Warmup 8 $/(\sqrt{3} \cdot \sqrt{3} \cdot \sqrt{3} \cdot \sqrt{3} \cdot \sqrt{3} \cdot \sqrt{3})$

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1. How many miles is it from the earth to the moon?

    238,900 miles

2. Estimate the square root of 2 to the nearest **hundredth**. Check your estimates until you get the closest. **PLEASE SHOW ME when you think you have it!!!**

$\sqrt{2} \approx 1.414$ **(nearest hundredth = 1.41)**

(This is a well-known value. This one and $\sqrt{3} \approx 1.732$ are the only ones I have memorized myself)

Plan for the rest of the unit

TUESDAY: Solving x^2 and x^3 equations

WEDNESDAY: Rational vs. Irrational

THURSDAY: Rational vs. Irrational

MONDAY: Unit 1 Review

TUESDAY: Unit 1 Test (Covers last week and this week)

Table of Contents

Objective:

-Solve equations of the form $x^2 =$ number and $x^3 =$ number

-Understand when there will be one solution, two solutions, or no solution

Using roots to solve equations

The way to solve equations is to use <u>inverse operations.</u>

SOLVE: $x + 8 = 12$

SOLVE: $x - 3 = 27$

SOLVE: $4x = 32$

Solving x^2 and x^3 equations

- Let's refresh our memory on some symbols…

- $\sqrt{49}$ **(the positive square root)** — **7**

- $-\sqrt{49}$ **(the negative square root)** — **-7**

- $\pm\sqrt{49}$ **(both!)** — **7, -7**

Solve: $x^2 = 64$

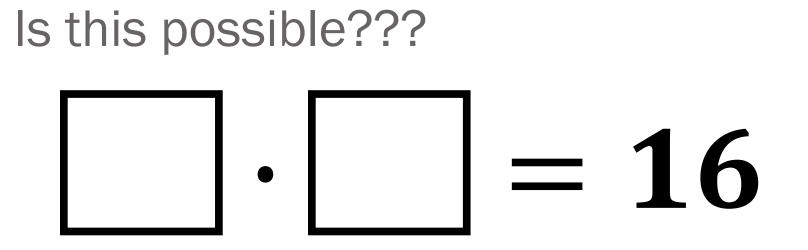What is the <u>inverse</u> of "squaring"?

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

Would positive 8 **AND** negative 8 both work?

So you should do $\sqrt{x^2} = \pm\sqrt{64}$

$$x = 8, -8$$

- Solve: $x^3 = 27$

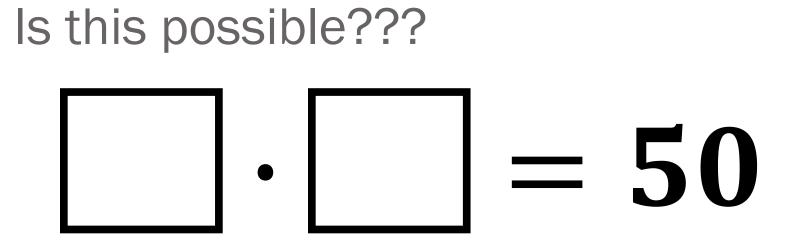- Would the positive <u>and</u> negative root both work?
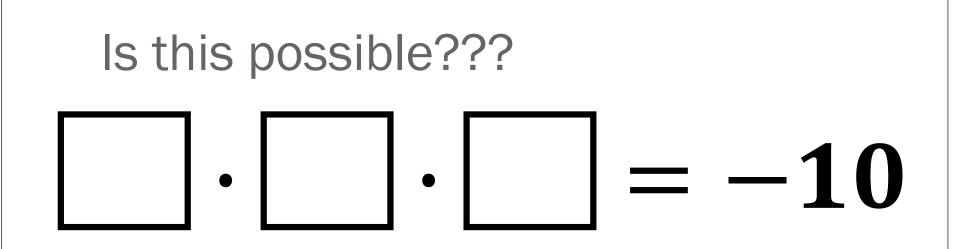
$$\sqrt[3]{x^3} = \sqrt[3]{27}$$
$$x = 3$$

Is this possible???

$$\square \cdot \square = 16$$

Yes, could be positive OR negative

$$(4 \ and \ -4)$$

Is this possible???

$$\square \cdot \square = 50$$

Yes, could be positive OR negative

$$\approx 7.1 \; or \approx -7.1$$

Is this possible???

$$\boxed{} \cdot \boxed{} \cdot \boxed{} = -10$$

Yes, would have to be negative

(-2.something)

Is this possible???

$$\square \cdot \square = -7$$

No; nothing times itself equals a negative

Is this possible???

$$\square \cdot \square = 2$$

Yes, could be positive OR negative

$$\approx 1.414 \; or \approx -1.414$$

Is this possible???

$$\square \cdot \square \cdot \square = \mathbf{16}$$

Yes, only a positive would work

(2.something)

Is this possible???

$$\square \cdot \square = -36$$

**No, nothing times itself
can equal a negative**

Is this possible???

$$\square \cdot \square \cdot \square = -567$$

Yes, would have to be negative

-8.something

Is this possible???

$$\square \cdot \square = 250,000$$

Yes, could be positive or negative

500 or –500

Solving x² and x³ equations

1. $x^2 = 196$ $x = 14, -14$

2. $x^3 = 125$ $x = 5$

3. $x^3 = -64$ $x = -4$

4. $x^2 = -289$ *no solution*

IMPORTANT: Be sure to check the positive <u>and</u> the negative root!

What if it's not a perfect square?

Solve each equation. Write both an <u>exact answer</u> and an estimate <u>rounded to the nearest tenth</u>.

5. $x^2 = 40$

ROUNDED ANSWER: $x \approx \pm 6.3$

EXACT ANSWER: $x = \pm\sqrt{40}$

SHOWDOWN

- A pile of cards is face down on the desk.

- The "Showdown Captain" will turn over the top card.

- Everyone at the group solves the problem on a whiteboard. Don't show your work to anyone.

- Your group needs to come up with a silent signal. When you feel you have answered the problem, give the silent signal to the showdown captain.

- When the entire group is ready, the Captain says "SHOWDOWN!" and everybody shows their answers.

- If there are disagreements, please respectfully discuss/debate until you agree. Try to resolve it with your group but call the teacher over if absolutely necessary.

- Rotate Showdown Captains for the next card.

Showdown Rules: Part 2

For the "x²" or "x³" Problems

- ***For these, you DO need to actually put the answers!!!***

- Write "$x =$" for exact solutions

- Write "$x \approx$" for rounded solutions

- If there are two solutions, write them both!

- Write "no solution" if it doesn't work

Showdown: Part 2

- $x^3 = -8$ x = -2
- $x^2 = -25$ **No solution**
- $x^2 = 49$ x = 7, -7
- $x^2 = 51$ $x \approx 7.1, -7.1$
- $x^3 = 1000$ x = 10
- $x^2 = -18$ **No Solution**
- $x^3 = -18$ $x \approx -2.6$
- $x^4 = 16$ x = 2, -2
- $x^{10} = -450$ **No solution**
- $x^7 = 21$ $x \approx 1.5$
- $x^2 = 0$ x = 0

Positives & negatives

$x^2 = (positive\ number)$ _____

$x^2 = (negative\ number)$ _____

$x^3 = (positive\ number)$ _____

$x^3 = (negative\ number)$ _____

Please write the correct phrase in each blank above!

> **Will have NO SOLUTION**
>
> **Will have ONE solution**
>
> **Will have TWO solutions**

How about...

$$\sqrt{x} = 16$$

HOMEWORK: Keep working on Patterns Worksheet!