^{1/2}$

$(3^{\frac{1}{2}})^2 = 3^{(\frac{1}{2}\cdot\frac{2}{1})}$

Ex 8: Simplify $\frac{6}{\sqrt{3}}\frac{\sqrt{3}}{\sqrt{3}} = \frac{\cancel{6}^{2}\sqrt{3}}{\cancel{3}_{1}} = 2\sqrt{3}$

Quadratics: 2ND degree polynomial

Ex 9: Solve $x^2 - 10x = -16$

Degree of the polynomial: the highest exponent of any term in the polynomial.

The Fundamental Theorem of Algebra (FTA): for our class, Degree of poly is MAX count of solutions

Solve

Are the "solutions" easy to spot on a graph of the polynomial?