

Properties of Real Numbers Video Lecture

Section 1.8

Course Learning Objective:

Identify and use the properties of real numbers.

Weekly Learning Objectives:

- 1) Identify and use the commutative and associative properties.**
- 2) Identify and use the distributive property.**
- 3) Identify and use the identity and inverse properties.**
- 4) Find the opposite and reciprocal of a number.**
- 5) Use the distributive property to remove parentheses.**
- 6) Use the distributive property to factor.**

Properties of Real Numbers

Commutative Property of Addition: $a + b = b + a$

Commutative Property of Multiplication: $ab = ba$

Note: There is no Commutative Property of Subtraction or Division because:

Associative Property of Addition: $a + (b + c) = (a + b) + c$

Associative Property of Multiplication: $a(bc) = (ab)c$

Identity Property of Addition: $a + 0 = a$ or $0 + a = a$

Identity Property of Multiplication: $a \cdot 1 = a$ or $1 \cdot a = a$

Inverse Property of Addition: $a + (-a) = 0$

Inverse Property of Multiplication:

$$a \cdot \frac{1}{a} = 1 \quad \text{or} \quad \frac{1}{a} \cdot a = 1$$

Vocabulary:

Additive Inverse (or opposite) of a is $-a$

Multiplicative Inverse (or reciprocal) of a is $\frac{1}{a}$

Distributive Property of Multiplication over Addition: $a(b + c) = ab + ac$

Example: $2(3x - 5) =$

Note: $a(b + c) =$

Multiplication gets rid of parentheses

$ab + ac =$

Factoring puts parentheses back in

Examples:

$$-2(4t - 3m) =$$

$$-4(4z + 5w - 9y) =$$

$$6x + x =$$

$$2x - 4y =$$

Examples of Identifying Properties:

1) $(x + 2) + 3 = (2 + x) + 3$

2) $x(yz) = x(zy)$

3) $x + (4 + y) = (x + 4) + y$

4) $4 + (-4) = 0$

5) $x(z + y) = xz + xy$

6) $xz + xy = xz + yx$

7) $(\frac{2}{3})(\frac{3}{2}) = 1$

8) $4 + 0 = 4$

9) $xz + xy = xy + xz$