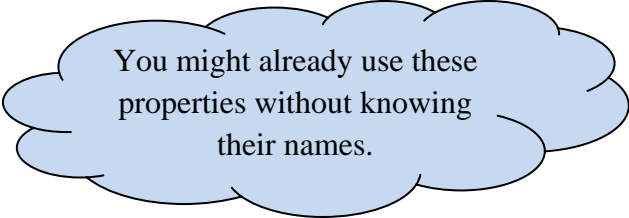


Elementary algebra
Class notes
Properties of Real Numbers (section 1.8)



You might already use these properties without knowing their names.

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

Commutative property of addition:

Commutative property of multiplication:

Associative property of addition:

Associative property of multiplication:

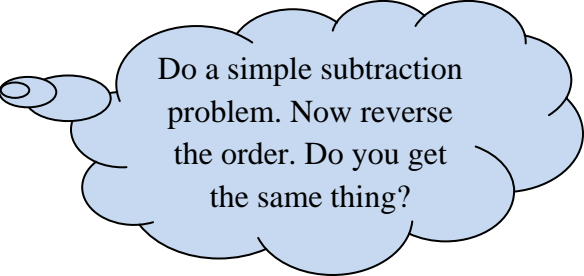
Distributive property:

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

a.) $-3(5y)$

b.) $8 + (x + 5)$

expl 2: Show that subtraction is not commutative.



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

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

$$-3(5x + 4) - 7$$

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

$$7x + 7y$$

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 5: Fill in the table with the desired inverses.

| Additive inverse of ... | | | | | Multiplicative Inverse of ... | | | | |
|-------------------------|-----|---------------|-----|------|-------------------------------|---------------|----------------|-----|--|
| 5 | -10 | $\frac{1}{2}$ | x | $3x$ | 5 | $\frac{1}{2}$ | $-\frac{2}{3}$ | x | |
| | | | | | | | | | |

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.