Goals: Review the properties of addition and highlight the difficulties of adding with integers.

* Review the properties of addition
  + Commutative Property of addition
  + Associative Property of addition
  + Distributive Property
* Vectors
  + Magnitude and absolute value
* Adding Integers
  + What is the order of operations?

(Use Goals as a section header for the transition into each topic)

# Review the properties of addition

Def: **The Commutative Property for addition**:

No matter how you order your addends, the sum will be the same.

Or

Let be any number, then

Ex

Def: **The associative property of addition**:

No matter how you group your addends, the sum will be the same.

Or

Let be any number, then

Ex:

Def: **The additive identity** (is there a number you can add that adds nothing to the original number?):

Zero is the additive identity.

Ex:

Def**: The additive Inverse** (the number you add to a number to bring it back to zero):

For every number N, there is a unique number –N, such that the sum of a number and its inverse will always be 0.

Or

For every number, N there is a unique additive inverse or opposite, -N, such that the sum of these two numbers will always add to zero.

Ex:

Theorem: The distributive property (multiplication over addition):

Let be any numbers

Then

Ex:

# Vectors

A vector is a mathematical object that possesses two important qualities:

1. Magnitude or size/length
2. Direction

Examples of vectors:

* Weight, (has a magnitude and direction)
* Force (intensity of the force and the direction it is traveling in.
* Velocity (80 MPH East on 50)
* Addition with integers , moving 3 places, to the left on a number line.

Ex: Express positive 4 on a number line as a vector.

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1. 4

Every integer can be expressed as a vector.

Ex: Express -3 as a vector.

Magnitude of a vector represents the size of the vector, without regard to its direction or meaning.

So the absolute value is the mathematical representation of magnitude.

Ex: consider the vector given by -6, find the magnitude of this vector.

# Adding Integers

What is the sum of 19 & (-20)

How do we treat this sum?

What if both numbers are positive?

What if both are negative?

What if one is positive and one is negative?

Examples:

What integer is represented by the given vector?

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2 8

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3 15

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2 20

Find the sums:

Find the additive inverse of each integer.

1. 9
2. -12
3. -84
4. 96

What is the easiest way to add these integers?

1+(-9)+7+(-6)

12+(-9)+8+(-6)

51+(-42)+49+(-38)