Warm Up 1

Determine if the set is finite or infinite:

1. {Even numbers greater than 4, but less than 100} finite
2. {odd numbers} infinite
3. {Fractions less than 1} infinite
4. -3 is a member of what set(s)? integers, rational & real
5. sqrt 2 Is a member of what set(s)? Irrational (real)

Cast of Characters

Set-Builder Notation

Naturals $1, 2, 3, \ldots$

Wholes $0, 1, 2, 3, \ldots$

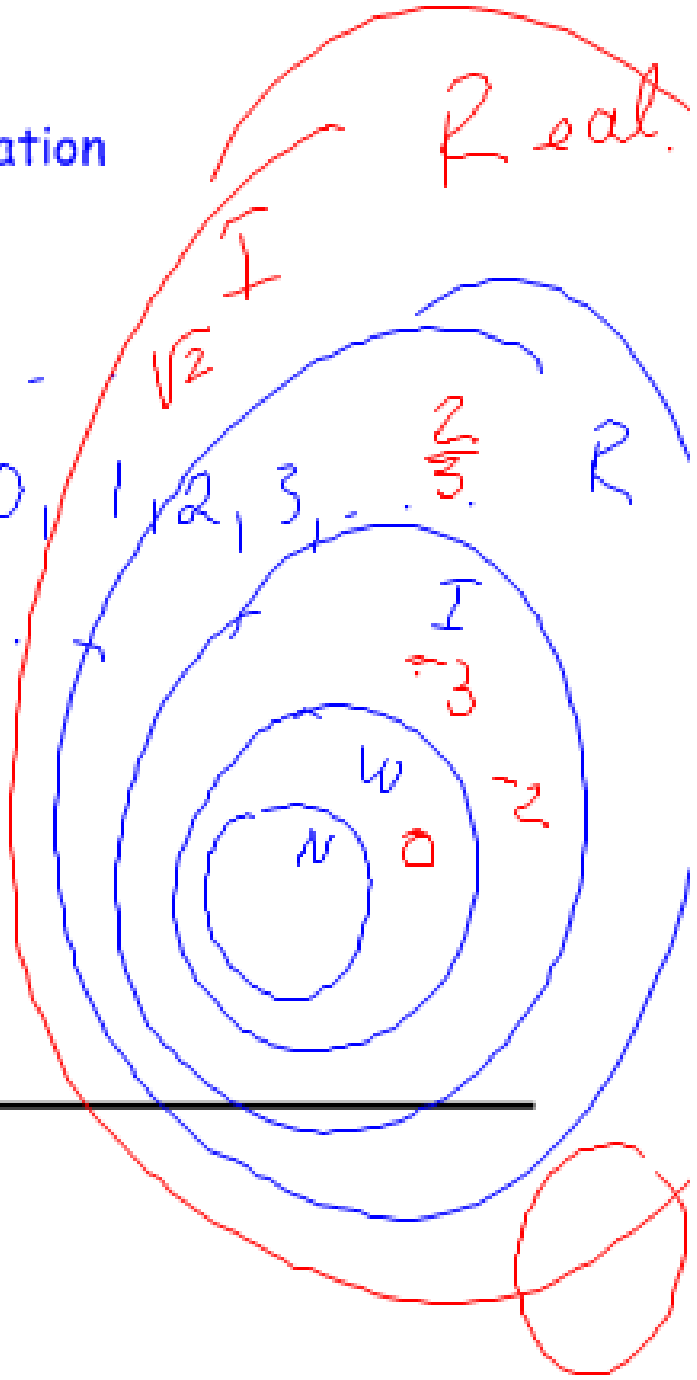
Integers $\ldots -3, -2, -1, 0, 1, 2, 3, \ldots$

Rationals $0.3, 1/2, \ldots$

Irrationals $\sqrt{1}, \sqrt{2}, \ldots$

Reals $0.33345\ldots$

$0.\overline{3}$



Real Number Line

Rational Numbers

Set-Builder Notation

{a/b | a, b are Integers, b ≠ 0}

Repeating

$\frac{1}{3} = 0.333\ldots = 0.\overline{3}$

$\frac{23}{5}$ $\frac{5}{0}$

Terminating

$\frac{1}{2} = 0.5$

Irrational Numbers

$\sqrt{5}$; $3\sqrt{7}$; π

$-\infty$

Order and Interval Notation

Inequality Symbols

Unbounded Interval

Interval Notation

a is greater than b $a > b$

$x > 3$ $(3, +\infty)$

a is less than b $a < b$

$x < 2$ $(-\infty, 2)$

a is greater than or equal to b $a \geq b$

$x \geq 3$ $[3, +\infty)$

a is less than or equal to b $a \leq b$

$x \leq -4$ $(-\infty, -4]$

Trichotomy Property

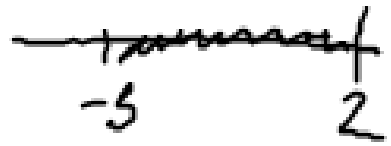
Let a and b be any two real numbers.
Exactly one of the following is true:

$a > b$ OR $a = b$ OR $a <$

Intervals

( ) ; ( ] ; [ ) ; [ ]

The real numbers between -3 and 2



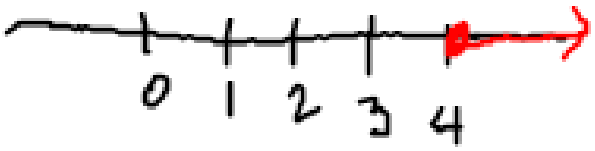
(−3, 2)

The real numbers greater than or equal to 4

Bounded Intervals of Real Numbers

let a and b be real numbers with a<b

[4, ∞)



Interval Notation	Interval Type	Inequality Notation	Graph
[a,b]	Closed		
(a,b)	Open		
[a,b)	Half-Open		
(a,b]	Half-Open		

Study table of Unbounded Interval types

Basic Properties of Algebra

Commutative	Addition	Multiplication
	$u+v=v+u$	$uv=vu$
Associative	$(u+v)+w=u+(v+w)$	$(uv)w=u(vw)$
Identity	$u+0=u$	$u\cdot 1=u$
Inverse	$u+(-u)=0$	$u\cdot(1/u)=1\ ,\ u\neq 0$
Distributive	$(u+v)w=uw+vw$ $u(v+w)=uv+uw$ $(u-v)w=uw-vw$ $u(v-w)=uv-uw$	$2+(3\cdot 5)\neq(2+3)\cdot(2+5)$ Does not exist

Additive Inverse Properties

$-(-u)=u$ $\quad -(-2)=2$

$(-u)v=u(-v)=-(uv)$ $\quad (-1)3=1(-3)=-(1\cdot 3)$

$(-u)(-v)=uv$ $\quad (-4)(-3)=4\cdot 3$

$(-1)u=-u$ $\quad (-1)\cdot 5=-5$

$-(u+v)=(-u)+(-v)$ $\quad -(2+3)=-2+(-3)$

Integer Exponents

Exponential Notation

If *a* is a real number, variable, or algebraic expression and *n* is a positive integer, then

$a^n = a \cdot a \cdot a \cdot a \cdot \ldots \cdot a$ (*n* times).

with *n* factors of *a*

exponent n

base a

nth power of a a^n

Properties of Exponents

$u^m u^n = u^{m+n}$ $\quad 2^6 \cdot 2^7 = 2^{6+7} = 2^{13}$

$(u^m)/(u^n) = u^{m-n}$ $\quad \frac{9^3}{9^2} = 9^{3-2} = 9^1 = 9$

$u^0 = 1$ $\quad 8^0 = 1$

$u^{-n} = 1/(u^n)$ $\quad 5^{-3} = \frac{1}{5^3}$

$(uv)^m = u^m v^m$ $\quad (4 \cdot 5)^{20} = 4^{20} \cdot 5^{20}$

$(u^m)^n = u^{mn}$ $\quad (7^2)^3 = 7^{2 \cdot 3} = 7^6$

$(u/v)^m = (u^m)/(v^m)$ $\quad \left(\frac{2}{1}\right)^2 = \frac{2^2}{1^2}$

Scientific Notation

Used for really large or really small numbers.

Represents a number as a product of:
a number between 1 and 10
times
a power of ten

Convert to and from scientific notation

$97354100034 = 9.735410034 \times 10^{10}$

$0.0000354717 = 3.54717 \times 10^{-5}$

P.1 Assignment

Pages 11-13
Edmodo:#2,18,20,30,32,40,42,44,
54,58,60

Paper-based:#5,7,9,13,18,25,27,33,
37,47,51, 53,57,63