

Real Numbers

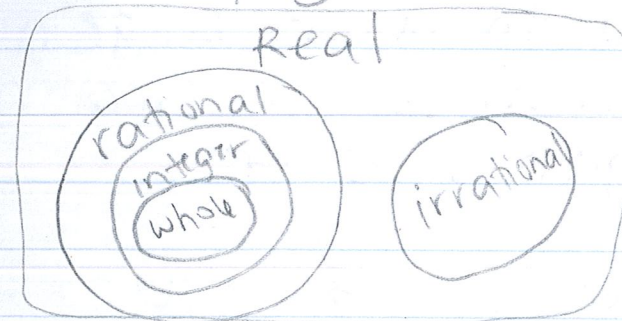
- square root - there are two square roots for every number, a positive and a negative
- principal square root - the positive root
- perfect square - has two square roots that are integers
- cube root - the inverse of a number cubed
- perfect cube - a root that is an integer
- irrational number - non-terminating, non-repeating decimals

Ex: ① $\pm\sqrt{25} = \pm 5$ ② $\sqrt[3]{64} = 4$

Estimating non-perfect square roots
find the two perfect square roots
it falls between and estimate between
the two integers it will fall between

Ex: $\sqrt{55}$ $\sqrt{49}$ $\sqrt{55}$ $\sqrt{64}$
 ↓ ↓ ↓
 7 7.4 8

Classifying Real Numbers



Exponents

Law of multiplication: $x^4 \cdot x^5 =$
add the exponents: x^9

Law of Division: $x^7 / x^3 =$
subtract the exponents: x^4

Law of Power to a Power: $(x^2)^3 =$
multiply the exponents: x^6

Zero Property: $x^0 = 1$

Negative Exponents: $x^{-3} = \frac{1}{x^3}$

Scientific Notation:

Decimal must be at least 1 and less
than 10, times a power of 10

Ex: 3.6×10^4 or 9.4×10^{-3}

the power tells you the number of place values to move. Large numbers have a positive power, small numbers have a negative power

$$\text{Ex: } ① \underline{3,200,000} = 3.2 \times 10^6$$

$$② \underline{.0000063} = 6.3 \times 10^{-6}$$

Operations with Scientific Notation

* make sure all final answers are in correct form

Adding + Subtracting \rightarrow need the same power of 10

$$\text{Ex: } 3.2 \times 10^4 + 5.8 \times 10^5$$

$$\hookrightarrow .32 \times 10^5 + 5.8 \times 10^5 = 6.12 \times 10^5$$

Multiplying + Dividing \rightarrow multiply or divide decimals and use exponent rules

$$\text{Ex: } ① (5.4 \times 10^2)(2.7 \times 10^3) = 14.58 \times 10^5$$

$$② \frac{1.25 \times 10^6}{2.5 \times 10^3} = .5 \times 10^3 \hookrightarrow 1.458 \times 10^6$$
$$\hookrightarrow 5 \times 10^2$$