Lesson 1.1 & 1.2: Real Numbers & Exponents and Radicals

Real Numbers

# System	Symbol	Description	Examples
Natural Numbers	$\mathbb{N}$	All _____ integers.	{1,2,3,4,…}
Integers	$\mathbb{Z}$	Consist of natural numbers and their opposites (negatives) as well as ____ .	{…,-2,-1,0,1,2,…}
Rational Numbers	$\mathbb{Q}$	Any number that can be written as a ratio of two _____. $\frac{a}{b}$ $where\ a\ and\ b\ are\ integers\ and\ b \neq 0.$	
Irrational Numbers	$\mathbb{R} - \mathbb{Q}$	Any number that cannot be expressed as a _____ of two integers. Will have an infinite non-repeating list of numbers to the right of the decimal point.	
Real Numbers	$\mathbb{R}$	Any number that can be represented on a _____ . This includes the set of natural numbers, integers, rational numbers, and irrational numbers.	

Sets

A **set** is the collection of objects, and these objects are called **_____** of the set.

- For example, S = {1, 2, 3, 4, 5} would be the set containing elements _____ .

$\in$ means "element of". For example $a \in S$ means a is an element of set S.

Set-builder Notation is when we define a set using brackets.

- For example: $A = \{x : x\ is\ an\ integer\ and\ 0 < x < 7\}$ would be the set of all integers in between 0 and 7.

$A \cup B$ means A "**union**" B. A union of two sets consists of all elements in _____ .

$A \cap B$ means A "**intersect"** B. An intersection of two sets consists of all elements in _____ A and B.

Intervals

Interval notation is used to describe a set of numbers between two endpoints. Both _____ parenthesis and _____ brackets are used.

Open parenthesis indicate that the endpoint _____ included. (a , b)

Closed brackets indicate that the endpoint _____ included. [a , b]

Absolute Value

The absolute value of a number is its _____ from zero. It is denoted by:

Exponents & Radicals

If **a** is any real number and **n** is a positive integer, then the **nth power** of a is:

_____

The number **a** is called the _____ and **n** is called the _____ .

Any number to the zeroth power (except 0) is _____ . $(a^0 = 1, when\ a \neq 0)$

Law of Exponents	Example	Description
$a^m a^n = a^{m+n}$	$x^3 x^2 = x^{3+2} = x^5$	To multiply two powers of the same base, add the exponents.
$\frac{a^m}{a^n} = a^{m-n}$	$\frac{x^3}{x^2} = x^{3-2} = x$	To divide two powers of the same base, subtract the exponents.
$(a^n)^m = a^{nm}$		
$(ab)^n = a^n b^n$		
$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$		
$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$		
$\frac{a^{-n}}{b^{-n}} = \frac{b^n}{a^n}$		