

Multiplication Properties

You can use multiplication properties to help you multiply more easily.

Associative Property of Multiplication

You can change the grouping of the factors. The product stays the same.

$$\begin{array}{ccc}
 (3 \times 4) \times 4 = 48 & & 3 \times (4 \times 4) = 48 \\
 \downarrow \downarrow \downarrow & & \downarrow \downarrow \downarrow \\
 \text{Factors} & & \text{Factors} \\
 \uparrow \uparrow & & \uparrow \uparrow \\
 12 \times 4 = 48 & & 3 \times 16 = 48 \\
 \text{Product} & & \text{Product}
 \end{array}$$

Commutative Property of Multiplication

You can change the order of the factors. The product stays the same.

$$\begin{array}{ccc}
 7 \times 4 = 28 & & 4 \times 7 = 28 \\
 \downarrow \downarrow & & \downarrow \downarrow \\
 \text{Factors} & & \text{Factors} \\
 \downarrow & & \downarrow \\
 \text{Product} & & \text{Product}
 \end{array}$$

Zero Property of Multiplication

When one of the factors is 0, the product is always 0.

$$\begin{array}{ccc}
 3 \times 0 = 0 & & 0 \times 3 = 0 \\
 \downarrow \downarrow & & \downarrow \downarrow \\
 \text{Factors} & & \text{Factors} \\
 \downarrow & & \downarrow \\
 \text{Product} & & \text{Product}
 \end{array}$$

Identity Property of Multiplication

When one of the factors is 1, the product is always the other factor.

Identify the multiplication property or properties used in each equation.

1. $100 \times 0 = 0$ _____ 2. $7 \times 2 = 2 \times 7$ _____

3. $1 \times 55 = 55$ _____ 4. $(6 \times 7) \times 9 = 6 \times (7 \times 9)$ _____

Reasoning Use the multiplication properties to determine what number must be in the box.

5. $5 \times 4 = \square \times 5$

6. $99 \times \square = 99$

7. $(3 \times 12) \times \square = 3 \times (12 \times 8)$

8. $\square \times 1 = 0$

9. $\square \times 2 = 2 \times 50$

10. $(16 \times \square) \times 25 = 16 \times (33 \times 25)$

Name _____

Multiplication Properties

In 1 through 5, write the multiplication property used in each equation.

1. $53 \times 6 = 6 \times 53$

2. $0 \times 374,387 = 0$

3. $5 \times (11 \times 4) = (5 \times 11) \times 4$

4. $42 \times 1 = 42$

5. $14 \times 5 = 5 \times 14$

6. **Reasoning** Chan bought 2 large frozen yogurts at \$1.50 each and 1 small bottle of water for \$1.00. How much did she pay in total?

7. Dan has 4 shelves. He has exactly 10 books on each shelf. Judy has 10 shelves. She has exactly 4 books on each shelf. Who has more books? Explain.

8. **Algebra** If $3 \times 8 \times 12 = 8 \times 3 \times n$, what is the value of n ?

A 3

B 8

C 12

D 18

9. **Explain It** Write a definition for the Associative Property of Multiplication in your own words and explain how you would use it to compute $4 \times 25 \times 27$ mentally.
