Lesson 3-4

Example 1

To which sets of numbers does each belong?

a. $-\dfrac{7}{15}$ b. 13   c. 0.10110111...

Solution

a. $-\dfrac{7}{15}$ is a rational number and, therefore, a real number.

b. 13 is a natural number, a whole number and an integer. It is a rational number because it can be expressed as $\dfrac{13}{1}$ It is a real number because it is a rational number.

c. 0.10110111... is an irrational number since it is a decimal that does not repeat and does not terminate. It is a real number because it is an irrational number.

Example 2

Complete. Tell which property you used.

a. $15(30 + 8) = 15 \cdot 30 + 15 \cdot \blacksquare$ b. $7 \cdot (5 \cdot 9) = (7 \cdot 5) \cdot \blacksquare$

Solution

a. Use the Distributive Property. $15(30 + 8) = 15 \cdot 30 + 15 \cdot 8$
The unknown number is 8.

b. Use the Associative Property. $7 \cdot (5 \cdot 9) = (7 \cdot 5) \cdot 9$
The unknown number is 9.

Example 3

State whether each set is closed under the given operation.

   a. whole numbers, subtraction   **b.** integers, multiplication

Solution

   a. The whole numbers are not closed under subtraction since $4 - 7 = -3$, which is not a whole number.

   b. The integers are closed under multiplication since the product of any two integers is always an integer.

Example 4

RETAIL On a recent trip to a local books-and-music store, Liam bought a book for $22.50, a CD for $14.99, and a magazine for $4.50. How much did he spend altogether, not including sales tax?

Solution

$$22.50 + 14.99 + 4.50 = 14.99 + (22.50 + 4.50) \quad \text{Use the Commutative and Associative Properties.}$$
$$= 14.99 + 27.00$$
$$= 41.99$$

Liam spent $41.99.