1.5 Properties of Real Numbers Solutions

Use the commutative property of addition or the commutative property of multiplication to rewrite in an equivalent form.

1. $4 + 20$ $= 20 + 4$

2. $3 + x$

3. $x \cdot 5$ $= 5x$

4. yx

Use the associative property of addition or the associative property of multiplication to rewrite in an equivalent form. Simplify if possible.

5. $(x + 5) + 7$ $= x + (5 + 7)$ $= x + 12$

6. $a + (b + c)$

7. $-3(4a)$ $= (-3 \cdot 4)\, a$ $= -12a$

8. $(-9x)y$

Use commutative and/or associative properties to simplify.

9. $(4 + x) + 5$ $= x + (4 + 5)$ $= x + 9$

10. $(-2 + x) + 7$

11. $12\left(\frac{3}{4}x\right) = \left(12 \cdot \frac{3}{4}\right) \cdot x = 9x$

12. $15\left(-\frac{3}{5}a\right)$

13. $6x(-2)$ $= (6 \cdot -2)\, x$ $= -12x$

14. $-5y(-5)$

Answers: **1.** $20 + 4$; **3.** $5x$; **5.** $x + 12$; **7.** $-12a$; **9.** $x + 9$; **11.** $9x$; **13.** $-12x$

Multiply by using the distributive property, $a(b + c) = ab + ac$.

15. $4(3x+5y)$ $= 4 \cdot 3x + 4 \cdot 5y$

$= 12x + 20y$

16. $4(3x-5y)$

17. $-6(-3x+4)$ $= -6 \cdot -3x + -6 \cdot 4$

$= 18x + -24$

$= 18x - 24$

18. $-5(2x+7)$

19. $-3(x-5y+1)$

$= -3 \cdot x + -3 \cdot -5y + -3 \cdot 1$

$= -3x + 15y + -3$

$= -3x + 15y - 3$

20. $3(x-5y+1)$

21. $-1(7r+3)$ $= -1 \cdot 7r + -1 \cdot 3$

$= -7r + -3$

$= -7r - 3$

22. $-1(7r-3)$

23. $-(7r+3)$ $= -1 \cdot (7r + 3)$

$= -1 \cdot 7r + -1 \cdot 3$

$= -7r + -3$

$= -7r - 3$

24. $-(7r-3)$

25. $(-3a+5)(2)$ $= 2 \cdot -3a + 2 \cdot 5$

$= -6a + 10$

26. $(-3a+5)(-2)$

Answers: **17.** $12x + 20y$; **17.** $18x - 24$; **19.** $-3x + 15y - 3$; **21.** $-7r - 3$; **23.** $-7r - 3$; **25.** $-6a + 10$

Match the letter of the property to the appropriate problem number.

a) commutative property of addition
b) commutative property of multiplication
c) associative property of addition
d) associative property of multiplication
e) distributive property
f) additive identity
g) multiplicative identity
h) additive inverse property
i) multiplicative inverse property

27. $x \cdot 3 = 3x$ ____b____
commutative property of multiplication

28. $(x + 7) + 4 = x + (7 + 4)$ _____

29. $x \cdot 1 = x$ ____g____
multiplicative identity

30. $-2(5x) = (-2 \cdot 5)x$ _____

31. $-3 + 0 = -3$ ____f____
additive identity

32. $3 + -3 = 0$ _____

Find the additive inverse (opposite) and the multiplicative inverse (reciprocal)

	Opposite	Reciprocal		Opposite	Reciprocal
33. $\frac{2}{3}$	$-\frac{2}{3}$	$\frac{3}{2}$	**34.** $-\frac{3}{4}$		
35. $-\frac{1}{5}$	$\frac{1}{5}$	$-\frac{5}{1} = -5$	**36.** 5		
37. x	$-x$	$\frac{1}{x}$	**38.** $-x$		

Answers: **27**. b; **29**. g; **31**. f; **33**. $-\frac{2}{3}$, $\frac{3}{2}$; **35**. $\frac{1}{5}$, -5 ; **37**. $-x$, $\frac{1}{x}$