## Warmup Created by Mr. Lischwe <br> 8/(Michael Jordan's original number)

THIS WARMUPWILL GO ON A NOTECARD. (On your warmup page, you can just write "notecard")

Solve each equation. Write your solutions as $\mathbf{x}=$ $\qquad$ -

1. $x^{2}=64$
$x^{2}=-64$
$x^{3}=64$
$x^{3}=-64$
2. Estimate $\sqrt{76}$. Your answer must be accurate to the nearest tenth. Show all of your work.

Tomorrow...

- Retake/Enrichment Wednesday
- If you want to do a retake tomorrow, you MUST let me know today. You will also have to meet with me either today or tomorrow.
Solve each equation. Write your solutions as $\mathrm{x}=$ $\qquad$
$x^{2}=64 \quad x=8,-8$
$x^{2}=-64 \quad$ No solution

3. $x^{3}=64 \quad x=4$
4. $x^{3}=-64 \quad x=-4$
5. Estimate $\sqrt{76}$. $\approx 8.7$

Table of Contents
Rational vs. Irrational (1.1)

Objective:
-Review whole numbers \& integers
-Know the difference between rational \& irrational numbers

## What do we remember?

- What is the difference between whole numbers and integers?
- Can you think of some numbers that are not whole numbers OR integers?
- The set of ALL numbers you know about is called real numbers.

Whole numbers: $0,1,2,3$...
Integers: Whole numbers plus all the negatives
Real Numbers: Integers plus all the fractions \& decimals in between

- Try to come up with one real-world example of something that you would count with:
- Whole numbers
- Integers
- Real Numbers


## The two most important groups of numbers for this unit...

- Real numbers can be broken into two categories;
- RATIONAL and IRRATIONAL.

Rational Numbers:
Anything that can be written as a fraction of integers
Irrational Numbers:
Anything that CANNOT be written as a fraction of integers

For example...

- $\frac{1}{2}$ is a rational number. It is 1 divided by 2 .
- -7 is a rational number. It is -7 divided by 1 .
- $2 \frac{1}{4}$ is a rational number. It is equivalent to $\frac{9}{4}$.
- Is 43.21 a rational number?
- Is 2.777 ... a rational number?
- Is $0.7423897 \ldots$ a rational number?


## What KIND of decimals can rational numbers be???

- A rational number is anything that can be written as a fraction of integers
- In your group, pick two integers. Divide them, and see what you get. You may use a calculator if you wish (push $\mathrm{ctrl} \rightarrow$ enter to get the decimal).
- Repeat the process. For each, write the FRACTION along with the DECIMAL that it equals.
- Write all of your results on a giant whiteboard.


## Fractions and Decimals

- Terminating Decimals:

When a long division problem results in a remainder of 0 . (The decimal "ends")

- Repeating Decimals:

Where one or more digits repeat without end.

## What about roots?

- Estimating $\sqrt{2}$ :
- $1.4 \cdot 1.4=1.96$ (too low)
- $1.5 \cdot 1.5=2.25$ (too high)
- $1.41 \cdot 1.41=1.9881$ (too low)
- $1.42 \cdot 1.42=2.0164$ (too high)
- $1.415 \cdot 1.415=2.002225$ (too high)
- $1.414 \cdot 1.414=1.999396$ (too low)
- $1.4145 \cdot 1.4145=2.00081025$ (too high)
- $1.4144 \cdot 1.4144=2.00052736$ (still too high)
- $1.4143 \cdot 1.4143=2.00024449$ (still too high)
- $1.4142 \cdot 1.4142=1.99996164$ (too low)
- Etc.
- You could keep going, but..
- You'll NEVER get exactly 2.

What about roots?
$\sqrt{1}=1$
$\sqrt{2} \approx 1.41421356 \ldots$
$\sqrt{3} \approx 1.73205080 \ldots$
$\sqrt{4}=2$
$\sqrt{5} \approx 2.23606797 \ldots$
$\sqrt{6} \approx 2.44948974 \ldots$
$\sqrt{7} \approx 2.64575131$...
$\sqrt{8} \approx 2.82842712 \ldots$
$\sqrt{9}=3$
$\sqrt{10} \approx 3.1622776 \ldots$

## Roots: Rational or Irrational?

- If a root doesn't come out as "exact", it is automatically irrational.
- $\sqrt{64}=8$, rational
- $\sqrt{37} \approx 6.1$, irrational
- $\sqrt{\frac{9}{16}}=\frac{3}{4}$, rational
- $\sqrt{\frac{8}{17}} \approx \frac{2.8 i s h}{4.1 \text { ish }}$, irrational


## COPY THE CHART!!!

| Rational | Irrational |
| :--- | :--- |
| - Integers | - Decimals that go on forever and <br> don't repeat |
| - Terminating decimals | - $\pi$ or any expression that contains <br> $\pi$ |
| - Repeating decimals | - Any root that doesn't come out <br> "exact" |
| - Any fraction made up of <br> integers |  |
| ***WARNING:ALWAYS SIMPLIFYTHE PROBLEM FIRST*** |  |

