Notes: Rational vs. Irrational

Question: *"Can all numbers be written as a fraction?"* _____ Explain.

Examples: 0. 2 7.16 $8\frac{4}{5}$ *This is a fraction already! 19.275

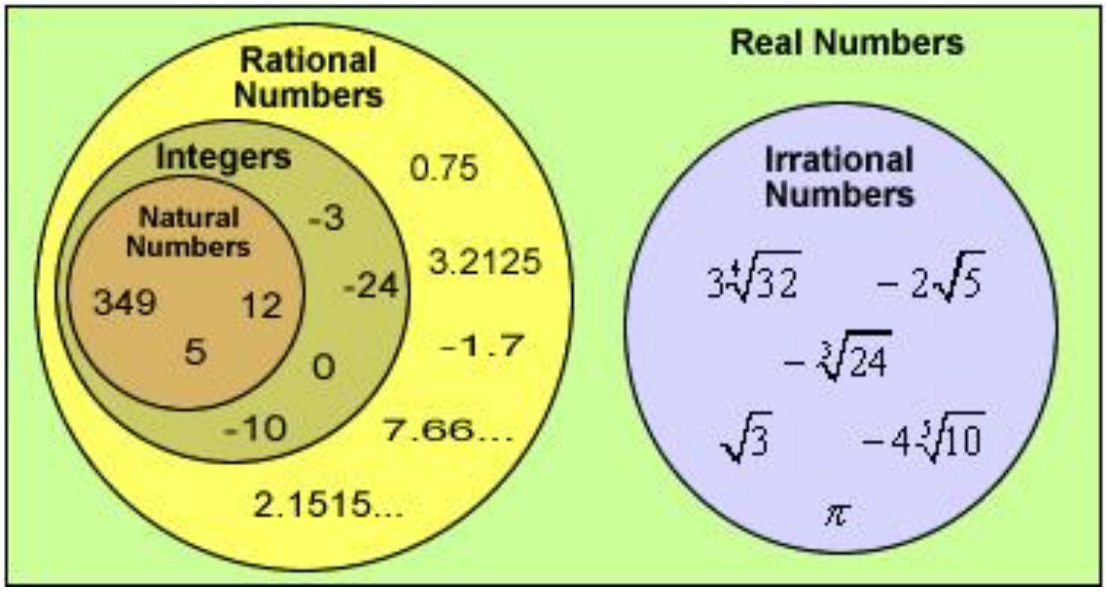
The Real Number System – includes Rational and Irrational numbers. (This is all the numbers we've worked with so far – except "imaginary" numbers, like $\sqrt{-4}$.)

It's important that you can identify numbers as either Rational or Irrational.

☆ Rational – Numbers that can be written as a fraction. These include: Integers, Whole numbers, & Natural or Counting Numbers – basically all numbers except the "weird ones"!!! ☺

How do I read the diagram below???

Ex. Find 0.75. It is a Rational number and a REAL number
Ex. Find 0. It is an Integer, but it is also a Rational number and a REAL number.
Ex. Find 349. It is a Natural number, but it is also an Integer and Rational and a REAL number.
Ex. Find $-2\sqrt{5}$. It is just an Irrational number and a REAL number.
**Note: All numbers (Rational and Irrational) are REAL numbers except…*_____.



What do you notice about all of the numbers in the Irrational circle?

Where do you think "Imaginary" numbers go?

☆ Irrational – Numbers that *cannot* be written as a fraction, AKA. the "weird" ones!

Let's investigate…

Take all the numbers listed in the Irrational Numbers circle above and record their decimals below. **Use your calculator.**

IRRATIONAL Numbers:

Radical notation	$3\sqrt[4]{32}$	$-2\sqrt{5}$	$-\sqrt[3]{24}$	$\sqrt{3}$	$-4\sqrt[3]{10}$	π
Decimal notation						

Irrational numbers _____ with crazy looking decimals, & we cannot use bar notation. Therefore, we can NOT write them as a _____.

☆ That means… If we see a number that looks like this: $\sqrt{3}$ (square root of a non-perfect square) OR like this: 0.8375911485… it is "weird" and IRRATIONAL! We cannot write it using bar notation because it is a non-terminating/non-repeating decimal. *Numbers with bar notation are rational!

All other numbers are "normal" and Rational! ☺

PRACTICE: Classify the numbers below as either Rational or Irrational.

1 -6 $\frac{3}{4}$

$3\frac{1}{2}$ $\frac{9}{4}$

$\sqrt{3}$ 2,000,000

1.5 - 4.25 π

$\frac{-24}{36}$ $\sqrt{2}$

Rational	Irrational