

# 1-4 Properties (Pages 22–25)

Commutative Property of Addition and Multiplication	
The order in which numbers are added does not change the sum. $5 + 3 = 3 + 5$ For any numbers $a$ and $b$ , $a + b = b + a$ .	The order in which numbers are multiplied does not change the product. $2 \cdot 4 = 4 \cdot 2$ For any numbers $a$ and $b$ , $a \cdot b = b \cdot a$ .
Associative Property of Addition and Multiplication	
The way in which addends are grouped does not change the sum. $(2 + 3) + 4 = 2 + (3 + 4)$ For any numbers $a$ , $b$ , and $c$ , $(a + b) + c = a + (b + c)$ .	The way in which factors are grouped does not change the product. $(2 \cdot 3) \cdot 4 = 2 \cdot (3 \cdot 4)$ For any numbers $a$ , $b$ , and $c$ , $(a \cdot b) \cdot c = a \cdot (b \cdot c)$ .
Identity Property of Addition and Multiplication	
The sum of an addend and zero is the addend. $6 + 0 = 6$ For any number $a$ , $a + 0 = a$ .	The product of a factor and one is the factor. $6 \cdot 1 = 6$ For any number $a$ , $a \cdot 1 = a$ .
Multiplicative Property of Zero	
The product of a factor and zero is zero. $5 \cdot 0 = 0$ . For any number $a$ , $a \cdot 0 = 0$ .	

## PRACTICE

Name the property shown by each statement.

- |                        |                          |                          |
|------------------------|--------------------------|--------------------------|
| 1. $x \cdot 0 = 0$     | 2. $a + 8 = 8 + a$       | 3. $2x(y) = 2xy$         |
| 4. $m + 0 = 0 + m$     | 5. $3(x + y) = (x + y)3$ | 6. $(4c)d = 4(cd)$       |
| 7. $7x + 10 = 10 + 7x$ | 8. $4x \cdot 1 = 4x$     | 9. $10x + 8y = 8y + 10x$ |

Find each sum or product mentally using the properties above.

10.  $37 + 8 + 23$       11.  $5 \cdot 11 \cdot 2$       12.  $4 \cdot 12 \cdot 6 \cdot 0$
13. Rewrite  $18y \cdot 4x$  using the commutative property.
14. Rewrite  $(2x + 8) + 4$  using the associative property. Then simplify.



15. **Standardized Test Practice** Juana is 4 feet 8 inches tall. She won 1st place in a cross-country race. To receive her medal, she stood on a platform that was 18 inches tall. What was the total distance from the top of Juana's head to the ground when she was standing on the platform?
- A** 5 feet 6 inches      **B** 5 feet 8 inches      **C** 6 feet      **D** 6 feet 2 inches

**Answers:** 1. multiplicative property of zero 2. commutative 3. associative 4. identity 5. commutative 6. associative 7. commutative 8. identity 9. commutative 10. 68 11. 110 12. 0 13.  $4x \cdot 18y$  14.  $2x + (8 + 4)$ ;  $2x + 12$  15. D