

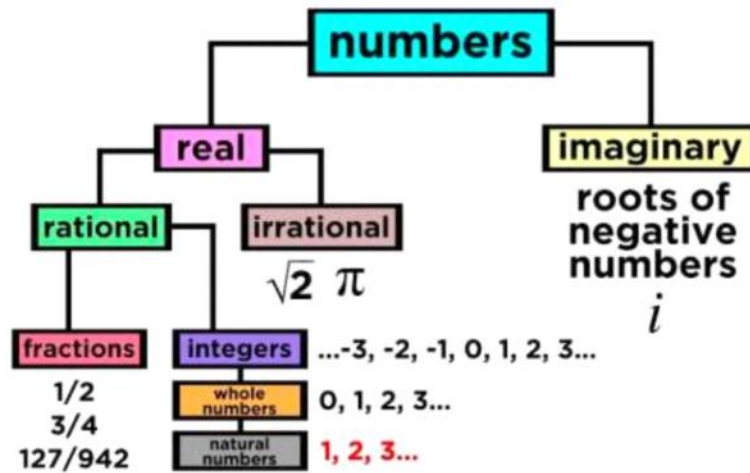
# 1.1 notes

Thursday, January 16, 2020 8:57 AM

Name: \_\_\_\_\_

Block: \_\_\_\_

## 1.1a Real Number System



## REAL NUMBERS

-all numbers that can be expressed in decimal form

### IRRATIONAL NUMBERS ( $\bar{Q}$ )

-when converted to decimal form they are:

\*non-terminating

\*non-repeating

$$\sqrt{2} = 1.4142135... \bar{Q}$$

no repeat  
no end

### RATIONAL NUMBERS (Q)

-numbers that can be written in fraction form.

$$\frac{2}{3} = 0.\bar{6} \dots Q$$

$$\frac{5}{4} = 1.25, Q$$

### NATURAL NUMBERS (N)

ex. 1, 2, 3, 4, ...  $\infty$

### WHOLE NUMBERS (W)

ex 0, 1, 2, ...  $\infty$

### INTEGERS (I)

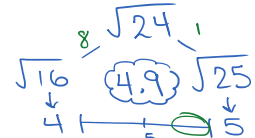
ex ..., -2, -1, 0, 1, 2, ...

$$(5)^2 = 25$$

$$(-5)^2 = 25$$

$$\sqrt{25} = 5$$

### 1.1b Intro to Radicals/Roots of Fractions



- 1
- 4
- 9
- 16
- 25
- 36
- 49
- 64
- 81
- 100

What is the square root of 25? What does that mean? Can you determine the square root of 24?  
*is ±5.*

**Perfect square** is the product of two equal integers. List the perfect squares to 100. Can you list the perfect cubes to 100?

Roots or radicals are the "opposite" operation of applying exponents; we can "undo" a power with a radical, and vice versa. For example:

$$3^2 = 9 \text{ and } \sqrt{9} = 3$$

$$\sqrt[3]{8} = 2 \text{ and } 2^3 = 8$$

Notice the relationship between the index and the exponent.

What number squared gives you 49 is the same question as what is the square root of 49.

$$x^2 = 49 \text{ is the same as } \sqrt{49} = x = 7$$

**Principal square root** of a number is the positive square root of that number. For example:

$$(4)(4) = 16 \text{ and } (-4)(-4) = 16 \text{ so the square root of 16 could be } 4 \text{ or } -4$$

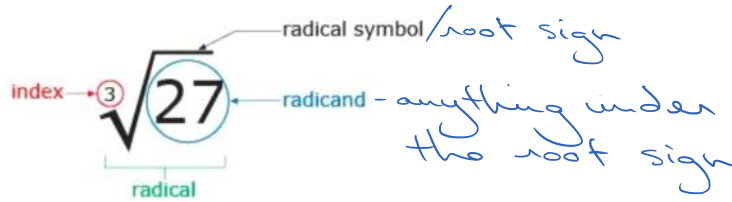
When it is written  $\sqrt{16} = 4$  ← the principal (**positive**) square root

To indicate the negative square root →  $-\sqrt{16} = -4$

*Coefficient*

$$\begin{aligned} & 3 \sqrt[4]{\frac{1}{16}} \\ &= \frac{\sqrt[4]{1}}{\sqrt[4]{16}} \\ &= \frac{1}{2} \end{aligned}$$

#### Parts of a Radical



The **division (quotient) property** of radicals:

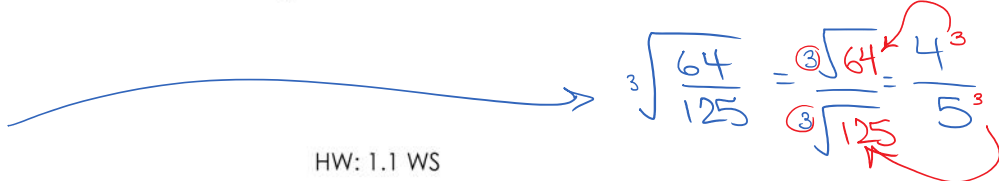
$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

This **property** allows you to split the radical between the numerator and denominator of the fraction. For example:

$$\sqrt[3]{\frac{8}{27}} = \frac{\sqrt[3]{8}}{\sqrt[3]{27}} = \frac{2}{3}$$

Ex.  $\sqrt[5]{\frac{1}{32}} = \frac{\sqrt[5]{1}}{\sqrt[5]{32}} = \frac{1}{2}$

Ex.  $\sqrt[3]{-\frac{8}{125}} = -\frac{\sqrt[3]{8}}{\sqrt[3]{125}} = -\frac{2}{5}$



HW: 1.1 WS

Pre-Calc 11