

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, $a(b + c) = ab + ac$.	
<p>15. $4(3x + 5y) = 4 \cdot 3x + 4 \cdot 5y$ $= 12x + 20y$</p>	<p>16. $4(3x - 5y)$</p>
<p>17. $-6(-3x + 4) = -6 \cdot -3x + -6 \cdot 4$ $= 18x + -24$ $= 18x - 24$</p>	<p>18. $-5(2x + 7)$</p>
<p>19. $-3(x - 5y + 1)$ $= -3 \cdot x + -3 \cdot -5y + -3 \cdot 1$ $= -3x + 15y + -3$ $= -3x + 15y - 3$</p>	<p>20. $3(x - 5y + 1)$</p>
<p>21. $-1(7r + 3) = -1 \cdot 7r + -1 \cdot 3$ $= -7r + -3$ $= -7r - 3$</p>	<p>22. $-1(7r - 3)$</p>
<p>23. $-(7r + 3) = -1 \cdot (7r + 3)$ $= -1 \cdot 7r + -1 \cdot 3$ $= -7r + -3$ $= -7r - 3$</p>	<p>24. $-(7r - 3)$</p>
<p>25. $(-3a + 5)(2) = 2 \cdot -3a + 2 \cdot 5$ $= -6a + 10$</p>	<p>26. $(-3a + 5)(-2)$</p>
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. $x \cdot 3 = 3x$ <u> b </u> commutative property of multiplication	28. $(x + 7) + 4 = x + (7 + 4)$ _____				
29. $x \cdot 1 = x$ <u> g </u> multiplicative identity	30. $-2(5x) = (-2 \cdot 5)x$ _____				
31. $-3 + 0 = -3$ <u> f </u> 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. $-x, \frac{1}{x}$					