



Lesson Check

Do you know HOW?

Name the property that each statement illustrates.

- $x + 12 = 12 + x$
- $5 \cdot (12 \cdot x) = (5 \cdot 12) \cdot x$
- You buy a sandwich for \$2.95, an apple for \$.45, and a bottle of juice for \$1.05. What is the total cost?
- Simplify $\frac{2Ac d}{c}$.

Do you UNDERSTAND?



5. **Vocabulary** Tell whether the expressions in each pair are equivalent.

- $5x \cdot 1$ and $1 + 5x$
- $1 + (2t + 1)$ and $2 + 2t$

6. Justify each step.

$$\begin{aligned} 3 \cdot (10 \cdot 12) &= 3 \cdot (12 \cdot 10) \\ &= (3 \cdot 12) \cdot 10 \\ &= 36 \cdot 10 \\ &= 360 \end{aligned}$$



Practice and Problem-Solving Exercises



Practice

Name the property that each statement illustrates.

- | | | |
|-----------------------|--|---|
| 7. $75 + 6 = 6 + 75$ | 8. $\frac{7}{9} \cdot 1 = \frac{7}{9}$ | 9. $h + 0 = h$ |
| 10. $389 \cdot 0 = 0$ | 11. $27 \cdot \pi = \pi \cdot 27$ | 12. $9 \cdot (-1 \cdot x) = 9 \cdot (-x)$ |

See Problem 1.

Mental Math Simplify each expression.

- | | | |
|----------------------------------|-----------------------------------|-----------------------------|
| 13. $21 + 6 + 9$ | 14. $10 \cdot 2 \cdot 19 \cdot 5$ | 15. $0.1 + 3.7 + 5.9$ |
| 16. $4 \cdot 5 \cdot 13 \cdot 5$ | 17. $55.3 + 0.2 + 23.8 + 0.7$ | 18. $0.25 \cdot 12 \cdot 4$ |

See Problem 2.

Simplify each expression. Justify each step.

See Problem 3.

- | | | | |
|-----------------------------|-----------------------|-----------------------------|------------------------|
| 20. $8 + (9t + 4)$ | 21. $9(2x)$ | 22. $(4 + 105x) + 5$ | 23. $(10p)11$ |
| 24. $(12 \cdot r) \cdot 13$ | 25. $(2 + 3x) + 9$ | 26. $4 \cdot (x \cdot 6.3)$ | 27. $1.1 + (7d + 0.1)$ |
| 28. $\frac{56ab}{b}$ | 29. $\frac{1.5mn}{m}$ | 30. $\frac{13p}{pq}$ | 31. $\frac{33xy}{3x}$ |

Use deductive reasoning to tell whether each statement is *true* or *false*. If it is false, give a counterexample. If true, use properties of real numbers to show the expressions are equivalent.

See Problem 4.

- For all real numbers r , s , and t , $(r \cdot s) \cdot t = t \cdot (s \cdot r)$.
- For all real numbers p and q , $p \div q = q \div p$.
- For all real numbers x , $x + 0 = 0$.
- For all real numbers a and b , $-a \cdot b = a \cdot (-b)$.