



Name _____

Multiplication Properties

R 2-1

Commutative: $3 \times 2 = 2 \times 3$
Changing the **order** of the factors doesn't change the product.

Associative:
 $(3 \times 2) \times 1 = 3 \times (2 \times 1)$
Changing the **grouping** of the factors doesn't change the product.

Distributive:
 $3 \times 12 = (3 \times 10) + (3 \times 2)$
You can **break apart** a factor:
 $12 = 10 + 2$, so you can multiply by 10, multiply by 2, and add.

Identity: $3 \times 1 = 3$
Multiplying a number by **one** gives the original number.

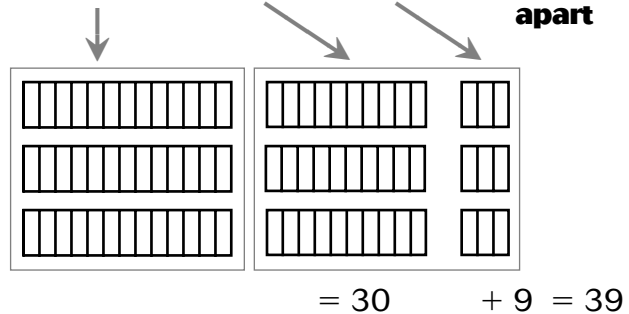
Zero: $3 \times 0 = 0$
Multiplying a number by **zero** gives zero.

Remembering the **boldface** words will help you remember the properties.

Knowing the properties of multiplication can often make it easier to multiply.

Example 1
 $2 \times (9 \times 5) = 2 \times (5 \times 9) \rightarrow$ **order**
 $= (2 \times 5) \times 9 \rightarrow$ **grouping**
 $= 10 \times 9 = 90$

Example 2
 $3 \times 13 = (3 \times 10) + (3 \times 3) \rightarrow$ **break apart**



Use the commutative and associative properties to change the order and grouping of the factors and multiply.

1. $2 \times (7 \times 5) = 2 \times (\underline{\quad})$
 $= (\underline{\quad} \times 5) \times \underline{\quad}$
 $= \underline{\quad} \times \underline{\quad} = \underline{\quad}$

2. $4 \times (8 \times 5) = 4 \times (\underline{\quad})$
 $= (\underline{\quad} \times 5) \times \underline{\quad}$
 $= \underline{\quad} \times \underline{\quad} = \underline{\quad}$

Use the distributive property to break apart one factor and multiply.

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

4. $3 \times 19 = (\underline{\quad}) + (\underline{\quad})$
 $= \underline{\quad} + \underline{\quad} = \underline{\quad}$