Review: Identify the following sets of real numbers by definition and special symbol (if there is one)

Natural Numbers counting numbers $\{1,2,3,\ldots\}$ $\mathbb{N}$

Prime Numbers only have as factors 1 and the number itself

Integers positive and negative whole numbers $\{\ldots -2,-1,0,1,2,\ldots\}$ $\mathbb{Z}$

Rational Numbers can be written as fractions terminating or repeating decimals $\{p/q \mid p,q \in \mathbb{Z}\}$ $\mathbb{Q}$

Irrational Numbers non-terminating, non repeating decimals

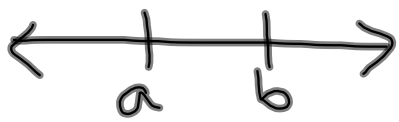
Real Numbers all decimals all rationals and irrationals $\mathbb{R}$

1.1 Real Numbers continued!

Variable - letter or other symbol used to represent any number that makes sense in the expression

$x+3=5$; $\frac{\square - 7}{\square + 6}$

$a < b$ "a is less than b" (b > a)



$a > b$ "a is greater than b" (b < a)

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

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

Additive Identity the unique real number zero (0) such that

$x+0=x$ and $0+x=x$ for all real #'s x

Additive Inverse

$x+(-x)=0$

the real # $-x$ s.t. $x+(-x)=0$ and $(-x)+x=0$

$\forall x \in \mathbb{R}$

Absolute Value makes things positive

$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

e.g. $|-2| = 2 = -(-2)$

methods of writing a set

roster method - list

$\{1,2,3,\ldots\}$; $\{\ldots -2,-1,0,1,2\ldots\}$, $\{a,b,c\}$

Set-builder Notation

$\{\text{variable(s)} \mid \text{condition(s) on the variables}\}$

$\{p/q \mid p,q \in \mathbb{Z}\}$ ("such that") $\{x \mid x \geq 2\}$

Interval Notation

$[a,b]$ closed interval — includes endpoints

(a,b) open interval — does not include endpoints

$(a,b]$ half-open

$[a,b)$ half-closed "cloper"

$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$ all acceptable

$\mathbb{R} = (-\infty, \infty)$

* ∞ is not a number, no it is never included

$\emptyset$ = the empty set = the set containing no elements

$\{\emptyset\}$ = the set containing the empty set as an element

Union & Intersection

$\cup$ "or"

the set of all the elements from any set

$\cap$ "and"

overlap of sets; all elements that occur in each set

$A=\{1,2,3,4,5\}$; $B=\{4,5,6,7\}$; $C=\{6,7,8\}$

$A \cup B = \{1,2,3,4,5,6,7\}$

$A \cap B = \{4,5\}$

$A \cap C = \emptyset$

$B \cup C = \{4,5,6,7,8\}$

$A \cup B \cup C = \{1,2,3,4,5,6,7,8\}$

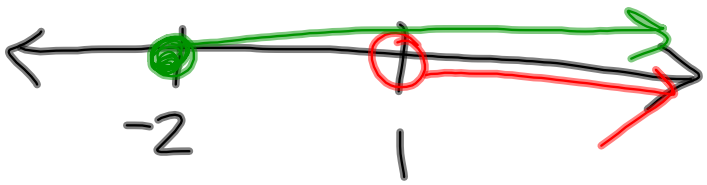
$(A \cap B) \cup C = \{4,5,6,7,8\} = B \cup C$

$A \cup \emptyset = A$

$B \cap \emptyset = \emptyset$

1.1

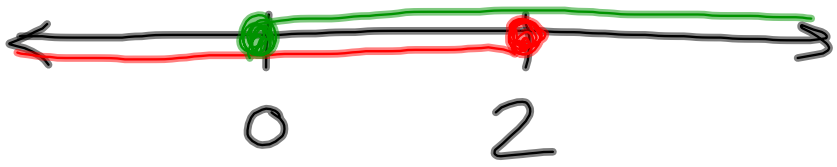
77. $\{x \mid x > 1\} \cap \{x \mid x \geq -2\}$



$= \{x \mid x > 1\}$

75.

$$\{x \mid x \leq 2\} \cap \{x \mid x \geq 0\}$$



$$[0, 2]$$

$$\{x \mid 0 \leq x \leq 2\}$$

113. $(2,\infty) \cup (-2,4]$

$(-2,\infty)$

$\{x \mid x > -2\}$

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

1.1
#1-126