EXAMPLE 3 Identify properties of real numbers

Identify the property that the statement illustrates.

a. $7 + 4 = 4 + 7$

b. $13 \cdot \frac{1}{13} = 1$

Solution

a. Commutative property of addition

b. Inverse property of multiplication

KEY CONCEPT — *For Your Notebook*

Defining Subtraction and Division

Subtraction is defined as *adding the opposite*. The **opposite**, or *additive inverse*, of any number b is $-b$. If b is positive, then $-b$ is negative. If b is negative, then $-b$ is positive.

$a - b = a + (-b)$ — **Definition of subtraction**

Division is defined as *multiplying by the reciprocal*. The **reciprocal**, or *multiplicative inverse*, of any nonzero number b is $\frac{1}{b}$.

$a \div b = a \cdot \frac{1}{b}, b \neq 0$ — **Definition of division**

EXAMPLE 4 Use properties and definitions of operations

Use properties and definitions of operations to show that $a + (2 - a) = 2$. Justify each step.

Solution

$a + (2 - a) = a + [2 + (-a)]$	Definition of subtraction
$= a + [(-a) + 2]$	Commutative property of addition
$= [a + (-a)] + 2$	Associative property of addition
$= 0 + 2$	Inverse property of addition
$= 2$	Identity property of addition

✓ GUIDED PRACTICE for Examples 3 and 4

Identify the property that the statement illustrates.

3. $(2 \cdot 3) \cdot 9 = 2 \cdot (3 \cdot 9)$

4. $15 + 0 = 15$

5. $4(5 + 25) = 4(5) + 4(25)$

6. $1 \cdot 500 = 500$

Use properties and definitions of operations to show that the statement is true. *Justify* each step.

7. $b \cdot (4 \div b) = 4$ when $b \neq 0$

8. $3x + (6 + 4x) = 7x + 6$