

# Commutative, Associative and Distributive Properties, Identities and Inverses

## Commutative Property of Addition

$$a + b = b + a$$

$$8 + 5 = 5 + 8$$

## Commutative Property of Multiplication

$$a \cdot b = b \cdot a$$

$$8 \cdot 5 = 5 \cdot 8$$

## Associative Property of Addition

$$(a + b) + c = a + (b + c)$$

$$(5 + 6) + 8 = 5 + (6 + 8)$$

## Associative Property of Multiplication

$$(a \cdot b) \cdot c = a \cdot (b \cdot c)$$

$$(5 \cdot 6) \cdot 8 = 5 \cdot (6 \cdot 8)$$

## Distributive Property

$$a \cdot (b + c) = a \cdot b + a \cdot c$$

$$2(3 + 4) = 2 \cdot 3 + 2 \cdot 4$$

$$2(3 - 4) = 2 \cdot 3 - 2 \cdot 4$$

## Identity for Addition

$$a + 0 = a$$

$$\underline{-7 + 0 = -7}$$

## Identity for Multiplication

$$a \cdot 1 = a$$

$$\underline{-7 \cdot 1 = -7}$$

Additive Inverse

identity = 0

$$a + (-a) = 0$$

$$7 + (-7) = 0$$

Multiplicative Inverse

identity = 1

$$a \cdot \frac{1}{a} = 1$$

$$7 \cdot \frac{1}{7} = 1$$

Directions: Name the property.

1.  $17 \cdot 5 = 5 \cdot 17$

commut. prop. of mult.

2.  $6(5+8) = 6(5) + 6(8)$

Dist. Prop. of  
Mult. over Addition

3.  $4 + 0 = 4$

Identity for addition

4.  $(3 \times 7) + 5 = (7 \times 3) + 5$

commut. prop. of mult.

5.  $(-2 \times 3) + 6 = 6 + (-2 \times 3)$

commut. prop.  
of addit.

6.  $1 \cdot x = x$

identity for mult.

7.  $(b+2)a = ba + 2a$

Distrib. Prop.

8.  $xy + 0 = xy$

identity for addit.

$$9. 19 \cdot x^2 = x^2 \cdot 19$$

commut. prop.  
of mult.

$$10. -6x \cdot 1 = -6x$$

ident. for mult.

$$11. 8 \cdot \frac{1}{8} = 1 \quad \text{ident. for mult.} = 1$$

multiplicative inverse

$$12. 5 + (-5) = 0 \quad \text{ident. for addit.} = 0$$

additive inverse

$$13. 4(5 \cdot y) = (4 \cdot 5)y$$

Assoc. Prop.  
of mult.

$$14. (6-3)5 = 6(5) - 3(5)$$

Dist. Prop.

$$15. \underline{3(8+4)} = \underline{(8+4)3}$$

Commut. Prop.  
of mult.