Algebra 2
Lesson 1-1
Properties of Real Numbers
Part 2: Properties of real numbers

The set of real numbers consists of two subsets: the set of rational numbers and the set of irrational numbers. This set of numbers (real numbers) works with eight (8) properties that govern all operations.

Additive Identity Property
The sum of zero (0) and any number yields the original number eg.: 5+0=0 .

Additive Inverse Property
The sum of a number and its opposite equals zero (0), eg.: $5 + -5 = 0$.

Multiplicative Identity Property
The product of any number and 1 equals the original number, eg.: $5 \cdot 1 = 5$.

Multiplicative Inverse Property
The product of a nonzero number and its reciprocal equals 1, eg: .: $5 \cdot \frac{1}{5} = 1$

Closure Property
The sum or product of any two real numbers is a real number, eg:
$a + b \in R,$ $a \cdot b \in R$

Commutative Property
You can add or multiply real numbers in any order without affecting the answer, eg.:
$a + b = b + a,$ $a \cdot b = b \cdot a$

Associative Property
The sum or product of three or more real numbers is unchanged, regardless of the order the numbers are grouped, eg:
$(a + b) + c = a + (b + c),$ $(a \cdot b) \cdot c = a \cdot (b \cdot c)$

Distributive Property
When multiplying a sum by a number, the result is the same, whether you add first and then multiply or multiply each number first and then add the numbers, eg.: $a(b + c) = ab + ac,$ $(b + c) \cdot a = ba + ca$

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Problem Set 1-1

1. Write the additive and multiplicative inverse for each number>

a) -15

b) $3\sqrt{2}$

c) 4.05

d) $\frac{3}{5}$

2. The expression 5n + 0 =5n is an example of _____ property.

3. The expression 3+2x=2x+3 is an example of _____ property.

4. The expression of $4 \cdot 3y \cdot 2x = \ (4 \cdot 3y) \cdot 2x$

5. The expression $3 + (n - 1) = 3 + (-1 + n)$ is an example of which property?

6. True or false: $ab\left(\frac{1}{ab}\right) = 0$ when $ab \neq 0$.

7. Translate "the cost of 3 movie tickets, 2 sodas and 2 popcorns is $42.75.

8. If the cost of one movie ticket is $9.50 and one soda is $2.50 and one popcorn is $4.25, how much did you spend at the movies?

9. Fill in the blank and state the property

$(12 + \_\_) + 20 = 12 + (5 + 20)$

10. Fill in the blank and state the property.

$3 \cdot 2n - 3 \cdot 5 = \_\_\_(2n - 3)$

11. Fill in the blank and state the property.

$6(3 + 2y) = (2y + \_\_) \cdot 6$

12. The retail price on a set of 4 auto tires is $260.50. The price is discounted 20%. If the sales tax rate is 8.25% on the selling price and there is a $2.50 disposal fee for each tire, how much would the final customer price be?

13. Which offer saves the customer the most money?

Offer A: Take 10% off the retail price of $436. Then add 8% sales tax.

Offer B: Take $40 off the retail price of $436. Then add 8% sales tax.

WHY?

14. A car averages 65 mph. It travels for 4.5 hours. The car gets about 26 miles per gallon of gasoline. If gas costs $3.98 a gallon, how much will the gas cost on the trip?