Elementary algebra
Class notes
Properties of Real Numbers (section 9.2)

We will learn how real numbers act with each other. These properties will directly translate to why algebra works.

Review Properties: From memory, fill in an example, using numbers, for each property below.

This is review from an earlier section.

Commutative property of addition:

Commutative property of multiplication:

Associative property of addition:

Associative property of multiplication:

Distributive property:

expl 1: Use the commutative or associative properties to simplify the following. Then tell which rule(s) you used.

a.) $-2(7w)$

b.) $-7 + (x + 3)$

c.) $\frac{-1}{2}(8y)$

expl 2: Show that division is not commutative.

Do a simple division problem. Now reverse the order. Do you get the same thing?

expl 3: Use the distributive property to rewrite the expressions below without parentheses. Then simplify.

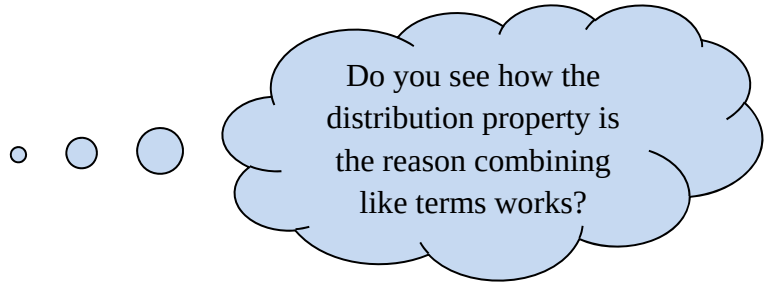
a.) $-5(2x + 9) - 7$

b.) $5(3x - 4) + 6$

expl 4: Use the distributive property to rewrite the sum as a product.

a.) $12x + 12y$

b.) $-9b + 6b$



expl 5: Use a commutative or associative property to complete the statement.

a.) $9 + x =$

b.) $3(2t) =$

c.) $xy =$

Identities and Inverses:

Complete the table with the values of the identities.

	Definition	**Value**
Additive Identity	the number you could add to any other number and get the number you started with	
Multiplicative Identity	the number you could multiply by any other number and get the number you started with	

The additive and multiplicative inverses help us turn numbers into the identities we see above. This is useful in many ways. Below are the definitions of the inverses.

	Definition
Additive Inverse	the number you add to another number to get 0
Multiplicative Inverse	the number you multiply another number by to get 1

expl 6: Fill in the table with the desired inverses.

Additive inverse of …						**Multiplicative Inverse of …**			
5	-10	$\frac{1}{2}$	x	$3x$		5	$\frac{1}{2}$	$-2/3$	x

expl 7: Using additive or multiplicative inverses, fill in the blanks.

a.) $5 + -5 =$ _____

b.) $x + -x =$ _____

c.) $5\left(1/5\right) =$ _____

d.) $6 +$ _____ $= 0$

e.) $\frac{2}{3}\underline{\left(\quad\right)} = 1$

Worksheet: Properties of real numbers 1:
This worksheet starts off by defining real numbers and integers. It discusses closure which is a lesser known property that underlies all algebra. We discuss factoring and reducing fractions with factoring, the distribution property, the commutative properties, the associative properties, and how combining like terms comes from the distribution property. Solutions are available.