

**Chapter  
3****Fair Game Review**

Write a sentence interpreting the expression.

1.  $2 \times (126 + 2566)$

2.  $4 \times (6425 + 25)$

3.  $(65 - 23) + 3$

4.  $(65,000 - 5169) + 58$

5.  $(890 \div 2) \div 2$

6.  $(65 \times 6) \div 3$

7. Write a real-life problem representing the expression below.

$$3 \times (20 + 6)$$

**Chapter  
3****Fair Game Review** (continued)

Simplify the expression.

8.  $4 - 8 \div 2$

9.  $2^2 \cdot 3 - 3$

10.  $16 - 32 \div 2^3$

11.  $3(4^2 - 9)$

12.  $12 + 16 \div 4 \cdot 2$

13.  $24 - 18 \div 3 + 2$

14.  $20 + 12 \div 2(7 - 4)$

15.  $4(3^3 - 7) \div 10$

16. A group of 4 adults and 5 children is visiting an amusement park. Admission is \$15 per adult and \$9 per child. Find the total cost of admission for the group.

**3.1****Algebraic Expressions**

For use with Activity 3.1

**Essential Question** How can you write and evaluate an expression that represents a real-life problem?

**1 ACTIVITY: Reading and Re-Reading**

a.

You babysit for 3 hours. You receive \$12. What is your hourly wage?

- Underline the important numbers and units you need to solve the problem.
- Read the problem carefully a second time. Circle the key word for the question.
- Write each important number or word, with its units, on a piece of paper. Write +, −, ×, ÷, and = on five other pieces of paper.
- Arrange the pieces of paper to answer the key word question, “What is your hourly wage?”
- Evaluate the expression that represents the hourly wage.

Your hourly wage is \_\_\_\_\_.

- b. How can you use your hourly wage to find how much you will receive for any number of hours worked?

**3.1 Algebraic Expressions (continued)**

**2 ACTIVITY:** Reading and Re-Reading

Work with a partner. Use the strategy shown in Activity 1 to write an expression for each problem. After you have written the expression, evaluate it using mental math or some other method.

- a. You wash cars for 2 hours. You receive \$6.  
How much do you earn per hour?

Expression: \_\_\_\_\_

Amount you earn per hour: \_\_\_\_\_



- b. You have \$60. You buy a pair of jeans and a shirt.  
The pair of jeans costs \$27. You come home with \$15. How much did you spend on the shirt?

Expression: \_\_\_\_\_

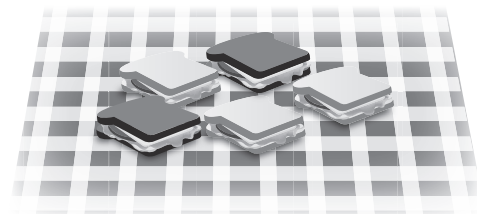
Amount you spend on shirt: \_\_\_\_\_



- c. For lunch, you buy 5 sandwiches that cost \$3 each.  
How much do you spend?

Expression: \_\_\_\_\_

Amount you spend on sandwiches: \_\_\_\_\_



**3.1 Algebraic Expressions (continued)**

- d. You are running a 4500-foot race. How much farther do you have to go after running 2000 feet?

Expression: \_\_\_\_\_

Amount left to go: \_\_\_\_\_



- e. A young rattlesnake grows at a rate of about 20 centimeters per year. How much does a young rattlesnake grow in 2 years?

Expression: \_\_\_\_\_

Amount rattlesnake grows in 2 years: \_\_\_\_\_



**What Is Your Answer?**

3. **IN YOUR OWN WORDS** How can you write and evaluate an expression that represents a real-life problem? Give one example with addition, one with subtraction, one with multiplication, and one with division.

**3.1****Practice**

For use after Lesson 3.1

Evaluate the expression when  $a = 4$ ,  $b = 5$ , and  $c = 10$ .

1.  $a + 7$

2.  $b - 3$

3.  $9c$

4.  $25 \div b$

5.  $a \cdot c$

6.  $b - a$

7.  $a + b + c$

8.  $\frac{c}{b}$

9.  $4a - 7$

10. You need  $2b$  cups of flour for making  $b$  loaves of bread. You have 8 cups of flour. Do you have enough for 5 loaves of bread? Explain.

11. The expression  $9a + 6s$  is the cost for  $a$  adults and  $s$  students to see a musical performance.

a. Find the total cost for three adults and five students.

b. Find the total cost for four adults and four students.

**3.2**

**Writing Expressions**  
For use with Activity 3.2

**Essential Question** How can you write an expression that represents an unknown quantity?

**1 ACTIVITY: Ordering Lunch**

**Work with a partner. You use a \$20 bill to buy lunch at a café. You order a sandwich from the menu board.**



a. Complete the table. In the last column, write a numerical expression for the amount of change received.

| Sandwich   | Price (dollars) | Change Received (dollars) |
|------------|-----------------|---------------------------|
| Reuben     |                 |                           |
| BLT        |                 |                           |
| Egg salad  |                 |                           |
| Roast beef |                 |                           |

b. **REPEATED REASONING** Write an expression for the amount of change you receive when you order any sandwich from the menu board.

c. Compare the expression you wrote in part (b) with the expression in the last column of the table in part (a).

**3.2 Writing Expressions (continued)**

- d. The café offers several side dishes, each at the same price. You order a chicken salad sandwich and two side dishes. Write an expression for the total amount of money you spend. Explain how you wrote your expression.
- e. The expression  $20 - 4.65s$  represents the amount of change one customer receives after ordering from the menu board. Explain what each part of the expression represents. Do you know what the customer ordered? Explain your reasoning.

**2 ACTIVITY: Words That Imply Addition or Subtraction**

Work with a partner.

- a. Complete the table.

| Variable | Phrase                           | Expression |
|----------|----------------------------------|------------|
| $n$      | 4 more than a number             |            |
| $m$      | the difference of a number and 3 |            |
| $x$      | the sum of a number and 8        |            |
| $p$      | 10 less than a number            |            |
| $n$      | 7 units farther away             |            |
| $t$      | 8 minutes sooner                 |            |
| $w$      | 12 minutes later                 |            |
| $y$      | a number increased by 9          |            |



**3.2 Writing Expressions (continued)**

- b. Here is a word problem that uses one of the expressions in the table.

*You arrive at the café 8 minutes sooner than your friend. Your friend arrives at 6:42 P.M. When did you arrive?*

Which expression from the table on the previous page can you use to solve the problem?

- c. Write a problem that uses a different expression from the table.

**3 ACTIVITY: Words That Imply Multiplication or Division**

**Work with a partner. Match each phrase with an expression.**

the product of a number and 3  $n \div 3$

the quotient of 3 and a number  $4p$

4 times a number  $n \cdot 3$

a number divided by 3  $2m$

twice a number  $3 \div n$

**What Is Your Answer?**

4. **IN YOUR OWN WORDS** How can you write an expression that represents an unknown quantity? Give examples to support your explanation.

**3.2****Practice**

For use after Lesson 3.2

Write the phrase as an expression.

1. the total of 8 and 13
2. 42 divided by 7

Give two ways to write the expression as a phrase.

3.  $6 + p$
4.  $9m$

Write the phrase as an expression. Then evaluate when  $x = 3$  and  $y = 15$ .

5. 7 more than the quotient of a number  $y$  and 5
6. twice the sum of a number  $x$  and 8

7. You earn \$7 for every hour that you babysit.

- a. Complete the table.

|                 |   |   |   |   |   |   |   |   |
|-----------------|---|---|---|---|---|---|---|---|
| <b>Hours</b>    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| <b>Earnings</b> |   |   |   |   |   |   |   |   |

- b. Write an expression for the amount you earn after  $h$  hours.

**3.3**

**Properties of Addition and Multiplication**

For use with Activity 3.3

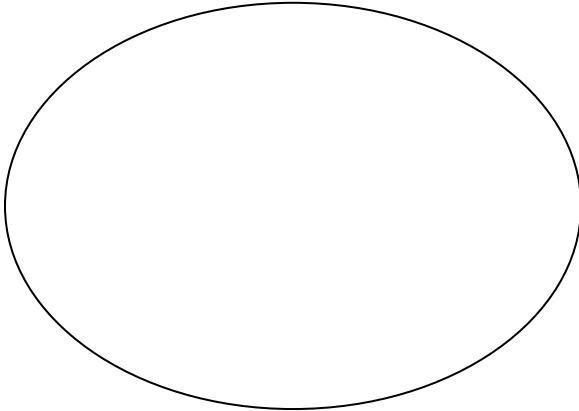
**Essential Question** Does the order in which you perform an operation matter?

**1 ACTIVITY:** Does Order Matter?

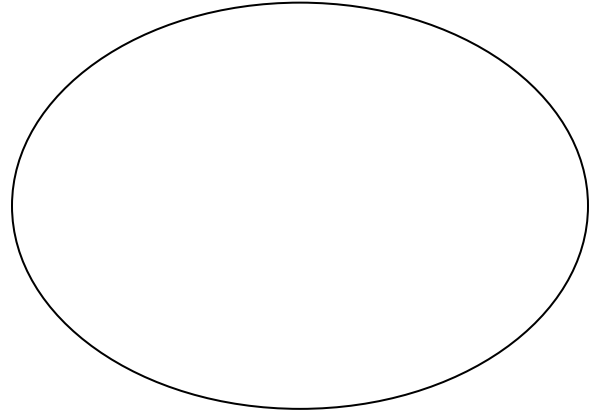
**Work with a partner. Place each statement in the correct oval.**

- a. Fasten 5 shirt buttons.
- b. Put on a shirt and tie.
- c. Fill and seal an envelope.
- d. Floss your teeth.
- e. Put on your shoes.
- f. Chew and swallow.

**Order Matters**



**Order Doesn't Matter**



Write three math problems using the four operations where order matters and three where order doesn't matter.

**3.3 Properties of Addition and Multiplication (continued)****2 ACTIVITY: Commutative Properties**

Work with a partner.

- a. Circle the statements that are true.

$$3 + 5 \stackrel{?}{=} 5 + 3$$

$$3 - 5 \stackrel{?}{=} 5 - 3$$

$$9 \times 3 \stackrel{?}{=} 3 \times 9$$

$$9 \div 3 \stackrel{?}{=} 3 \div 9$$

- b. The true equations show the Commutative Properties of Addition and Multiplication. Why do you think they are called *commutative*?

**3 ACTIVITY: Associative Properties**

Work with a partner.

- a. Circle the statements that are true.

$$8 + (3 + 1) \stackrel{?}{=} (8 + 3) + 1$$

$$8 - (3 - 1) \stackrel{?}{=} (8 - 3) - 1$$

$$12 \times (6 \times 2) \stackrel{?}{=} (12 \times 6) \times 2$$

$$12 \div (6 \div 2) \stackrel{?}{=} (12 \div 6) \div 2$$

- b. The true equations show the Associative Properties of Addition and Multiplication. Why do you think they are called *associative*?

**What Is Your Answer?**

4. **IN YOUR OWN WORDS** Does the order in which you perform an operation matter? Give examples to support your explanation.

**3.3 Properties of Addition and Multiplication (continued)**

5. **MENTAL MATH** Explain how you can add the sum in your head.

$$11 + 7 + 12 + 13 + 8 + 9$$

6. **SECRET CODE** The creatures on a distant planet use the symbols ■, ◆, ★, and ● for the four operations.

- a. Use the codes to decide which symbol represents addition and which symbol represents multiplication. Explain your reasoning.

$$3 \bullet 4 = 4 \bullet 3$$

$$3 \star 4 = 4 \star 3$$

$$2 \bullet (5 \bullet 3) = (2 \bullet 5) \bullet 3$$

$$2 \star (5 \star 3) = (2 \star 5) \star 3$$

$$0 \bullet 4 = 0$$

$$0 \star 4 = 4$$

- b. Make up your own symbols for addition and multiplication. Write codes using your symbols. Trade codes with a classmate. Decide which symbol represents addition and which symbol represents multiplication.

**3.3****Practice**

For use after Lesson 3.3

Tell which property illustrates the statement.

1.  $x \cdot 1 = x$

2.  $4.8 + k = k + 4.8$

Simplify the expression. Explain each step.

3.  $8 + (7 + x)$

4.  $10(11a)$

Complete the statement using the specified property.

|    | Property                               | Statement               |
|----|--|-------------------------|
| 5. | Addition Property of Zero              | $(b + 0) + 6 =$         |
| 6. | Commutative Property of Multiplication | $3 \cdot (n \cdot 5) =$ |

7. You earn 10 points for every coin you collect in a video game. Then you find a star that triples your score.

a. Write an expression for the number of points you earn from the coins.

b. Write and simplify an expression for the total number of points you earn.

**3.4**

**The Distributive Property**

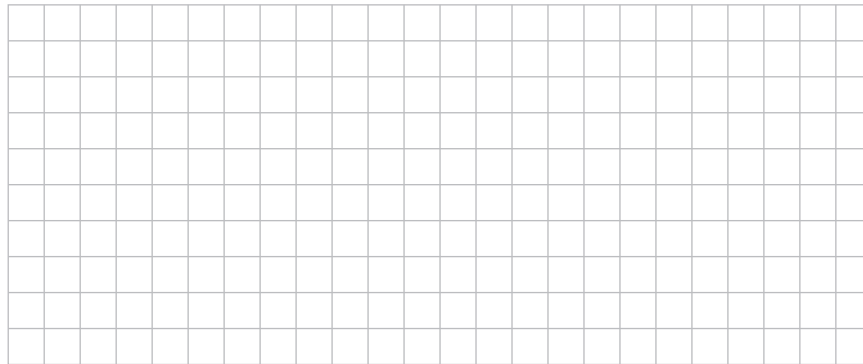
For use with Activity 3.4

**Essential Question** How do you use mental math to multiply two numbers?

**1 ACTIVITY:** Modeling a Property

**Work with a partner.**

- a. **MODELING** Draw two rectangles of the same width but with different lengths. Label the dimensions.



- b. Write an expression for the total area of the rectangles.

$$(\text{_____} \times \text{_____}) + (\text{_____} \times \text{_____})$$

- c. Rearrange the rectangles by aligning the shortest sides to form one rectangle. Label the dimensions. Write an expression for the area.

$$\text{_____} \times (\text{_____} + \text{_____})$$

- d. Can the expressions from parts (b) and (c) be set equal to each other? Explain.

- e. **REPEATED REASONING** Repeat this activity using different rectangles. Explain how this illustrates the Distributive Property. Write a rule for the Distributive Property.

**3.4** The Distributive Property (continued)**2** **ACTIVITY:** Using Mental Math

Work with a partner. Use mental math to find the product.

a.  $23 \times 6$

b.  $33 \times 7$

c.  $47 \times 9$

d.  $28 \times 5$

e.  $17 \times 4$

**3** **ACTIVITY:** Using Mental Math

Work with a partner. Use the Distributive Property and mental math to find the product.

a.  $6 \times 23$



**3.4** The Distributive Property (continued)

b.  $5 \times 17$

c.  $8 \times 26$

d.  $20 \times 19$

e.  $40 \times 29$

f.  $25 \times 39$

g.  $15 \times 47$

**What Is Your Answer?**

4. Compare the methods in Activities 2 and 3.

5. **IN YOUR OWN WORDS** How do you use mental math to multiply two numbers? Give examples to support your explanation.

**3.4****Practice**

For use after Lesson 3.4

Use the Distributive Property and mental math to find the product.

1.  $4 \times 31$

2.  $7 \times 49$

3.  $16(38)$

Use the Distributive Property to simplify the expression.

4.  $8(5 + w)$

5.  $11(9 + d)$

6.  $15(p + 4 + 2)$

Simplify the expression.

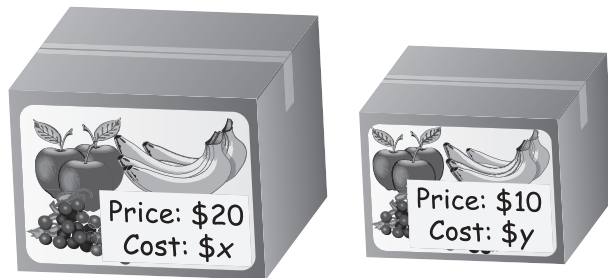
7.  $2x - 4 + 3x$

8.  $4y - 1 - 3y + 2$

9.  $x + 2(x - 4)$

10. A jazz band sells 31 large boxes of fruit and 74 small boxes of fruit for a fundraiser.

- a. Use the Distributive Property to write and simplify an expression for the profit.



$$\text{Profit} = \text{Price} - \text{Cost}$$

- b. A large box of fruit costs \$9 and a small box of fruit costs \$4. What is the jazz band's profit?

**Extension**  
**3.4****Practice**

For use after Extension 3.4

Factor the expression using the GCF.

1.  $2 + 8$

2.  $9 - 3$

3.  $30 + 25$

4.  $35 - 14$

5.  $81 - 18$

6.  $60 + 100$

7.  $28 - 20$

8.  $72 + 48$

9.  $12x + 18$

10.  $4y + 10$

**Extension**  
**3.4****Practice (continued)**

11.  $32y - 48$

12.  $15y + 40$

13.  $16x + 24$

14.  $11x + 33$

15.  $13x + 39y$

16.  $21x - 42y$

17. The length of a rectangle is 6 inches and its area is  $(18x + 24)$  square inches. Write an expression for the width.