

Math 172 – Section 1.5: Properties of Real Numbers

Commutative Properties

addition: $a + b = b + a$ for a, b real

multiplication: $ab = ba$ for a, b real

Associative Properties

addition: $(a + b) + c = a + (b + c) = a + b + c$ for a, b, c real

multiplication: $(ab)c = a(bc) = abc$ for a, b real

Distributive Property

$$a(b + c) = ab + ac \quad \text{for } a, b, c \text{ real}$$

Identity Properties

additive: $a + 0 = 0 + a = a$ for a real

multiplicative: $a \cdot 1 = 1 \cdot a = a$ for a real

Inverse Properties

additive: $a + (-a) = -a + a = 0$ for a real

multiplicative: $a \cdot \frac{1}{a} = \frac{1}{a} \cdot a = 1$ for a real, $a \neq 0$

Multiplication Property of Zero

$$0 \cdot a = a \cdot 0 = 0 \quad \text{for } a \text{ real}$$