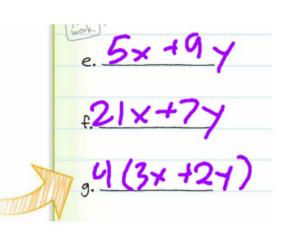
$$=$$
 9(3 x + 2 y)

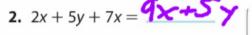
Distributive Property

Got It? Do these problems to find out.

- **e.** Simplify 3x + 9y + 2x.
- **f.** Simplify 7(3x + y).
- **g.** Factor 12x + 8y.



Simplify each expression. (Examples 1, 3, and 4)



2.
$$2x + 5y + 7x = 4x + 5y$$
 3. $4(2x + 5y) = 8x + 20 + 7$



- **4.** Factor 35x + 28y. (Example 5)
- 5. Mikayla bought five skirts at x each. Three of the five skirts came with a matching top for an additional \$9 each. Write and simplify an expression that represents the total cost of her purchase. (Example 2)

6. The gift bag from Claire Cosmetics includes 5 bottles of nail polish and 2 tubes of lip gloss. Use p to represent the cost of each bottle of nail polish and g to represent the cost of each tube of lip gloss. Write and simplify an expression that represents the total cost of 8 gift bags. (Example 6)

8(5p+2g)=40p+16g

7. **Quilding on the Essential Question** How can properties help to write equivalent algebraic expressions?

Sample answer: To find equivalent algebraic expressions,

apply the properties and combine like terms, if needed.

Rat

Are:

For m

Simplify each expression. (Examples 1, 3, and 4)

1.
$$x + 4x + 6x = \frac{11x}{1}$$

1.
$$x + 4x + 6x = \frac{11x}{2}$$
 2. $3x + 4x + 5x = \frac{12x}{2}$

$$9(5x) = 45x$$



4.
$$3x + 8y + 13x =$$

$$16x + 8y$$

5.
$$7(3x + 5y) =$$

$$21x + 35y$$

6.
$$3x + 6x + 2x =$$

$$\frac{1}{6} 24x + 18y = \frac{1}{6} (4x + 31)$$

9. Eight friends went to a hockey game. The price of admission per person was \$x. Four of the friends paid an extra \$6 each for a player guide book. Write and simplify an expression that represents the total cost.

(Example 2)

$$4(x+6)+4x$$
; $$8x+24

A DVD box set includes 3 thriller movies and 2 comedies. Use t to represent the cost of each thriller and c to represent the cost of each comedy. Write and simplify an expression that represents the total cost of

$$6(3t + 2c) = 18t + 12c$$

6 box sets. (Example 6)

10. Gabriella is x years old. Her sister, Felicia, is six years older than she is. Their mother is twice as old as Felicia. Their aunt, Tanya, is x years older than their mother. Write and simplify an expression that represents Tanya's age in years. (Example 2)

$$2(x+6)+x$$
; $3x+12$

12. A fall candle gift set has 4 vanilla candles and 6 pumpkin spice candles. Use *v* to represent the cost of each vanilla candle and *p* to represent the cost of each pumpkin candle. Write and simplify an expression that represents the total cost of 4 sets. (Example 6)

$$4(4v + 6p) = 16v + 24p$$

13.
$$3x + 6x = yx$$
 9

14.
$$x + 5 + 11x = 12x + y$$
 5

- **15. Use Math Tools** Pizza Palace charges \$x for a large cheese pizza and an additional fee based on the number of toppings ordered.
 - **a.** Two large cheese pizzas and three large pepperoni pizzas are ordered. Write and simplify an expression that represents the total cost. 3(x + 0.75) + 2x; 5x + 2.25
 - **b.** Write and simplify an expression that represents the total cost of eight large pizzas, if two are cheese and six have four toppings each.

$$6(x+3)+2x$$
; $$8x+18

c. Elsa orders three large cheese pizzas, a large pepperoni and mushroom pizza, and a large green pepper and onion pizza. Write and simplify an expression that represents the total cost.

$$2(x + 1.50) + 3x$$
; $$5x + 3



Pizza Palace Prices	
Pizza	Price (\$)
large cheese	х
add 1 topping	add \$0.75
add 2 toppings	add \$1.50
add 3 toppings	add \$2.25
add 4 toppings	add \$3.00

H.O.T. Problems Higher Order Thinking

- **16. Sample answer:** 8x + 7 + 7x **Sample answer:** 8x + 7 + 7x
- **17.** Reason Inductively Explain why the expressions y + y + y and 3y are equivalent.

Sample answer: The expressions are equivalent because they name the same number regardless of which number stands for y.

Persevere with Problems For Exercises 18 and 19, simplify each expression.

18.
$$7x + 5(x + 3) + 4x + x + 2$$
 17 17 17

19.
$$6 + 2(x + 8) + 3x + 11 + x$$
 6x + 33

20. Reason Abstractly The algebraic expression shown below is missing two whole-number constants. Determine the constants so that the expression simplifies to 14x + 11.

$$4x + 8(x + 1) + 3 + 2x$$