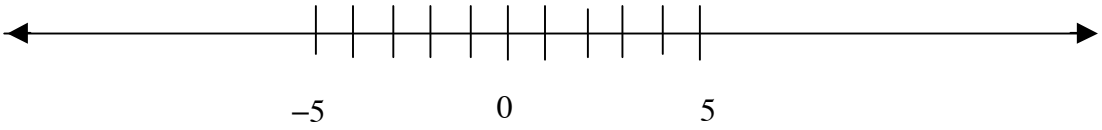
Section 2.1 Positive and Negative Numbers

1. Positive and Negative Numbers on the Number Line: On a straight line, label a convenient point with 0. This is called the origin, and it is usually in the middle of the line. Then label the positive numbers to the right of 0 and the negative numbers to the left of 0. Numbers increase going from left to right. Any number to the left of another number is considered to be smaller that the number to its right.



Example: In each blank, write "smaller than" or "larger than."

a. –3 is _____ –2

b. 7 is _____ –10

c. –5 is _____ 2

2. Inequality Notation: If a and b are any two numbers on the number line, then

$a < b$ is read "a is less than b"

$a > b$ is read "a is greater than b".

Example: In each blank place the symbol "<" or ">."

a. –7____ –5

b –2 ___ 1

c. –10 ___ –11

Note: Portions of this document are excerpted from the textbook *Prealgebra,* 7th ed. by Charles McKeague

3. Absolute Value: The absolute value of a number is its distance from 0 on the number line. We denote the absolute value of a number with vertical lines around the number. Thus the absolute value of –3 is written $|-3|$.

Example: Simplify each of the following.

a. $|-7|$

b. $|8|$

c. $|-6|$

d. $-|-3|$

4. Opposite of a Number: Two numbers that are the same distance from 0 are called opposites. The notation for the opposite of a is –a.

Example: Fill in the blanks with the correct answer.

a. The opposite of –5 is _____.

b. The opposite of 7 is _____.

c. The opposite of –10 is _____.

5. Property of Opposites: If a represents any positive number, then it is true that –(–a) = a. Thus, the opposite of a negative number is a positive number.

Example: Simplify.

a. –(–7)

b. –(–8)

c. $|-7|$

d. $-|-7|$

6. Different Interpretations of "+" and "–" Symbols: The "+" and "–" symbols can be used to indicate addition and subtraction, or to indicate the direction that a number is from 0 on the number line.

Examples:

a. $7 + 6$ The + sign indicates addition.

b. $8 - 3$ The – sign indicates subtraction.

c. -3 The – sign is read "negative" three.

d. $-(-8)$ The first – sign is read the "opposite of" and the second is read "negative" eight. Also, it may be read as "the negative of negative eight."

7. Vocabulary:

Whole numbers: The whole numbers are the set of numbers $\{0,\ 1,\ 2,\ 3,...\}$.

Integers: The integers are the set of numbers $\{...-3,-2,-1,\ 0,\ 1,\ 2,\ 3,...\}$

Example:

a. Name two integers that are not whole numbers.

b. Is it possible to name two whole numbers that are not integers? Why not?

c. Name two numbers that are not integers.