5.1 Addition and Subtraction of Integers

The set of integers = **Z** =

Properties for Integers with Addition

1. Closure

2. Commutativity

3. Associativity

4. Additive Identity

5. Additive Inverse

- sign...its many guises and names

1.

2.

3.

1. How would you properly read these statements? And can you explain why these are true?

(a) -(-x) = x

(b) -a + -b = -(a + b)

(c) a - b = a + (-b)

2. Is -x always negative?

Absolute Value Definition

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

Geometrically, the absolute value of a number represents how far away it is from the origin on the real number line.

1. Explain whether the sum of any two negative numbers is also negative.

2. Explain whether the sum of a positive integer with a negative integer is positive or negative and why?

3. Simplify.

(a) $|x| + x$ if $x < 0$

(b) $-|x| + x$ if $x < 0$

(c) $-|x| + x$ if $x > 0$

Addition of Integers--various models/algorithms

1. Set Model
2. Measurement (number line)
3. Pattern

Examples:

1. -2 + 5

2. 3 + -4

3. -5 + -6

4. Make up a story problem that would produce this addition computation.

23 + -15 + -8

Subtraction of Integers--various models/algorithms

1. Set Model

2. Measurement (number line)

3. Pattern

4. Adding the opposite

5. Missing Addend

Examples:

1. -2 - 5

2. 3 - -4

3. -5 - -6

4. 10-(-(-2))

5. Make up a story problem that would produce this computation.
   23 - (-17)