L4-1 The Distributive Property

- equivalent expressions - expressions that have the same value

- simplify - put the mathematical expression or equation in its most basic form

- solve - find an answer or a value for the variable

equation ⇒ has equal sign

expression ⇒ Part of an equation
⇒ DOES NOT include
an equal sign

Evaluate Numerical Expressions

Key Concept   **Distributive Property**

Words   To multiply a sum or difference by a number, multiply each term inside the parentheses by the number outside the parentheses.

Symbols $a(b + c) = ab + ac$ $a(b - c) = ab - ac$

Example $5(6 + 7) = 5 \cdot 6 + 5 \cdot 7$ $(9 - 3)8 = 9 \cdot 8 - 3 \cdot 8$

Use the Distributive Property to write 4(5 + 8) as an equivalent expression. Then evaluate the expression.

$$4(5 + 8) =$$
$$(4 \cdot 5) + (4 \cdot 8) =$$
$$20 + 32 = \boxed{52}$$

$$4(5 + 8) =$$
$$4(13) = \boxed{52}$$

Use the Distributive Property to write (6 – 9)2 as an equivalent expression. Then evaluate the expression.

$$(6-9)2 =$$

$$(2 \cdot 6) - (2 \cdot 9) =$$

$$12 - 18 = \boxed{-6}$$

$$(6-9)2 =$$

$$(-3)2 = \boxed{-6}$$

Simplify Algebraic Expressions

Use the Distributive Property to write 2(x + 4) as an equivalent algebraic expression.

$$2(x + 4) =$$
$$(2 \cdot x) + (2 \cdot 4) =$$
$$2x + 8$$

equivalent
expressions

Use the Distributive Property to write 4(*x* – 2) as an equivalent algebraic expression.

$$4(x - 2)$$

$$(4 \cdot x) - (4 \cdot 2)$$

$$4x - 8$$

Use the Distributive Property to write −2(*n* − 3) as an equivalent algebraic expression.

$$-2(n-3) =$$
$$(-2 \cdot n) - (-2 \cdot 3) =$$
$$-2n + (-6) = -2n + 6$$

MOVIES The cost of a movie ticket is $7 and the cost of a box of popcorn is $2. Write two equivalent expressions to find the total cost for a family of five to go to the movies if each member of the family gets a box of popcorn. Then find the total cost.

popcorn = $2 (per) family member

ticket = $7 (per) family member

5 family

5(7+2)

5(9) = $45 for the family

(5·7) + (5·2)

35 + 10 = $45

Step #1 important info

Step 2 Logical Equation

Step 3 work

Step 4 Answer w/ label

RECREATION A community center offers a canoeing day trip. The canoeing fee is $80 per person. The cost of food is an additional $39 per person. Find the total cost for a family of four.

Canoe = $80/person
food = $139/person
4 family members

$4(80 + 39) =$
$(4 \cdot 80) + (4 \cdot 39) =$
$320 + 156 = \$476$ for family

$4(80 + 39) = 4 \cdot 119$
$= \$476$ for family

MENTAL MATH Find each product mentally. Justify your answer.

31. $8 \cdot 22$

$8(20 + 2)$
$160 + 16 = \boxed{176}$

32. $13 \cdot 39$

$13(40 - 1)$
$520 - 13 =$
$\boxed{507}$

33. $19 \cdot 41$

$19(40 + 1)$
$760 + 19 =$
$\boxed{779}$