

Study Guide and Intervention *(continued)***Properties of Real Numbers****Properties of Real Numbers**

Real Number Properties		
For any real numbers a , b , and c		
Property	Addition	Multiplication
Commutative	$a + b = b + a$	$a \cdot b = b \cdot a$
Associative	$(a + b) + c = a + (b + c)$	$(a \cdot b) \cdot c = a \cdot (b \cdot c)$
Identity	$a + 0 = a$ and $0 + a = a$	$a \cdot 1 = a$ and $1 \cdot a = a$
Inverse	$a + (-a) = 0$ and $(-a) + a = 0$	If a is not zero, then $a \cdot \frac{1}{a} = 1$ and $\frac{1}{a} \cdot a = 1$
Distributive	$a(b + c) = ab + ac$ and $(b + c)a = ba + ca$	

ExampleSimplify $9x + 3y + 12y - 0.9x$.

$9x + 3y + 12y$

$$\begin{aligned} 0.9x &= 9x + (-0.9x) + 3y + 12y \\ &= (9 + (-0.9))x + (3 + 12)y \\ &= 8.1x + 15y \end{aligned}$$

Commutative Property ($-$)
Distributive Property
Simplify.

Exercises

Simplify each expression.

1. $8(3a - b) + 4(2b - a)$

2. $40s + 18t - 5t + 11r$

3. $\frac{1}{5}(4j + 2k - 9j + 3k)$

4. $10(6g + 3h) + 4(5g - h)$

5. $12\left(\frac{a}{3} - \frac{b}{4}\right)$

6. $8(2.4r - 3.1s) - 6(1.5r + 2.4s)$

7. $4(20 - 4p) - \frac{3}{4}(4 - 16p)$

8. $5.5j + 8.9k - 4.7k - 10.9j$

9. $1.2(7x - 5) - (10 - 4.3x)$

10. $9(7e - 4f) - 0.6(e + 5f)$

11. $2.5m(12 - 8.5)$

12. $\frac{8}{4}p - \frac{1}{5}r - \frac{3}{5}r - \frac{1}{2}p$

13. $4(10g + 80h) - 20(10h - 5g)$

14. $2(15 + 45c) + \frac{5}{6}(12 + 18c)$

15. $(7 - 2.1x)8 + 2(3.5x - 6)$

16. $\frac{2}{y}(18 - 6n + 12 + 3n)$

17. $14(j - 2) - 3j(4 - 7)$

18. $50(3a - h) - 20(b - 2a)$