

Some important theorems.

The additive identity is unique. If a is an additive identity then $a = 0$

	Let a be an additive identity		
	$a + x = x$		
	$(a + x) + -x = x + -x$		
	$a + (x + -x) = x + -x$		
	$a + 0 = 0$		
	$a = 0$		

The opposite of a number is unique. If a is an opposite of x then $a = -x$

	Let a be an opposite of x .		
	$a + x = 0$		
	$(a + x) + -x = 0 + -x$		
	$a + (x + -x) = 0 + -x$		
	$a + 0 = 0 + -x$		
	$a = -x$		

$0 \cdot x = 0$ Zero times a number is an additive identity

	$x + 0 \cdot x$		
	$1 \cdot x + 0 \cdot x$		
	$(1 + 0)x$		
	$1 \cdot x$		
	x		
	$x + 0 \cdot x = x$		
	$0 \cdot x = 0$		

$-1 \cdot x = -x$ Negative one times a number is the opposite of that number

	$-1 \cdot x + x = -1 \cdot x + x$		
	$-1 \cdot x + 1 \cdot x$		
	$(-1 + 1)x$		
	$0 \cdot x$		
	0		
	$-1 \cdot x = -x$		