Includes:

**Chapter Resources**
- Graphic Organizer
- Student-Built Glossary
- Family Letter
- Anticipation Guide
- Game

**Leveled Lesson Resources**
- Reteach
- Skills Practice
- Homework Practice
- Problem-Solving Practice
- Enrich

**Assessment Resources**
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- Chapter Diagnostic Test
- Chapter Pretest
- 3 Quizzes
- Mid-Chapter Test
- Vocabulary Test
- Oral Assessment
- Chapter Project Rubric
- Foldables Rubric
- 6 Chapter Tests
- Extended Response Test
- Student Recording Sheet
- Cumulative Standardized Test Practice
- Answer Pages
- Chapter 6 Assessment Line-up
- Answer Keys

All Answers Included
# Grade 4 Chapter 6

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Teacher’s Guide to Using the
Chapter 6 Resource Masters

The Chapter 6 Resource Masters includes the core materials needed for Chapter 6. These materials include worksheets, extensions, and assessment options. The answers for these pages appear at the back of this booklet.

All of the materials found in this booklet are included for viewing and printing on the TeacherWorks Plus™ CD-ROM.

Chapter Resources

**Graphic Organizer** (page 1) This master is a tool designed to assist students with comprehension of grade-level concepts. You can use this graphic organizer in coordination with the appropriate lesson. While the content and layout of these tools vary, their goal is to assist students by providing a visual representation from which they can learn new concepts.

**Student Glossary** (page 2) This master is a study tool that presents the key vocabulary terms from the chapter. You may suggest that students highlight or star the terms they do not understand. Give this list to students before beginning Lesson 6-1. Remind them to add these pages to their mathematics study notebooks.

**Anticipation Guide** (page 6) This master is a survey designed for use before beginning the chapter. You can use this survey to highlight what students may or may not know about the concepts in the chapter. If feasible, interview students in small groups, asking them the interview questions in the guide. There is space for recording how well students answer the questions before they complete the chapter. You may find it helpful to interview students a second time, after completing the chapter, to determine their progress.

**Game** (page 7) A game is provided to reinforce chapter concepts and may be used at appropriate times throughout the chapter.

Resources for Lessons

**Reteach** Each lesson has an associated Reteach worksheet. In general, the Reteach worksheet focuses on the same lesson content but uses a different approach, learning style, or modality than that used in the Student Edition. The Reteach worksheet closes with computational practice of the concept.

**Skills Practice** The Skills Practice worksheet for each lesson focuses on the computational aspect of the lesson. The Skills Practice worksheet may be helpful in providing additional practice of the skill taught in the lesson. It also contains word problems that cover the skill. Spaces for students’ answers are provided on the worksheet.

**Homework Practice** The Homework Practice worksheet provides an opportunity for additional computational practice. The Homework Practice worksheet includes word problems that address the skill taught in the lesson. Spaces for students’ answers are provided on the worksheet.

**Problem-Solving Practice** The Problem-Solving Practice worksheet presents additional reinforcement in solving word problems that apply both the concepts of the lesson and some review concepts.

**Enrich** The Enrich worksheet presents activities that extend the concepts of the lesson or offer a historical or multicultural look at the lesson’s concepts. Some Enrich materials are designed to widen students’ perspectives on the mathematics they are learning.

Resources for Problem-Solving Lessons

In recognition of the importance of problem-solving strategies, worksheets for problem-solving lessons follow a slightly different format. For problem-solving lessons, a two-page Reteach worksheet offers a complete model for choosing a problem-solving strategy. For each Problem-Solving Strategy lesson, Reteach and Homework
Practice worksheets offer reinforcement of the strategy taught in the Student Edition lesson. In contrast, the Problem-Solving Investigation worksheets include a model strategy on the Reteach worksheets and provide problems requiring several alternate strategies on practice worksheets.

Assessment Options

The assessment masters in the Chapter 6 Resource Masters offer a wide variety of assessment tools for monitoring progress as well as final assessment.

Individual Progress Checklist This checklist explains the chapter’s goals or objectives. Teachers can record whether a student’s mastery of each objective is beginning (B), developing (D), or mastered (M). The checklist includes space to record notes to parents as well as other pertinent observations.

Chapter Diagnostic Assessment This one-page test assesses students’ grasp of skills that are needed for success in the chapter.

Chapter Pretest This one-page quick check of the chapter’s concepts is useful for determining pacing. Performance on the pretest can help you determine which concepts can be covered quickly and which specific concepts may need additional time.

Quizzes Three free-response quizzes offer quick assessment opportunities at appropriate intervals in the chapter.

Mid-Chapter Review This one-page chapter test provides an option to assess the first half of the chapter. It includes both multiple-choice and free-response questions.

Vocabulary Test This one-page test focuses on chapter vocabulary. It is suitable for all students. It includes a list of vocabulary words and questions to assess students’ knowledge of the words.

Oral Assessment This two-page test consists of one page for teacher directions and questions and a second page for recording responses. Although this assessment is designed to be used with all students, the interview format focuses on assessing chapter content assimilated by ELL students. The variety of approaches includes solving problems using manipulatives as well as pencil and paper.

Chapter Project Rubric This one-page rubric is designed for use in assessing the chapter project. You may want to distribute copies of the rubric when you assign the project and use the rubric to record each student’s chapter project score.

Foldables Rubric This one-page rubric is designed to assess the Foldables graphic organizer. The rubric is written to the students, telling them what you will be looking for as you evaluate their completed Foldables graphic organizer.

Leveled Chapter Tests

- Form 1 assesses basic chapter concepts through multiple-choice questions and is designed for use with on-level students.
- Form 2A is designed for on-level students and is primarily for those who may have missed the Form 1 test. It may be used as a retest for students who received additional instruction following the Form 1 test.
- Form 2B is designed for students with a below-level command of the English language.
- Form 2C is a free-response test designed for on-level students.
- Form 2D is written for students with a below-level command of the English language.
- Form 3 is a free-response test written for above-level students.
- Extended-Response Test is an extended response test for on-level students.

Recording Sheet This one-page recording sheet is for the standardized test in the Student Edition.

Cumulative Standardized Test Practice This three-page test, aimed at on-level students, offers multiple-choice questions and free-response questions.

Answers

The answers for the Anticipation Guide and Lesson Resources are provided as reduced pages with answers appearing in black. Full size line-up answer keys are provided for the Assessment Masters.
Find the value of each expression if $a = 3$ and $b = 4$.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a + 5$</td>
<td></td>
</tr>
<tr>
<td>$a + b$</td>
<td></td>
</tr>
<tr>
<td>$b \times 5$</td>
<td></td>
</tr>
<tr>
<td>$40 \div b$</td>
<td></td>
</tr>
<tr>
<td>$24 \div a$</td>
<td></td>
</tr>
<tr>
<td>$16 - b$</td>
<td></td>
</tr>
</tbody>
</table>
This is an alphabetical list of new vocabulary terms you will learn in Chapter 6: **Algebra: Use Multiplication and Division**. As you study the chapter, complete each term’s definition or description. Remember to add the page number where you found the term. Add this page to your math study notebook to review vocabulary at the end of the chapter.

<table>
<thead>
<tr>
<th>Vocabulary Term</th>
<th>Found on Page</th>
<th>Definition/Description/Example</th>
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<td>balance</td>
<td></td>
<td></td>
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<tr>
<td>equation</td>
<td></td>
<td></td>
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<td>expression</td>
<td></td>
<td></td>
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<tr>
<td>order of operations</td>
<td></td>
<td></td>
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<tr>
<td>rule</td>
<td></td>
<td></td>
</tr>
<tr>
<td>variable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dear Family,

Today my class started Chapter 6, Algebra: Use Multiplication and Division. I will be learning to write and find the value of expressions. I will also be learning to solve multiplication and division equations mentally. Here are my vocabulary words and an activity that we can do together.

Love, _____________

Key Vocabulary

**order of operations** Rules that tell what order to follow in evaluating expressions. Example: Add or subtract left to right.

**equation** A mathematical sentence that contains an equals sign, =, indicating that the left side of the equals sign has the same value as the right side. $4 \div n = 2$

**expression** A combination of numbers, variables, and operation symbols that represents a mathematical quantity. $2 \times (15 \div x)$

**variable** A letter or symbol used to represent an unknown quantity. In $x + 5 = 10$, $x$ is the variable.

**multiplication** An operation on two numbers to find their product. It can be thought of as repeated addition. $5 \times 2 = 10$

**divide** To separate into equal groups. Can also be thought of as repeated subtraction. $16 \div 2 = 8$

**Activity**

Place 24 pennies on the table. Put the pennies in even rows of 4. In your head, determine the total number of pennies in each row. Add 3 pennies to the pile. Put the pennies in even rows of 3. In your head, determine the total number of pennies in each row.

Books to Read

*Anno’s Mysterious Multiplying Jar*  
by Mitsumasa Anno

*The King’s Chessboard*  
by David Birch

*Spaghetti and Meatballs For All*  
by Marilyn Burns
Estimada familia:

Hoy mi clase comenzó el Capítulo 6, Álgebra: Usa la multiplicación y la división. Aprenderé a escribir y a calcular el valor de las expresiones y también a resolver mentalmente ecuaciones de multiplicación y de división. A continuación, están mis palabras de vocabulario y una actividad que podemos hacer juntos.

Cariños, ________________

Vocabulario clave

orden de las operaciones Reglas que indican el orden a seguir al evaluar expresiones. Ejemplo: Sumar o restar de izquierda a derecha

ecuación Enunciado matemático que contiene el signo de igualdad, =, el que indica que el lado izquierdo del signo de igualdad tiene el mismo valor que el lado derecho. $4 \div n = 2$

expresión Combinación de números, variables y símbolos de operaciones que representan una cantidad matemática. $2 \times (15 \div x)$

variable Letra o símbolo que se usa para representar una cantidad desconocida. $x + 5 = 10$, $x$ is the variable.

multiplicación Operación en dos números para calcular su producto. También se puede interpretar como una adición repetida. $5 \times 2 = 10$

dividir Separar en grupos iguales. También se puede considerar una sustracción repetida. $16 \div 2 = 8$

Actividad

Coloquen 24 monedas de 1¢ sobre la mesa. Colóquenlas en filas pares de 4. Determinen mentalmente el número total de monedas de 1¢ en cada fila. Añadan 3 monedas de 1¢ a la pila y luego colóquenlas todas en filas pares de 3. Determinen mentalmente el número total de monedas en cada fila.

Libros recomendados:

Anno’s Mysterious Multiplying Jar de Mitsumasa Anno

The King’s Chessboard de David Birch

Spaghetti and Meatballs For All de Marilyn Burns
Anticipation Guide  
*Algebra: Use Multiplication and Division*

**Before you begin Chapter 6**

- Read each statement.
- Decide whether you agree (A) or disagree (D) with the statement.
- Write A or D in the first column OR if you are not sure whether you agree or disagree, write NS (not sure).

<table>
<thead>
<tr>
<th>STEP 1 A, D, or NS</th>
<th>Statement</th>
<th>STEP 2 A or D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong></td>
<td>If ( k \div 5 = 3 ), then ( k = 10 ).</td>
<td></td>
</tr>
<tr>
<td><strong>2.</strong></td>
<td>If ( h = 2 ), then ( 10 \div h = 5 ).</td>
<td></td>
</tr>
<tr>
<td><strong>3.</strong></td>
<td>The rules for order of operations tell you how to find the value of an expression with more than one operation in it.</td>
<td></td>
</tr>
<tr>
<td><strong>4.</strong></td>
<td>((4 \div 2) \times 2 = 8)</td>
<td></td>
</tr>
<tr>
<td><strong>5.</strong></td>
<td>(5 \times (2 \div 2) = 5)</td>
<td></td>
</tr>
<tr>
<td><strong>6.</strong></td>
<td>Some problems can be solved by working backwards.</td>
<td></td>
</tr>
<tr>
<td><strong>7.</strong></td>
<td>The following equation is balanced: (12 \div 3 = 8 \div 2).</td>
<td></td>
</tr>
<tr>
<td><strong>8.</strong></td>
<td>An equation is a number sentence that does not have an equals sign.</td>
<td></td>
</tr>
<tr>
<td><strong>9.</strong></td>
<td>(2) pennies (\times) (10 = 5) nickels (\times) (4).</td>
<td></td>
</tr>
<tr>
<td><strong>10.</strong></td>
<td>Rules can help you to write an equation.</td>
<td></td>
</tr>
</tbody>
</table>

**After you complete Chapter 6**

- Reread each statement and complete the last column by entering an A (agree) or a D (disagree).
- Did any of your opinions about the statements change from the first column?
- For those statements that you mark with a D, use a separate sheet of paper to explain why you disagree. Use examples, if possible.
ORDER DOES MATTER

You will need:
18 index cards
Paper and pencil

1. Draw 4 cards and place them face up so all players can see them. Cards should be placed from left to right as they are drawn.

2. Create a numerical expression using the numbers and either addition, subtraction, multiplication, or division. Keep the following rules in mind:
   - Addition, subtraction, multiplication, and division may be used only once each in your expression.
   - You may place parentheses anywhere in your expression.
   - When you figure out the numerical value of your expression it must be a whole number.

3. Find the numerical value of the expressions keeping the order of operations in mind. The player with the smallest numerical value is the winner.
Multiplication and Division Expressions

A variable is used in an expression to represent an unknown number. In the expression $5 \times x$, the unknown number is represented by the variable $x$.

You can find the value of an expression by substituting different numbers for the variable.

Find the value of $5 \times x$ when $x = 2$.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5 \times x$</td>
<td>$5 \times 2 = 10$</td>
</tr>
<tr>
<td>So, the value of $5 \times x$ when $x = 2$ is 10.</td>
<td></td>
</tr>
</tbody>
</table>

Find the value of $5 \times x$ when $x = 5$.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5 \times x$</td>
<td>$5 \times 5 = 25$</td>
</tr>
<tr>
<td>So, the value of $5 \times x$ when $x = 5$ is 25.</td>
<td></td>
</tr>
</tbody>
</table>

Find the value of $m \div 3$ when $m = 21$.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$m \div 3$</td>
<td>$21 \div 3 = 7$</td>
</tr>
<tr>
<td>So, the value of $m \div 3$ when $m = 21$ is 7.</td>
<td></td>
</tr>
</tbody>
</table>

Find the value of $m \div 3$ when $m = 15$.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$m \div 3$</td>
<td>$15 \div 3 = 5$</td>
</tr>
<tr>
<td>So, the value of $m \div 3$ when $m = 15$ is 5.</td>
<td></td>
</tr>
</tbody>
</table>

Find the value of the expression.

1. $m \times 1$ when $m = 1$ _____
2. $5 \times s$ when $s = 3$ _____
3. $16 \div y$ when $y = 2$ _____
4. $b \times 3$ when $b = 2$ _____
5. $c \times 4$ when $c = 5$ _____
6. $f \div 1$ when $f = 6$ _____
7. $a \div 2$ when $a = 8$ _____
8. $8 \times d$ when $d = 0$ _____
9. $3 \times x$ when $x = 4$ _____
10. $10 \div w$ when $w = 5$ _____
11. $z \times 4$ when $z = 10$ _____
12. $6 \times p$ when $p = 2$ _____
13. $30 \div l$ when $l = 6$ _____
14. $k \times 8$ when $k = 4$ _____
15. $r \div 6$ when $r = 48$ _____
16. $p \times 7$ when $p = 6$ _____
17. $g \div 3$ when $g = 21$ _____
18. $s \times 5$ when $s = 5$ _____
19. $n \times 9$ when $n = 3$ _____
20. $72 \div t$ when $t = 8$ _____
Find the value of each expression.

1. \(3 \times (5 \div 1)\)
2. \((8 \times 3) \div 2\)
3. \(12 \times (6 \div 2)\)

Circle the best expression.

4. Each week Mark spends 10 minutes a day cleaning his room for 3 days. Mark does this for 3 weeks.
   A. \((10 \times 3) + 15\)
   B. \(10 \times (3 \times 3)\)

5. Jennifer had 3 packs of 10 stickers. She gave half of her stickers to Melanie.
   A. \(3 \times (10 \times 2)\)
   B. \((3 \times 10) \div 2\)

Find the value of each expression for the value given.

6. \((d \times 6) \div 2\) for \(d = 2\)

7. \(8 \times (5 \times z)\) for \(z = 2\)

8. \((14 \div n) \times 3\) for \(n = 7\)

9. \((x \times 2) \times 2\) for \(x = 3\)

10. \(x \times (4 \times 3)\) for \(x = 10\)

11. \(8 \times (15 \div x)\) for \(x = 5\)

Solve. Use data from the chart for problems 12 and 13.

12. Last week, Karla bought 3 pens. How much did she spend?

13. This week, all items are half price. How much will Karla pay for a ruler and a notebook?
Homework Practice

Multiplication and Division Expressions

Find the value of each expression if \( j = 12 \) and \( k = 6 \).

1. \( j \div 3 \)  
2. \( k \div 2 \)  
3. \( 3 \times j \)  
4. \( 5 \times k \)  
5. \( j \times k \)  
6. \( j \div k \)  
7. \( 5 \times (j \div 4) \)  
8. \( (18 \div k) \div 3 \)  
9. \( (j \div k) \times 5 \)  

Write an expression for each situation.

10. a number multiplied by 3  
11. the product of 5 and a number  
12. 16 divided by a number  
13. a number divided by 8  
14. Three times a week, Savannah does yard work for her neighbors for 2 hours. If she is paid $5 per hour, how much does she earn each week? Write an expression using \( m \) for money and solve.

Spiral Review

Identify the factors of each number. Decide whether the number is composite or prime. (Lesson 5–10)

15. 4  
16. 7  
17. 18  
18. 29  
19. 36  
20. 41  
21. Mrs. Hernandez is hanging 17 posters in the gym. Is there any way she can arrange the posters so that they are in even rows? Tell whether 17 is a composite or prime number. Explain.
Solve.

1. Ming and Amy have 6 bags of beads. Each bag contains 14 beads. Define a variable and write an expression for the number of beads Ming and Amy have. Then find the total number of beads.

2. If Ming buys 3 more bags of beads, how many beads will Ming and Amy have altogether?

3. Julie’s mother is 40 years old. She is 4 times as old as Julie. To find Julie’s age, solve the equation \( \frac{40}{a} = 4 \), where \( a \) equals Julie’s age.

4. Andrew has three boxes of holiday decorations. There are 12 decorations in each box. Write and solve an expression for the number of decorations in each box. Then solve the expression.

5. George and his brother have a total of 8 CDs. Each CD has the same amount of songs. If there are 88 total songs, how many songs are on each CD? Write an expression to find the number of songs on each CD. Then solve the expression.

6. Each of Mrs. Fairview’s children need 3 books for school. She has 4 children. If each book costs $8, what will be the total cost for all of the books? Write an expression to find the total amount the books will cost. Then solve the expression.
Choose one of these expressions for each arm of the octopus. Write the expression on the arm that contains the matching word phrase.

Arm 1  forty divided by two times a number
Arm 2  five times a number
Arm 3  six times a number decreased by seven
Arm 4  thirty-six divided by three times a number
Arm 5  seven times a number, divided by 5
Arm 6  two more than forty-nine divided by seven
Arm 7  eleven less than three times a number
Arm 8  nine more than twice a number
Reteach
Problem-Solving Strategy

Work Backward
Tim had $5 more yesterday than he does today. Yesterday he had $10. How much does Tim have today?

Step 1.
Understand
Be sure you understand the problem. Read carefully.

• What do you know?
  Tim had ______ more yesterday than he does today.
  Yesterday Tim had ______.

• What do you need to find?
  You need to find how much ________.

Step 2.
Plan

Make a plan.
Choose a strategy.
You can work backward to solve the problem.
Start with how much Tim had yesterday.
Then work backward to find how much he has today.

• Use Logical Reasoning
• Draw a Picture or Diagram
• Make a Graph
• Act It Out
• Make a Table or List
• Find a Pattern
• Guess and Check
• Write an Equation
• Work Backward
• Solve a Simpler Problem
**Problem-Solving Strategy**

**Step 3. Solve**

**Carry out your plan.**

You know Tim had ____ yesterday.

You know Tim had ____ more yesterday than he does today.

Think: Tim had $10 yesterday, which is $5 more than he has today.

Subtract to find how much Tim has today.

$10 - $5 = $5

Tim has ____ today.

**Step 4. Check**

**Is the solution reasonable?**

Reread the problem.

Work forward to check your answer.

Start with your answer. Add $5.

Did you end with $10? _________________

What other strategies could you use to solve the problem?

______________________________________________________________

**Practice**

1. Patti had $10 less yesterday than she does today. Yesterday she had $1. How much does Patti have today? __________

2. Fred and Ed walk to the library. Fred walks twice as far as Ed. Ed walks 2 miles. How far does Fred walk? __________
Skills Practice
Problem-Solving Strategy

Solve. Use the work backward strategy.

1. Carol had $10 less yesterday than she does today. Yesterday she had $15. How much does Carol have today?

2. J.R. had 5 baseball cards. Then he bought some more baseball cards at the store. Now J.R. has 9 baseball cards. How many cards did J.R. buy?

3. Mr. Robinson and Ms. Alvirez drive to the same movie theater. Mr. Robinson drives twice as far as Ms. Alvirez. Ms. Alvirez drives 15 miles. How far does Mr. Robinson drive?

4. Suki has 4 times as many New York quarters as Georgia quarters. She has 24 New York quarters. How many Georgia quarters does Suki have?

Mixed Strategy Review
Solve. Use any strategy.

5. Barry spent $6 on a book, $9 on snacks, and $2 on bus fare. He gave $3 to a friend. How much money did Barry start with?

6. Mr. Carlson has $424. He spends $29 on gasoline. How much money does Mr. Carlson have left?

7. Walking a mile burns about 110 calories. About how many calories would you burn if you walked 2 miles?

8. Write a problem that can be solved by working backward. Share it with others.
Solve. Use the work backward strategy.

1. Paige gave 12 barrettes to her sister. Jordan gave Paige 5 more barrettes. Then Paige gave 6 barrettes to Maria. Now Paige has 8 barrettes. How many barrettes did Paige have to start with?

2. Luis bought 6 new baseball cards on Tuesday. On Thursday he bought three times as many. He now has 35 baseball cards. How many cards did he have originally?

3. Mary practiced playing the piano twice as long Monday than Tuesday. Tuesday she practiced 20 minutes less than Wednesday. Wednesday she practiced for 30 minutes. How long did Mary practice playing the piano on Monday?

4. In Jared’s school, 6 more fourth-graders use blue pens than black. Four times as many fourth-graders use pencils than blue pens. If 5 fourth-graders use black pens, how many fourth-graders use pencils?

Spiral Review

Find the value of each expression if $q = 15$ and $r = 5$. (Lesson 6-1)

5. $q \div 5$

6. $4 \times r$

7. $5 \times (q \div 5)$

8. $(20 \div r) \div 2$

Write an expression for each situation.

9. 6 multiplied by a number

10. a number divided by 5

11. Each of three friends can decorate 3 pencil boxes a day. Write an expression to show how many pencil boxes the friends can decorate in $d$ days.
$60 $85 $164

**Use two of the numbers in the box to fill in the first and last blanks in the story. Use your head to fill in all the other blanks!**

Larry loves lemons. He has saved up ______. He wants to use his money to buy a bag of lemons every week. There are ______ weeks in a year. A large bag of Larry’s favorite kind of lemons costs ______. If he follows his plan, by the end of one year, Larry will have spent ______ on lemons. If he doesn’t add to his savings, Larry will have ______ left.

**Can you find another way?**
**Use a different number for the first blank and last blanks.**

Larry loves lemons. He has saved up ______. He wants to use his money to buy a bag of lemons every week. There are ______ weeks in a year. A large bag of Larry’s favorite kind of lemons costs ______. If he follows his plan, by the end of one year, Larry will have spent ______ on lemons. If he doesn’t add to his savings, Larry will have ______ left.
Always use the order of operations to simplify expressions. The rules for the order in which you should perform operations are given below.

Simplify \((20 + 8) \div 4 - 2\).

**Step 1:**
Do the operations in parentheses first.

\[
(20 + 8) \div 4 - 2
\]

28 \div 4 - 2

**Step 2:**
Multiply and divide from left to right.

28 \div 4 - 2

7 - 2

**Step 3:**
Add and subtract from left to right.

7 - 2

5

Write which operation should be done first.

1. \(12 + 4 \div 2\)

4. \((3 + 7) \div 2\)

7. \(6 \times (8 - 5)\)

2. \(4 + (10 - 2)\)

5. \(9 + 3 \times 2\)

8. \(8 - 4 \times 2\)

3. \(2 \times 8 \div 4\)

6. \(8 + 2 - 4\)

9. \(12 \div (2 + 2)\)

Find the value of each expression.

10. \(3 \times (2 + 5) = \) ____

16. \(12 \div 3 - 2 = \) ____

11. \(14 \div 7 + 2 = \) ____

17. \((1 + 5) \times 4 = \) ____

12. \(9 + (6 - 2) = \) ____

18. \(8 - 8 \div 4 = \) ____

13. \(4 + 2 \times 5 = \) ____

19. \((5 + 5) \div 2 = \) ____

14. \(8 \div 2 - 2 = \) ____

20. \(14 - 10 + 2 = \) ____

15. \(10 - 8 \div 4 = \) ____

21. \(16 \div 4 \div 2 = \) ____
Skills Practice
Order of Operations

Write which operation should be done first.
1. $2 \times 8 + 7$
2. $2 + 3 \times 9$
3. $4 + 10 \div 2$
4. $9 - 2 + 3$
5. $(3 + 2) \times 9$
6. $8 \div (2 + 2)$
7. $6 \div 2 - 1$
8. $1 + 3 \times 5$
9. $10 \div 5 \times 2$
10. $7 - 8 \div 2$
11. $(12 - 4) \div 2$
12. $9 + 2 - 6$

Find the value of each expression.
13. $3 + 2 \times 7 =$
14. $10 \div 2 - 1 =$
15. $9 - 6 \div 2 =$
16. $24 \div 2 - 8 =$
17. $(2 + 6) \times 7 =$
18. $12 - 12 \div 3 =$
19. $(4 + 6) \div 5 =$
20. $12 - 3 + 9 =$
21. $20 \div 5 \div 2 =$
22. $18 \div 9 \times 6 =$
23. $2 \times 8 \div 4 =$
24. $20 - 5 \times 4 =$
25. $2 \times 6 + 4 \times 3 =$
26. $20 \div 2 \times 3 - 6 =$
27. $(2 + 9) \times (7 - 3) =$
28. $4 + (14 - 6) \times 2 + 5 =$
29. $2 \times 9 + 10 \div 5 \times (3 + 2) =$
30. $16 \div 4 \times 2 - 5 =$

Solve.
31. Tamara buys 6 toys for $2 each. She has a $1-off coupon. How much does Tamara spend? Write an expression and simplify.

32. Steven has 126 photos in an album. He adds 18 more photos to the album. Each page holds 12 photos. Write an expression and simplify to find out how many pages Steven fills.
Find the value of each expression.

1. \((3 + 2) \times 5\)  
2. \((13 - 5) \div 4\)  
3. \(7 \times (12 - 9)\)  
4. \(18 \div (4 + 5)\)  
5. \((24 \div 8) + (5 \times 6)\)  
6. \((8 \times 6) - (25 - 7)\)

7. \(4 \times 3 - 7\)  
8. \(8 - 9 \div 3\)  
9. \(6 \div 3 + 8\)  
10. \(15 - 3 \times 3\)  
11. \(2 \times 4 + 5 - 6\)  
12. \(21 \div 7 + 8 - 5\)

13. Juan collects shells. He had 15 before he went on vacation. On vacation he found 4 shells per day for 3 days. Then he found 6 shells on the fourth day. Write an expression and solve it to find out how many shells he has after vacation.

14. Michelle practices dribbling the soccer ball for 10 minutes each day during the school week. She practices for 30 minutes each day on the weekend. How many minutes does she practice during a whole week?

Spiral Review

Solve. Use the work backward strategy. (Lesson 6-2)

15. Hunter gave his sister $3. He earned $12. Then he paid $6 for lunch. Now Hunter has $18. How much money did Hunter have to start with? __________

16. Mark downloaded 8 new songs on Tuesday. On Thursday he downloaded four times as many. He now has 45 songs. How many songs did he have originally? __________
Problem-Solving Practice
Order of Operations

Write which operation should be done first. Then solve.

1. Tod buys 4 packs of batteries. Each pack has 4 batteries. He gives 6 batteries to his sister. How many batteries does he have left?
   \[4 \times 4 - 6 = \text{______} \text{ batteries}\]
   Which operation should be done first? 

2. Ryan has 36 stickers. He buys 6 more stickers. Then he divides the stickers into 6 groups. How many stickers are in each group?
   \[(36 + 6) \div 6 = \text{______} \text{ stickers}\]
   Which operation should be done first?

Use the proper order of operations to solve.

3. Jen had 6 blank CDs, but needed to buy more. She bought 2 packs of blank CDs. Each pack has 8 CDs. How many blank CDs does she have now?
   \[6 + 2 \times 8 = \text{______} \text{ CDs}\]

4. Sara has 20 stickers. She buys 5 packs of stickers. Each pack has 8 stickers. She adds the stickers to her collection. How many stickers does she have in her collection now?
   \[20 + 5 \times 8 = \text{______} \text{ stickers}\]

Solve.

5. Coach Coleman has 32 softballs left from last season, but 3 are torn and cannot be used. He buys 2 boxes of softballs to start the new season. Each box has 12 softballs. How many good softballs does he have in all? Show your work.

6. Coach Coleman is ordering hats for this year’s teams. There are 6 teams. Each team has 12 players on the roster. He orders 12 more hats for the team managers. How many hats does he order in all? Show your work.
Enrich

*My Dear Aunt Sally*

You know to simplify expressions inside parentheses first, but what if there are no parentheses? Good mathematicians work from left to right, but they often think of "My Dear Aunt Sally" as a reminder. *Multiply and Divide before Adding or Subtracting.*

Decide whether each of the following expressions has been simplified correctly. For those that are correct, mark a C. For those that are incorrect, write the correct answer.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Simplified</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $15 + 2 \times 10$</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>2. $20 ÷ 10 - 2$</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3. $2 \times 1 \times 4 \times 3$</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>4. $4 + (6 \times 8) ÷ 2$</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>5. $24 ÷ 3 + 1$</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6. $36 ÷ 6 \times 2$</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
Reteach

Solve Equations Mentally

Sometimes in math it helps to think about what the problem is asking you to do. $7 \times c = 28$

In $7 \times c = 28$, you can ask, “7 times what number equals 28?” You might know that $7 \times 4 = 28$, so you know that 4 is the correct answer.

If you do not know the answer right away, you can try a few answers that you do know: “I know $7 \times 2 = 14$. 14 is less than 28, so I need to try something bigger.” You can try this a few times to find the correct answer.

You can think about division problems the same way. In $35 \div f = 5$, “35 divided by what number equals 5?” You might know that $35 \div 7 = 5$, so you know that 7 is the correct answer.

If you do not know the answer right away, you can try a few answers that you do know: “I know that $35 \div 5 = 7$. 7 is greater than 5, so I need to try something bigger.”

Write out each equation in words. The first problem has been done for you.

1. $2 \times v = 18$ 2 times what number equals 18?
2. $x \times 7 = 42$ ________________________________
3. $8 \times p = 64$ ________________________________
4. $9 \times y = 63$ ________________________________
5. $g \div 6 = 9$ ________________________________
6. $35 \div j = 7$ ________________________________
7. $45 \div h = 9$ ________________________________
8. $s \div 12 = 8$ ________________________________

Write the missing number.
9. _____ $\times 8 = 48$  
10. $60 \div$ _____ = 12  
11. _____ $\times 6 = 54$  
12. $5 \times$ _____ = 15  
13. _____ $\div 5 = 10$  
14. $77 \div$ _____ = 11  
15. _____ $\times 3 = 27$  
16. $2 \times$ _____ = 22  
17. $81 \div$ _____ = 9
Solve each equation mentally.

1. \(2 \times a = 8\)  
2. \(b \times 7 = 42\)  
3. \(5 \times c = 40\)  
4. \(d \times 10 = 120\)  
5. \(9 \times e = 99\)  
6. \(f \times 4 = 36\)  
7. \(8 \div g = 4\)  
8. \(42 \div h = 6\)  
9. \(56 \div i = 7\)  
10. \(j \div 12 = 8\)  
11. \(24 \div k = 2\)  
12. \(72 \div l = 8\)

Write an equation for each situation. Then solve.

13. A number multiplied by 6 is 48. What is the number?  

14. 3 times a number is 21. What is the number?  

15. A number divided by 5 equals 8. What is the number?  

16. 64 divided by a number equals 8. What is the number?  

17. The product of a number and 4 is 48. What is the number?  

18. 120 divided by a number equals 10. What is the number?  

19. Kelly and her family rode bikes for \(x\) hours yesterday. They rode 36 miles at a speed of 12 miles per hour. Write and solve an equation to find how many hours they rode yesterday.  

20. Each of Caleb’s \(y\) friends brings 8 snacks to his house. They have 32 snacks. Write and solve an equation to find out how many friends came to Caleb’s house.
Homework Practice
Solve Equations Mentally

Solve each equation mentally.
1. \(5 \times q = 45\)  
2. \(h \times 4 = 32\)  
3. \(6 \times u = 36\)  
4. \(5 \times r = 60\)  
5. \(11 \times c = 77\)  
6. \(56 \div j = 7\)  
7. \(y \div 8 = 9\)  
8. \(k \div 7 = 5\)  
9. \(27 \div d = 9\)

Write an equation for each situation. Then solve.
10. A number multiplied by 9 equals 36. What is the number?
11. 8 times a number equals 48. What is the number?
12. A number divided by 7 equals 4. What is the number?
13. 132 divided by a number equals 11. What is the number?
14. Devin has saved twice as much money as Gabrielle. Devin has saved $20. Write and solve a multiplication equation to find how much Gabrielle has saved.
15. Mark takes 4 times as long to get to school as Alicia. Mark takes 28 minutes to get to school. Write and solve an equation to find how long it takes Alicia to get to school.

Spiral Review
Find the value of each expression. (Lesson 6-3)
16. \((4 + 3) \times 6\)
17. \((12 - 8) \div 2\)
18. \((7 \times 3) - (23 - 7)\)
19. \(5 \times 2 - 6\)
20. \(7 - 18 \div 3\)
21. \(16 \div 4 + 7 - 2\)
22. Miguel found T-shirts for $6 each. His mother bought him 5 shirts. Then she used a coupon for $7 off the total price. Write an expression and solve it to find how much the 5 T-shirts cost.
Write an equation for each situation. Then solve.

1. Mrs. Jones needs to say how many people, including chaperones, will be on the school trip. Each of the 4 fourth-grade classrooms is sending 11 students. The school is sending 5 chaperones. Write and solve an equation to find how many total people are going on the school trip. 

2. Nathan went hiking for 2 hours with his older brother. He covered $n$ miles at a speed of 4 miles each hour. Write and solve an equation to find how many miles Nathan hiked.

3. Tiffany can hold her breath 5 times longer than Marcus can. Tiffany held her breath for 60 seconds. Write and solve an equation to find how long Marcus held his breath.

4. Four friends went apple picking. Each friend picked the same number of apples. The whole group picked a total of 44 apples. Write and solve an equation to find how many apples each friend picked.

5. Ricardo has 5 times as many perfect papers in math as Sean does. Sean has 7 perfect papers. Write and solve an equation to find how many perfect papers Ricardo has.

6. Cheyenne baked 48 cookies. It is enough for a number of friends to have 4 cookies each. Write and solve an equation to find how many friends can have cookies.
Each circle has a specific value. The products of their values appear where two or more circles overlap. Find the value of each circle.

<table>
<thead>
<tr>
<th>Circle</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>
Choose a Strategy

Fernando picked 18 apples to make applesauce. It will take 9 apples for each batch of sauce. How many batches of sauce can Fernando make?

**Step 1 Understand**

Be sure you understand the problem.
Read carefully.

What do you know?
- Fernando picked _____ apples.
- It will take _____ apples to make a batch of applesauce.

What do you need to find?
- You need to find how many batches of _____________ Fernando can make.

**Step 2 Plan**

Make a plan.
Choose a strategy.

To find the answer, you can draw a picture.

Draw a picture of 18 apples. Circle groups of 9 apples to see how many batches Fernando can make.

Then, check your solution to make sure it is reasonable.
**Step 3. Solve**

*Carry out your plan.*

You know that you need to find out how many batches of applesauce Fernando can make with 18 apples.

Draw 18 circles to represent the apples. Circle groups of 9.

OR: You can also write a division equation.

Fernando has ____ apples. He will use ____ apples in each batch.

Write a division equation. ____ ÷ ____ = ____

Camille uses ____ cones.

**Step 4. Check**

*Is the solution reasonable?*

Reread the problem.

Does your answer make sense? Yes  No

Which method do you prefer? Explain.

________________________________________________________________________

________________________________________________________________________

**Practice**

1. Stanley has 25 marbles, and he wants to share them with 5 friends. If each friend gets the same number of marbles, how many will each friend get?

2. Robin spent 15 minutes reading on Monday. She spent 25 minutes reading on Tuesday and 35 minutes on Wednesday. If the pattern continues, how many minutes will she read on Friday?
Choose a strategy. Use it to solve the problem.

1. Laura went to the playground with 7 friends. Three of them left early and one got hurt. How many are left to play with Laura?

2. There are 10 puppies at the puppy daycare. The puppies are fed 3 times a day. If they are given 1 cup of food each time, how much food will the puppy daycare use in one day?

3. There are 25 students going to a volleyball tournament. Each van carries 10 students. How many vans are needed?

4. Mr. Smith has 36 golf balls. He puts 18 golf balls in a large display case. Mr. Smith has 3 smaller display cases. If he puts the same number of golf balls in each of the smaller display cases, how many golf balls will be in each case?

Tell what strategy you used to solve the problem.

5. Caroline swims for 1 hour each day after school and 3 hours each day on the weekend. How many hours does Caroline swim in 2 weeks?

6. Jonathan has 4 snakes in an aquarium. The second snake is twice as long as the first. The third snake is 2 inches shorter than the second and the fourth snake is 5 inches longer than the third. The first snake is 6 inches long. How long is the longest snake? Which snake is it?
Use any strategy below to solve. Tell what strategy you used.

Problem-Solving Strategies

• Make a table
• Choose an operation
• Work backward

1. Christina and her 3 friends want to play mini golf. It costs $4 per person per round of golf. The friends all play 3 rounds of golf. How much change will the friends get back if they pay with $50? _____
   Strategy: ____________________________________________

2. A playground has three times as many swings as monkey bars. There are 4 more monkey bars than slides. There are 3 slides at the playground. How many swings are at the playground?  
   Strategy: ____________________________________________

3. Carlos gets to choose the family dinner 3 times for every week that he completes his homework each night. There are 4 weeks each month and 9 months in the school year. How many times could Carlos get to choose the dinner? __________
   Strategy: ____________________________________________

Spiral Review

Solve each equation mentally. (Lesson 6-4)

4. \(6 \times q = 48\) _____ 
5. \(h \times 3 = 27\) _____ 
6. \(7 \times u = 42\) _____ 
7. \(6 \times r = 72\) _____ 
8. \(11 \times c = 77\) _____ 
9. \(56 \div j = 8\) _____ 
10. \(y \div 9 = 9\) _____ 
11. \(k \div 4 = 8\) _____ 
12. \(24 \div d = 8\) _____
The number cube below has faces labeled 0 through 5. How many different products can you make by multiplying any two numbers on this number cube?

To find the answer, make an organized list or table in the space below.

The number cube below has faces labeled 5 through 10. Create two questions for a classmate that uses the number cube. Try to challenge your classmate!

Question 1: ________________________________

Question 2: ________________________________

Now, trade with a classmate and answer each other’s questions.
Sometimes in math there is a pattern to the answers. Once you find the pattern, you can make a rule that will solve the problem for any input.

Use this problem to learn more about finding a pattern and making a rule.

No matter how many hats Vanessa has, Holly always has 4 times as many.

This problem tells you the rule: Vanessa’s hats $\times 4 = $ Holly’s hats. If Vanessa has 5 hats, how many hats does Holly have? Holly will have $5 \times 4$, or 20 hats.

Now see the same problem written a different way.

| Rule: _____ | 1. Identify the pattern: $3 \times \_ = 12$
| Vanessa’s Hats | Holly’s Hats | $5 \times \_ = 20$
| Input ($v$) | Output ($h$) | The pattern is to multiply each number by 4.
| 3 | 12 |
| 5 | 20 |
| 7 | ? |
| 9 | ? |

2. Identify the rule and write it as an equation.
   $v \times 4 = h$
   So the next numbers in the table are 28 and 36.

Write an equation that describes the pattern. Then use the equation to find the next two numbers.

3. | Rule: _____ |
   | Input ($d$) | Output ($e$) |
   | 1 | 3 |
   | 2 | 6 |
   | 3 | 9 |
   | 4 | |
   | 5 | |

4. | Rule: _____ |
   | Input ($j$) | Output ($k$) |
   | 20 | 5 |
   | 24 | 6 |
   | 28 | 7 |
   | 32 | |
   | 36 | |
**Skills Practice**

*Algebra: Find a Rule*

Write an equation that describes the pattern. Then use the equation to find the next two numbers.

1. **Rule:** __________

<table>
<thead>
<tr>
<th>Input (f)</th>
<th>Output (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>exo</td>
<td>1</td>
</tr>
</tbody>
</table>

2. **Rule:** __________

<table>
<thead>
<tr>
<th>Input (h)</th>
<th>Output (i)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>48</td>
</tr>
<tr>
<td>7</td>
<td>56</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

3. **Rule:** __________

<table>
<thead>
<tr>
<th>Input (n)</th>
<th>Output (o)</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
</tr>
<tr>
<td>45</td>
<td>5</td>
</tr>
<tr>
<td>54</td>
<td>6</td>
</tr>
<tr>
<td>63</td>
<td>7</td>
</tr>
</tbody>
</table>

4. **Rule:** __________

<table>
<thead>
<tr>
<th>Input (t)</th>
<th>Output (u)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td>35</td>
<td>5</td>
</tr>
</tbody>
</table>

5. My class has to form teams of five. Make a table to find how many teams we can make if there are 15, 20, 25, and 30 of us.

<table>
<thead>
<tr>
<th>Input (k)</th>
<th>Output (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>
**Homework Practice**  
*Algebra: Find a Rule*

Write an equation that describes the pattern. Then use the equation to find the next three numbers.

1. Rule: __________  

<table>
<thead>
<tr>
<th>Input (v)</th>
<th>Output (w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

2. Rule: __________  

<table>
<thead>
<tr>
<th>Input (x)</th>
<th>Output (y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

3. Shannon found out there are four yellow pencils for every one blue pencil. Make a table to find how many yellow pencils there would be if she found 4, 6, 8, 10, and 12 blue pencils.

<table>
<thead>
<tr>
<th>Rule: __________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue Pencils</td>
</tr>
<tr>
<td>Input (x)</td>
</tr>
<tr>
<td>Yellow Pencils</td>
</tr>
<tr>
<td>Output (y)</td>
</tr>
</tbody>
</table>

4. **Spiral Review**  
**Use any strategy to solve. Tell what strategy you used. (Lesson 6-5)**

In Alexa’s neighborhood, there are 3 times as many dogs as birds. There are 5 more cats than birds. There are 24 cats. How many dogs are there? __________ Strategy:
Problem-Solving Practice
Algebra: Find a Rule

Jorge and his dad make sandwiches for a party. The table shows grilled cheese and turkey sandwiches.

<table>
<thead>
<tr>
<th>Rule: _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grilled Cheese Input (c)</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>28</td>
</tr>
<tr>
<td>36</td>
</tr>
</tbody>
</table>

1. Write an equation that describes the relationship between grilled cheese and turkey sandwiches. 

2. How many turkey sandwiches will Jorge make if he is making 28 grilled cheese sandwiches? _____

Chloe is helping plan the class field trip. Her teacher asked her to figure out how many students can come. The table shows the students and chaperones for the field trip.

<table>
<thead>
<tr>
<th>Rule: _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chaperones Input (c)</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>11</td>
</tr>
</tbody>
</table>

3. Write an equation that describes the relationship between chaperones and students. ________

4. How many students can come if 9 chaperones go on the field trip? ________

5. How many people in all will go if 66 students go on the trip? ________
### Enrich

**Next Three**

Draw a line from each pattern to the equation that was used to make it. Then write the next three numbers in the pattern.

#### 1.
- \( x \) | 5 | 6 | 7 | 8 | 9 | 10  
- \( y \) | 15 | 16 | 17  
- **Equation:** \( y = 2x + 1 \)

#### 2.
- \( x \) | 1 | 3 | 5 | 15 | 31 | 63  
- \( y \) | 3 | 7 | 15  
- **Equation:** \( y = x + 10 \)

#### 3.
- \( x \) | 2 | 3 | 4 | 5 | 6 | 7  
- \( y \) | 4 | 6 | 8  
- **Equation:** \( y = 2x - 10 \)

#### 4.
- \( x \) | 10 | 11 | 12 | 13 | 14 | 15  
- \( y \) | 10 | 12 | 14  
- **Equation:** \( y = 2x \)

#### 5.
- \( x \) | 2 | 4 | 6 | 8 | 10 | 12  
- \( y \) | 8 | 16 | 24  
- **Equation:** \( y = 4x \)

#### 6.
- \( x \) | 3 | 6 | 9 | 12 | 15 | 18  
- \( y \) | 6 | 9 | 12  
- **Equation:** \( y = x + 3 \)

#### 7.
- \( x \) | 10 | 9 | 8 | 7 | 6 | 5  
- \( y \) | 5 | 4 | 3  
- **Equation:** \( y = 3x + 3 \)

#### 8.
- \( x \) | 30 | 40 | 50 | 60 | 70 | 80  
- \( y \) | 93 | 123 | 153  
- **Equation:** \( y = x - 5 \)
Balanced Equations

Equations are balanced when both sides are equal (\(=\)). They are not balanced when the two sides are not equal (\(\neq\)).

Think about holding a T-shirt in one hand and something heavier, like a pair of boots, in the other hand. You can tell that they are not the same weight.

T-shirt \(\neq\) boots

If the two sides have the same totals, they are equal. They are equal even if the numbers on each side are different:

\[
2 \times 8 = 4 \times 4 \\
(16) = (16)
\]

Sometimes you have to figure out what number to add or subtract from one side to make the two sides equal, or balanced.

\[
(1 + 2) \times \_ = 5 \times 6
\]

First, simplify.

\[
3 \times \_ = 30
\]

You need to multiply 3 by 10 to balance the equation.

\[
(1 + 2) \times 10 = 5 \times 6
\]

Write \(=\) or \(\neq\).

1. \(1 + 5 \; \_\) \(5 + 1\)
2. \(5 \times 3 \; \_\) \(10 + 5\)
3. \(5 + 2 \times 4 \; \_\) \(28\)
4. \(18 \div 6 \; \_\) \(18 \div 3\)

Explain what you need to do to balance each equation. The first problem has been done for you.

5. \(4 \times (3 + 6) = 6 \times \_\)
   Multiply the right side by 6.

6. \(\_\) \(+ 3 = 5 \times 2\)

7. \((6 + 2) \times 8 = 4 \times 2 \times \_\)
Skills Practice

Balanced Equations

Complete each equation to make it balanced.

1. \( 2 \times (9 - 6) = (8 - 6) \times \_ \_ \_ \)
2. \( 15 - 4 \times \_ \_ \_ = 27 \div 9 \)
3. \( \_ \_ \_ \div (4 + 5) = 9 - 1 \)
4. \( 4 + 6 \times 3 = \_ \_ \_ - 3 \times 4 \)

5. Colin walks 4 miles 3 days each week. Ana walks 12 miles each week for 5 weeks. How many weeks does Colin walk in order to go the same distance as Ana? __________

6. Ann earns $10 per hour delivering newspapers. Dominique earns $8 per hour delivering newspapers. Ann delivered newspapers for 4 hours. Use the equation \( 10 \times 4 = 8 \times h \) to find how many hours Dominique must deliver papers to earn the same amount of money. __________

Tell whether each equation is balanced. Explain.

7. \( 8 \times 6 = 2 \times 4 \times 6 \) __________
8. \( 3 \times 10 \div 5 = 28 \div 4 \) __________
9. \( 3 \times 6 \div 2 = 2 \times 9 \div 2 \) __________
10. \( 3 \times 3 \times 3 = 2 \times 6 \times 2 \) __________
11. \( 10 \times 4 = 5 \times 2 \times 2 \times 2 \) __________
12. \( 4 \times 5 = 2 \times 3 \times 4 \) __________
13. \( 36 \div 3 = (12 \times 3) \div 3 \) __________
14. \( (8 \times 7) \div 8 = 42 \div 7 \) __________
Tell whether each equation is balanced. Explain.

1. $4 \times 4 = 2 \times 2 \times 4$  
   __________________________

2. $4 \times 6 \div 8 = 8 \times 2 \div 8$  
   __________________________

3. $8 \times 3 \times 2 = 6 \times 4 \times 2$  
   __________________________

4. $48 \div 4 = (8 \times 3) \div 2$  
   __________________________

Complete each equation to make it balanced.

5. $4 \times (7 - 3) = ____ \times 2$

6. ____ $\div (8 - 5) = (3 - 2) \times 4$

7. Megan scores 5 baskets every quarter. Alexis scores 3 baskets every quarter. Megan played 6 quarters this week. Use the equation $5 \times 6 = 3 \times q$ to find how many quarters Alexis must play to score the same number of baskets. ____________________

Spiral Review

Write a rule as an equation for the pattern in each table. Then find the next two numbers in each pattern. (Lesson 6-6)

<table>
<thead>
<tr>
<th>Input ($a$)</th>
<th>Output ($b$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

| Rule: |
|------------|--------------|

<table>
<thead>
<tr>
<th>Input ($c$)</th>
<th>Output ($d$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>
Problem-Solving Practice
Balanced Equations

Michael and Jessica are going shopping.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>$1</td>
</tr>
<tr>
<td>Milk</td>
<td>$3</td>
</tr>
<tr>
<td>Pizza</td>
<td>$6</td>
</tr>
<tr>
<td>Chicken Meal</td>
<td>$12</td>
</tr>
</tbody>
</table>

1. Jessica’s bill is $35. How many milks did she buy?
   Chicken meal + Pizza + Milk + Apple
   $12 + (2 × $6) + (m × $3) + (2 × $1) = ___________

2. Michael’s bill is $49. How many pizzas did he buy?
   Chicken meal + Pizza + Milk + Apple
   (1 × $12) + (p × $6) + (5 × $3) + (4 × $1) = ___________

3. Michael and Jessica want to spend the same amount of money. What can Jessica buy to equal Michael’s bill?

   ______________________

Hannah does certain activities at different speeds.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>jogging</td>
<td>5 mph</td>
</tr>
<tr>
<td>walking</td>
<td>3 mph</td>
</tr>
<tr>
<td>hiking</td>
<td>2 mph</td>
</tr>
<tr>
<td>bicycling</td>
<td>6 mph</td>
</tr>
</tbody>
</table>

4. If Hannah walks 1 hour one day and rides her bike 2 hours another day, did she travel the same distance? Explain.

   ______________________

5. Hannah jogged for 1 hour. On her way back, she walked and hiked. If Hannah walked for 1 hour, for how long did she hike?

   ______________________
Enrich

Both Sides

For each problem below, look at the first equation. Then write what was done to both sides of the first equation in order to get to the next equation. Here is an example.

Start with: \((4 \times n) = 24\)

\(n = 6\)

1. Start with: \(3p + 5 = 20\)
   \(3p = 15\)
   \(p = 5\)

2. Start with: \(79 = (10 \times s) - 1\)
   \(80 = 10s\)
   \(8 = s\)

3. Start with: \(2t = 24\)
   \(t = 12\)

4. Start with: \(56 = 8r\)
   \(7 = r\)

5. Start with: \(6q + 4 = 40\)
   \(6q = 36\)
   \(q = 6\)
# Individual Progress Checklist

<table>
<thead>
<tr>
<th>B</th>
<th>D</th>
<th>S</th>
<th>Goal</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>write and find the value of expressions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>use the order of operations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>solve problems by working backwards</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>solve multiplication and division equations mentally</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>find and use a rule to write an equation</td>
<td></td>
</tr>
</tbody>
</table>

## Notes

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Find the missing number.

1. \( 4 + \square = 20 \)
2. \( 3 + \square = 12 \)
3. \( 18 - \square = 5 \)
4. \( 24 - \square = 8 \)
5. \( 3 + \square = 9 \)
6. \( 34 - \square = 28 \)

7. Samantha made 14 friendship bracelets in a week. Use the number sentence 14 - \( \square \) = 7 to find out how many bracelets she gave to her friends.

Write a number sentence for each exercise and solve.

8. Alma bought 6 packs of gum. She gave some away. She has 2 packs of gum left. How many packs of gum did Alma give away?

9. Marco earned 15 points in one game. He earned some more points in a second game. The total number of points he earned was 27. How many points did he earn in the second game?

Write an equation to describe the pattern. Then use the equation to find the next three numbers.

<table>
<thead>
<tr>
<th>Input (d)</th>
<th>Output (e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input (d)</th>
<th>Output (e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>27</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>
Write an expression for each situation.

1. a number added to 6
2. the product of 13 and a number
3. 35 divided by a number
4. 10 times a number
5. 78 added to a number
6. a number subtracted from 27

Find the value of each expression if \( a = 2 \) and \( c = 5 \).

7. \( a \times (c + 16) = \)
8. \( (c \div 5) \times a = \)
9. \( (a \times 5) - c = \)

Use the order of operations to find the value of each expression.

10. \( (10 - 2) \div 4 \)
11. \( 8 + 2 \times 3 \)
12. \( (7 \times 3) \div 3 \)

Write and solve each equation.

13. A number times 8 equals 64. What is the number?
14. 42 divided by a number is 7. What is the number?
15. The product of a number and 9 equals 54. What is the number?
16. 5 plus the product of 3 and 4 is equal to a number. What is the number?
Quiz 1 (Lessons 6-1 through 6-2)

Find the value of each expression if \(t = 8\) and \(u = 4\).

1. \(t \div 4\)  
2. \(u \times 3\)  
3. \((3 \times u) \div 2\)  
4. \((t \div 2) \times 6\)  
5. \((t \times u) \div 2\)

Write an expression for each situation.

6. 5 multiplied by a number

7. the product of a number and 9

8. Carlos bought 3 packages of juice boxes. Each package has 6 boxes. If he shares the boxes with 9 friends, how many boxes can each friend have? Write an expression using \(f\) for friends and solve.

Solve.

9. Brooke has 4 more crayons than Sydney. Inez has 4 times as many crayons as Brooke. If Sydney has 5 crayons, how many crayons does Inez have?

10. Antonio gave his brother 4 stickers. He gave his cousin 3 stickers. His neighbor gave him 2 stickers. Antonio now has 12 stickers. How many stickers did Antonio have to start with?
Quiz 2 (Lessons 6-3 through 6-4)

Find the value of each expression.

1. \((4 + 7) \times 3\)  
2. \(18 \div (9 - 3)\)  
3. \(25 \div (12 - 7)\)

Solve each equation mentally.

4. \(6 \times j = 24\)
5. \(36 \div g = 3\)
6. \((8 + 4) \times 4\)

Write and solve each equation.

7. A number multiplied by 5 equals 40. What is the number?

8. 84 divided by a number equals 12. What is the number?

9. Each staircase in Marissa’s apartment building has 12 stairs. If Marissa climbed 96 stairs, how many staircases did she climb?

10. Mariah has 5 times as many ribbons as Andrea. Mariah has 60 ribbons. Write and solve an equation to find how many ribbons Andrea has.
Write an equation for the pattern in each table. Then use the equation to find the next two numbers.

1. | Rule: | Input (f) | Output (g) |
   |      | 5        | 20         |
   |      | 7        | 28         |
   |      | 9        | 36         |
   |      | 11       |            |
   |      | 13       |            |

2. | Rule: | Input (n) | Output (o) |
   |      | 12       | 4          |
   |      | 21       | 7          |
   |      | 30       | 10         |
   |      | 39       |            |
   |      | 48       |            |

Tell whether each equation is balanced. Explain.

3. \[5 \times 2 \times 4 = 10 \times 2 \times 2\]
   
   4. \[3 \times 4 \times 5 = 7 \times 5\]

Complete each equation to make it balanced.

5. \[4 \times (8 - 3) = 2 \times \_ \times 5\]  
6. \[(4 - 3) \times 8 = \_ \div 12\]

Use any strategy shown below to solve. Tell what strategy you used.

Problem-Solving Strategies

- Use the four-step plan
- Choose an operation
- Make a table
- Work backward

7. A can of nuts has 3 times as many peanuts as cashews. There are 6 more cashews than pecans. There are 15 pecans. How many peanuts are there? Strategy:

8. It takes James 5 minutes per problem to finish his science homework. Each day it takes another 3 minutes to take out his books and pencils to do the work. There are 5 school days this week. If he has 10 science problems, how much total time does he spend on science homework? Strategy:
Read each question carefully. Write your answer on the line provided.

1. What is the value of the expression below if \( c = 5? \)
   \[ (c \times 2) + 8 \]
   - \( A. 15 \)
   - \( B. 18 \)
   - \( C. 12 \)
   - \( D. 20 \)

2. Which represents an expression for this situation?
   the product of 17 and a number
   - \( F. 17 \times n \)
   - \( G. n \div 17 \)
   - \( H. 17 + n \)
   - \( J. n - 17 \)

3. What is the value of the expression below?
   \[ (4 \times 3) - (8 \div 2) \]
   - \( A. 3 \)
   - \( B. 6 \)
   - \( C. 12 \)
   - \( D. 8 \)

Find the value of each expression if \( b = 3 \) and \( c = 6 \).

4. \( (c \times 4) - 12 \)

5. \( (21 \div b) \times c \)

Write and solve an equation for each situation.

6. a number multiplied by 4 equals 20

7. 42 divided by a number equals 6

Find the value of each expression.

8. \( 15 \div (7 - 2) \)

9. \( (7 + 4) - (18 \div 3) \)

Solve. Use the work backwards strategy.

10. Logan set the table for dinner. He used 3 times as many utensils as plates. He used 3 more plates than glasses. He used 4 plates. How many plates, glasses, and utensils did Logan use to set the table?

11. Three students were home sick today. Four students from another class joined us for a field trip. Five students did not have permission to go. 26 students are going on the field trip. How many students are in my class?
Using the word bank below, complete each sentence by writing the correct word or words in the blank.

- equation
- expression
- multiplication
- divide
- variable
- order of operations

1. _________________ are rules that tell what order to follow in evaluating expressions.

2. A(n) _______________ is a mathematical sentence that contains an equals sign, =, indicating that the left side of the equal sign has the same value as the right side.

3. A letter or symbol used to represent an unknown quantity.
   _________________

4. A combination of numbers, variables, and operation symbols that represents a mathematical quantity. ________________

5. To separate into equal groups. ________

6. An operation on two numbers to find their product. It can be thought of as repeated addition. ________________
Place 8 blue paper clips, 9 red paper clips, a paper cut out of the letter “X”, a paper cut out of a minus sign, a paper cut out of a plus sign, and a paper cut out of an equals sign on the table. 8 blue paper clips will always be used. “X” will represent the number of red paper clips used. Use the materials to formulate the equations below.

**Read each question aloud to the student. Then write the student’s answers on the lines below the question.**

1. How many blue paper clips are there?

   ___________________________________________________________

2. What is $20 + x$ if $x = 5$?

   ___________________________________________________________

3. What is $14 + x$ if $x = 8$?

   ___________________________________________________________

4. Tell how you got your answer.

   ___________________________________________________________

5. What would $2 + x$ equal if $x = 3$?

   ___________________________________________________________

6. Tell how you got your answer.

   ___________________________________________________________
Facts About Polar Bears

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum running speed</td>
<td>30 mph</td>
</tr>
<tr>
<td>Maximum height of males</td>
<td>9 feet</td>
</tr>
<tr>
<td>Maximum weight</td>
<td>1,600 pounds</td>
</tr>
<tr>
<td>Length of front claws</td>
<td>almost 6 inches</td>
</tr>
</tbody>
</table>

7. What is the expression for the total height of $b$ male bears?

8. What is the total height of $b$ male bears if $b = 4$?

9. Tell how you got your answer.

10. What is the expression for the total length of $c$ front claws?

11. What is the expression for the total length of $c$ front claws if $c = 2$?

12. Tell how you got your answer.
# Chapter Project Rubric

<table>
<thead>
<tr>
<th>Score</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Student successfully completed the chapter project. Student demonstrated appropriate use of chapter information in completing the chapter project.</td>
</tr>
<tr>
<td>2</td>
<td>Student completed the chapter project with partial success. Student partially demonstrated appropriate use of chapter information in completing the chapter project.</td>
</tr>
<tr>
<td>1</td>
<td>Student did not complete the chapter project or completed it with little success. Student demonstrated very little appropriate use of chapter information in completing the chapter project.</td>
</tr>
<tr>
<td>0</td>
<td>Student did not complete the chapter project. Student demonstrated inappropriate use of chapter information in completing the chapter project.</td>
</tr>
</tbody>
</table>
## Foldables Rubric

### Three-Pocket Foldables

**Algebra: Use Multiplication and Division**

<table>
<thead>
<tr>
<th>Score</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Student properly assembled Foldables graphic organizer according to instructions. Student recorded information related to the chapter in the manner directed by the Foldables graphic organizer. Student used the Foldables graphic organizer as a study guide and organizational tool.</td>
</tr>
<tr>
<td>2</td>
<td>Student exhibited partial understanding of proper Foldables graphic organizer assembly. Student recorded most but not all information related to the chapter in the manner directed by the Foldables graphic organizer. Student demonstrated partial use of the Foldables graphic organizer as a study guide and organizational tool.</td>
</tr>
<tr>
<td>1</td>
<td>Student showed little understanding of proper Foldables graphic organizer assembly. Student recorded only some information related to the chapter in the manner directed by the Foldables graphic organizer. Student demonstrated little use of the Foldables graphic organizer as a study guide and organizational tool.</td>
</tr>
<tr>
<td>0</td>
<td>Student did not assemble Foldables graphic organizer according to instructions. Student recorded little or no information related to the chapter in the manner directed by the Foldables graphic organizer. Student did not use the Foldables graphic organizer as a study guide and organizational tool.</td>
</tr>
</tbody>
</table>
Find the value of each expression if \( j = 3 \) and \( k = 7 \).

1. \( 45 \div (j \times 3) \)
   - A. 3
   - B. 4
   - C. 5
   - D. 6

2. \( (28 \div k) \times j \)
   - F. 3
   - G. 4
   - H. 7
   - J. 12

3. \( 2 \times (27 \div j) \)
   - A. 6
   - B. 18
   - C. 9
   - D. 54

Use order of operations to simplify.

4. \( 36 \div (3 + 6) \times 2 = \)
   - F. 36
   - G. 24
   - H. 8
   - J. 2

5. \( 24 \div (4 + 2) \times 5 = \)
   - A. 60
   - B. 40
   - C. 20
   - D. 16

6. \( (7 \times 5) + 4 = \)
   - F. 39
   - G. 36
   - H. 21
   - J. 13

7. \( 5 \times (4 + 8) \div 6 = \)
   - A. 4
   - B. 10
   - C. 12
   - D. 66

8. \( 36 \div (4 + 2) \times 7 = \)
   - F. 2
   - G. 6
   - H. 36
   - J. 42

9. \( 9 \times l = 54 \)
   - A. 6
   - B. 7
   - C. 8
   - D. 9

10. \( m \times 4 = 28 \)
    - F. 6
    - G. 7
    - H. 8
    - J. 9

11. \( 81 \div n = 9 \)
    - A. 6
    - B. 7
    - C. 8
    - D. 9

12. \( p \div 9 = 8 \)
    - F. 17
    - G. 21
    - H. 56
    - J. 72
Complete each equation to make it balanced.

13. \[2 \times 9 = (36 \div q) \times 6\]
   A. 3 \hspace{1cm} B. 6 \hspace{1cm} C. 9 \hspace{1cm} D. 12

14. \[48 \div 4 = (24 \div z) \times 3\]
   F. 2 \hspace{1cm} G. 4 \hspace{1cm} H. 6 \hspace{1cm} J. 8

15. There are 56 children signed up to play basketball. There are 8 teams. How many players are on each team?
   A. 7 players \hspace{1cm} B. 8 players \hspace{1cm} C. 9 players \hspace{1cm} D. 10 players

16. Sammy has 45 CDs. He put them into 5 CD holders. Each holder has the same number of CDs. How many CDs are in each holder?
   F. 3 \hspace{1cm} G. 5 \hspace{1cm} H. 7 \hspace{1cm} J. 9

17. There are 22 students signed up to go canoeing. Each canoe will hold 2 students. How many canoes are needed?
   A. 4 \hspace{1cm} B. 8 \hspace{1cm} C. 11 \hspace{1cm} D. 22

18. Shawna bought 4 notebooks for $3 each and a calendar for $5. How much money did Shawna spend altogether?
   F. $17 \hspace{1cm} G. $12 \hspace{1cm} H. $8 \hspace{1cm} J. $5

19. The school hallway is 30 yards long. Wall outlets are installed every 6 yards along the wall. How many outlets are needed?
   A. 8 \hspace{1cm} B. 7 \hspace{1cm} C. 6 \hspace{1cm} D. 5

20. At snacktime, each student in Mr. Ramos’s class will receive 5 crackers, 4 slices of cheese, and 2 pieces of fruit. There are 12 students in his class. How many total crackers, slices of cheese, and pieces of fruit will he need?
   F. 11 \hspace{1cm} G. 154 \hspace{1cm} H. 132 \hspace{1cm} J. 144
Chapter Test, Form 2A

Read each question carefully. Write your answer on the line provided.

Find the value of each expression if \( b = 2 \) and \( c = 8 \).

1. \( 64 \div (b \times 4) \)
   \[ A. \ 32 \quad B. \ 24 \quad C. \ 16 \quad D. \ 8 \]
   1. ____

2. \( (72 \div c) \times b \)
   \[ F. \ 9 \quad G. \ 36 \quad H. \ 18 \quad J. \ 16 \]
   2. ____

3. \( 12 \times (c \div 4) \)
   \[ A. \ 24 \quad B. \ 52 \quad C. \ 104 \quad D. \ 134 \]
   3. ____

Use order of operations to simplify.

4. \( 36 \div (4 + 2) \times 5 = \)
   \[ F. \ 40 \quad G. \ 30 \quad H. \ 20 \quad J. \ 10 \]
   4. ____

5. \( 42 \div (2 + 5) \times 6 = \)
   \[ A. \ 156 \quad B. \ 36 \quad C. \ 7 \quad D. \ 1 \]
   5. ____

6. \( (4 \times 9) \div (8 - 2) = \)
   \[ F. \ 3 \quad G. \ 6 \quad H. \ 36 \quad J. \ 216 \]
   6. ____

7. \( 8 - (8 + 6) \div 7 = \)
   \[ A. \ 30 \quad B. \ 7 \quad C. \ 6 \quad D. \ 42 \]
   7. ____

8. \( 120 \div (9 + 3) \times 5 = \)
   \[ F. \ 50 \quad G. \ 12 \quad H. \ 47 \quad J. \ 60 \]
   8. ____

9. \( 7 \times w = 21 \)
   \[ A. \ 5 \quad B. \ 4 \quad C. \ 3 \quad D. \ 2 \]
   9. ____

10. \( y \times 5 = 55 \)
    \[ F. \ 11 \quad G. \ 12 \quad H. \ 13 \quad J. \ 14 \]
    10. ____

11. \( 56 \div f = 8 \)
    \[ A. \ 6 \quad B. \ 7 \quad C. \ 8 \quad D. \ 9 \]
    11. ____

12. \( g \div 3 = 2 \)
    \[ F. \ 5 \quad G. \ 6 \quad H. \ 7 \quad J. \ 8 \]
    12. ____
Complete each equation to make it balanced.

13. $5 \times 4 = (32 \div r) \times 5$
   A. 20  B. 12  C. 8  D. 4  13. ____

14. $16 \div 2 = (16 \div s) \times 2$
   F. 32  G. 12  H. 8  J. 4  14. ____

15. There are 63 children signed up to play softball. There are 7 teams. How many players are on each team?
   A. 6 players  B. 7 players  C. 8 players  D. 9 players  15. ____

16. Jen has 35 CDs. She put them into 7 CD holders. Each holder has the same number of CDs. How many CDs are in each holder?
   F. 5  G. 4  H. 3  J. 2  16. ____

17. There are 18 students signed up to go canoeing. Each canoe will hold 3 students. How many canoes are needed?
   A. 9  B. 6  C. 5  D. 4  17. ____

18. Ramon bought 3 sandwiches for $3 each and a salad for $6. How much money did Ramon spend altogether?
   F. $9  G. $12  H. $15  J. $20  18. ____

19. A basement wall is 20 yards long. Wall outlets were installed every 5 yards along the wall. How many outlets were needed?
   A. 6  B. 5  C. 4  D. 3  19. ____

20. The students in Ms. Chavez’s art class will receive 6 pencils, 3 paint brushes, and 1 canvas. There are 11 students in her class. What is the total number of pencils, paint brushes, and canvases she will need?
   F. 10  G. 11  H. 110  J. 116  20. ____
Read each question carefully. Write your answer on the line provided.

What answer correctly solves the problem?

1. \(42 \div (2 + 5) \times 6 = \)  
   \(\)  
   A. 36  
   B. 7  
   C. 1  

2. \(36 \div (4 + 2) \times 5 = \)  
   \(\)  
   F. 30  
   G. 20  
   H. 40  

3. \(2 \times (4 + 6) \div 5 = \)  
   \(\)  
   A. 3  
   B. 4  
   C. 8  

4. \((4 \times 9) \div (8 - 2) = \)  
   \(\)  
   F. 3  
   G. 36  
   H. 6  

5. \(7 \times w = 21\)  
   \(\)  
   A. 3  
   B. 4  
   C. 5  

6. \(120 \div (9 + 3) \times 5 = \)  
   \(\)  
   F. 50  
   G. 47  
   H. 12  

7. \(56 \div f = 8\)  
   \(\)  
   A. 7  
   B. 8  
   C. 9  

8. \(g \div 3 = 2\)  
   \(\)  
   F. 4  
   G. 5  
   H. 6  

9. \(y \times 5 = 60\)  
   \(\)  
   A. 12  
   B. 13  
   C. 14  

If \(b = 2\) and \(c = 8\), what is the answer to the problem?

10. \((72 \div c) \times b\)  
    \(\)  
    F. 36  
    G. 18  
    H. 9  

11. \(64 \div (b \times 4)\)  
    \(\)  
    A. 24  
    B. 16  
    C. 8  

12. \(11 \times (c \div 4)\)  
    \(\)  
    F. 132  
    G. 26  
    H. 22
Complete each equation so that both sides are equal.

13. \[5 \times 4 = (32 \div r) \times 5\]
   A. 20  
   B. 8  
   C. 4  
   13. ___

14. \[18 \div 2 = (16 \div s) + 5\]
   F. 32  
   G. 8  
   H. 4  
   14. ___

15. There are 18 campers signed up to go canoeing. Each canoe will hold 3 campers. How many canoes are needed?
   A. 9  
   B. 6  
   C. 5  
   15. ___

16. Jen has 35 CDs. She put them into 7 CD holders. Each holder has the same number of CDs. How many CDs are in each holder?
   F. 3  
   G. 4  
   H. 5  
   16. ___

17. There are 63 children signed up to play softball. There are 7 teams. How many players are on each team?
   A. 7 players  
   B. 8 players  
   C. 9 players  
   17. ___

18. Ramon bought 3 sandwiches for $3 each and a salad for $6. How much money did Ramon spend altogether?
   F. $9  
   G. $15  
   H. $12  
   18. ___

19. A basement wall is 20 yards long. Wall outlets were placed every 5 yards along the wall. How many outlets were needed?
   A. 4  
   B. 5  
   C. 6  
   19. ___

20. The students in Ms. Chavez’s art class will receive 6 pencils, 3 pens, and 1 canvas. There are 10 students in her class. How many pencils, pens, and canvases will she need in all?
   F. 20  
   G. 90  
   H. 100  
   20. ___
Chapter Test, Form 2C

Read each question carefully. Write your answer on the line provided.

Find the value of each expression if \( b = 2 \) and \( c = 8 \).

1. \( 12 \times (c \div 4) \)

2. \( 64 \div (b \times 4) \)

3. \( (72 \div c) \times b \)

Complete each equation to make it balanced.

4. \( 5 \times 4 = (32 \div r) \times 5 \)

5. \( 16 \div 2 = (12 \div s) \times 8 \)

Use order of operations to simplify.

6. \( 42 \div (2 + 5) \times 6 = \)

7. \( 2 \times (3 + 4) \div 7 = \)

8. \( (4 \times 9) \div (8 - 2) = \)

9. \( 36 \div (4 + 2) \times 5 = \)

10. \( y \times 5 = 60 \)

11. \( 56 \div f = 8 \)

12. \( 120 \div (9 + 3) \times 5 = \)

13. \( 7 \times w = 21 \)

14. \( g \div 3 = 2 \)
15. There are 63 children signed up to play softball. There are 7 teams. How many players are on each team? 15. ____

16. A basement wall is 20 yards long. Wall outlets were installed every 5 yards along the wall. How many outlets were needed? 16. ____

17. The students in Ms. Chavez’s art class will receive 6 pencils, 3 paint brushes, and 1 canvas. There are 11 students in her class. What is the total number of pencils, paint brushes, and canvases she will need? 17. ____

18. Ramon bought 3 sandwiches for $3 each and a salad for $6. How much money did Ramon spend altogether? 18. ____

19. There are 18 students signed up to go canoeing. Each canoe will hold 3 students. How many canoes are needed? 19. ____

20. Jen has 35 CDs. She put them into 7 CD holders. Each holder has the same number of CDs. How many CDs are in each holder? 20. ____
Chapter Test, Form 2D

Read each question carefully. Write your answer on the line provided.

Make both sides of the equation equal.

1. \(5 \times 4 = (32 \div r) \times 5\)
2. \(18 \div 2 = (21 \div s) \times 3\)

Solve the following problems.

3. \((4 \times 9) \div (8 - 2) = \) 
4. \(2 \times (3 + 4) \div 7 = \) 
5. \(42 \div (2 + 5) \times 6 = \) 
6. \(36 \div (4 + 2) \times 5 = \) 
7. \(120 \div (9 + 3) \times 5 = \) 
8. \(g \div 3 = 2\) 
9. \(56 \div f = 8\) 
10. \(7 \times w = 21\) 
11. \(y \times 5 = 55\)

If \(b = 2\) and \(c = 8\), what is the answer to the problem?

12. \(64 \div (b \times 4) = \) 
13. \(12 \times (c \div 4) = \) 
14. \((72 \div c) \times b = \) 

15. A basement wall is 20 yards long. Wall outlets were placed every 5 yards along the wall. How many outlets were needed?
16. There are 63 children signed up to play softball. There are 7 teams. How many players are on each team?
17. The students in Ms. Chavez's art class will receive 6 pencils, 3 pens, and 1 canvas. There are 17 students in her class. How many pencils, pens, and canvases will she need in all?  

18. Ramon purchased 3 sandwiches for $3 each and a salad for $6. How much money did Ramon spend altogether?  

19. Jen owns 35 CDs. She puts them into 7 CD holders. Each holder has the same number of CDs. How many CDs are in each holder?  

20. There are 18 students signed up to go canoeing. Each canoe will hold 3 students. How many canoes are needed?
Chapter Test, Form 3

Read each question carefully. Write your answer on the line provided.

Determine the value of each expression if \( b = 2 \) and \( c = 8 \).

1. \( 64 \div (b \times 4) \)  
2. \( (72 \div c) \times b \)  
3. \( 11 \times (c \div 4) \)

Simplify each equation using order of operations.

4. \( (6 \times 5 + 12) \div 7 = \)  
5. \( 36 \div (4 + 2) \times 5 = \)  
6. \( (4 \times 9) \div (8 - 2) = \)  
7. \( 42 \div (2 + 5) \times 6 = \)  
8. \( y \times 5 = 65 \)  
9. \( 120 \div (9 + 3) \times 5 = \)
10. \( 56 \div f = 8 \)
11. \( g \div 3 = 2 \)
12. \( 7 \times w = 21 \)

Complete each equation to make it balanced.

13. \( 24 \div 2 = (16 \div s) + 8 \)
14. \( 5 \times 4 = (32 \div r) \times 5 \)

15. A basement wall is 20 yards long. Wall outlets were installed every 5 yards along the wall. How many outlets were needed?

16. Ramon purchased 3 sandwiches for $3 each and a salad for $6 from the deli. The deli also had yogurt and fruit for sale for $2 each. How much money did Ramon spend altogether?
17. The students in Ms. Chavez’s art class will receive 6 pencils, 3 paint brushes, and 1 canvas. There are 12 students in her class. What is the total number of pencils, paint brushes, and canvases she will need?

18. There are 18 students signed up to go canoeing. Each canoe will hold 3 students. The students plan to canoe for five miles. How many canoes are needed?

19. Jen owns 35 CDs. 15 of the CDs are classical music. 20 of the CDs are jazz CDs. She distributes them into 7 CD wallets. Each wallet holds the same number of CDs. How many CDs does each wallet hold?

20. There are 63 children signed up to play softball. There are 7 teams. How many players are on each team?
Demonstrate your knowledge by giving a clear, concise solution to each problem. Be sure to include all relevant drawings and justify your answers. You may show your solution in more than one way or investigate beyond the requirements of the problem. If necessary, record your answer on another piece of paper.

1. Find the value of \(3 \times (18 \div x)\) if \(x = 3\). Show your work.

2. Jane’s mother is 40 years old. To find Jane’s age, divide her mother’s age by 5. To find Jane’s sister’s age, subtract \(y\) from Jane’s age. Write an expression for Jane’s sister’s age and solve if \(y = 2\).

   a. Write an expression for Jane’s sister’s age and solve if \(y = 4\).

   b. Write an expression for Jane’s sister’s age and solve if \(y = 1\).

3. Explain the order of operations in your own words.

4. Explain how the order of operations affect the way you would find the value of \(5 \times (5 + 4)\).
Use this recording sheet with pages 258–259 of the Student Edition.

Read each question. Then fill in the correct answer.

1. A B C D

2. F G H J

3. A B C D

4. F G H J

5. A B C D

6. F G H J

7. A B C D

8. F G H J

9. A B C D

10. F G H J
Test Example
Look at the table below.

<table>
<thead>
<tr>
<th>Input (x)</th>
<th>Output (y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

A. 6   B. 7   C. 8   D. 9

Read the Question
You need to find the missing value in the table.

Solve the Question
Determine how the numbers relate.
The output is 3 times the input.
Multiply $3 \times 3 = 9$
So, the missing value is 9.
The answer is D.

Choose the best answer.

1. Which equation can be used to describe the pattern in the table?

<table>
<thead>
<tr>
<th>Rule:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

A. $y = 2x - 3$  
B. $y = 3x - 2$  
C. $y = 3x + 2$  
D. $y = 2x + 3$  

1. ____
2. What is the value of the expression below?
\[(64 \div 8) \div (2 \times 2)\]
F. 2  G. 4  H. 6  J. 8

3. Which number is represented by \(d\)?
\[12 \times d = 108\]
A. 8  B. 9  C. 11  D. 12

4. What is the value of the expression below if \(v = 7\)?
\[(79 - v) \div 8\]
F. 9  G. 8  H. 10  J. 10.75

5. What number goes in the box to make this number sentence true?
\[(11 - 3) \times 3 = 4 \times \square\]
A. 8  B. 7  C. 6  D. 5

6. Benita spent $16.00 on a gift for her sister. She has $28.00 left to spend on a gift for her mother. Which equation can be used to find how much money Benita had before she went shopping? Let \(m = \) money.
F. \(28 - m = 16\)  G. \(m - 16 = 28\)
H. \(m + 28 = 16\)  J. \(m + 16 = 28\)

7. Look at the table below.

<table>
<thead>
<tr>
<th>Input ((x))</th>
<th>Output ((y))</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>35</td>
</tr>
</tbody>
</table>

What is the missing value in the table?
A. 10  B. 20  C. 25  D. 30

8. Which of the following is a prime number?
F. 14  G. 19  H. 21  J. 27
9. The table shows the number of people who went to the City Library this winter. How many people went to the library in December and February?

<table>
<thead>
<tr>
<th>City Library</th>
<th>Month</th>
<th>Number of Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>November</td>
<td>5,563</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>4,321</td>
</tr>
<tr>
<td></td>
<td>January</td>
<td>5,877</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>6,481</td>
</tr>
</tbody>
</table>

A. 11,340 B. 11,440 C. 10,702 D. 10,802

9. ____

10. Which number is 100,000 less than 567,231?

F. 667,231 G. 557,231 H. 566,231 J. 467,231

10. ____

11. What prime number is between 25 and 30?

11. ____

12. What is the value of the expression below if \( f = 6 \)?

\((5 \times f) \div 10\)

12. ____

13. Look at the table below.

<table>
<thead>
<tr>
<th>Rule:</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x )</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

Write an equation to describe the pattern in the table.

14. What is the value of the expression below?

\((31 + 5) \div (3 \times 1)\)

14. ____

15. Carly read 72 pages over 8 days. Find the number of pages Carly read each day if she read an equal number of pages each day.

15. ____
Find the value of each expression if \( a = 3 \) and \( b = 4 \).

\[
\begin{align*}
\text{a + 5} &= 8 \\
\text{a + b} &= 7 \\
\text{b \times 5} &= 20 \\
\text{40 \div b} &= 10 \\
\text{24 \div a} &= 8 \\
\text{16 - b} &= 12
\end{align*}
\]
Name __________________________________________ Date __________

Reteach

Multiplication and Division Expressions

A variable is used in an expression to represent an unknown number. In the expression $5 \times x$, the unknown number is represented by the variable $x$.

You can find the value of an expression by substituting different numbers for the variable.

Find the value of $5 \times x$ when $x = 2$.
- $5 \times x$ $= 10$
- So, the value of $5 \times x$ when $x = 2$ is 10.

Find the value of $m \div 3$ when $m = 21$.
- $m \div 3$ $= 7$
- So, the value of $m \div 3$ when $m = 21$ is 7.

Find the value of each expression.

1. $3 \times (5 \div 1)$ $= 15$
2. $(8 \times 3) \div 2$ $= 12$
3. $12 \times (6 \div 2)$ $= 36$

Circle the best expression.

4. Each week Mark spends 10 minutes a day cleaning his room for 3 days. Mark does this for 3 weeks.
   - A. $(10 \times 3) + 15$
   - B. $10 \times (3 \times 3)$

5. Jennifer had 3 packs of 10 stickers. She gave half of her stickers to Melanie.
   - A. $3 \times (10 \times 2)$
   - B. $(5 \times 10) \div 2$

Find the value of each expression for the value given.

6. $(d \times 6) \div 2$ for $d = 2$ $= 6$
7. $8 \times (5 \times z)$ for $z = 2$ $= 80$
8. $(14 \div n) \times 3$ for $n = 7$ $= 6$
9. $(x \times 2) \div 2$ for $x = 3$ $= 12$
10. $x \times (4 \times 3)$ for $x = 10$ $= 120$
11. $8 \times (15 \div x)$ for $x = 5$ $= 24$

Solve. Use data from the chart for problems 12 and 13.

12. Last week, Karla bought 3 pens. How much did she spend? $9$
13. This week, all items are half price. How much will Karla pay for a ruler and a notebook? $3$

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>pen</td>
<td>$3</td>
</tr>
<tr>
<td>ruler</td>
<td>$2</td>
</tr>
<tr>
<td>notebook</td>
<td>$4</td>
</tr>
</tbody>
</table>
Homework Practice

Multiplication and Division Expressions

Find the value of each expression if \( j = 12 \) and \( k = 6 \).

1. \( j \div 3 = \frac{4}{3} \)
2. \( k \div 2 = \frac{3}{2} \)
3. \( 3 \times j = 36 \)
4. \( 5 \times k = 30 \)
5. \( j \times k = 72 \)
6. \( j \div k = 2 \)
7. \( 5 \times (j \div 4) = 15 \)
8. \( (18 \div k) \div 3 = 1 \)
9. \( (j \div k) \times 5 = 10 \)

Write an expression for each situation.

10. a number multiplied by 3

11. the product of 5 and a number

12. 16 divided by a number

13. a number divided by 8

Solve.

1. Ming and Amy have 6 bags of beads. Each bag contains 14 beads. Define a variable and write an expression for the number of beads Ming and Amy have. Then find the total number of beads.

Let \( b = \) beads; \( 6 \times b = 84 \) beads

2. If Ming buys 3 more bags of beads, how many beads will Ming and Amy have altogether?

126 beads

3. Julie's mother is 40 years old. She is 4 times as old as Julie. To find Julie's age, solve the equation \( 40 \div a = 4 \), where \( a \) equals Julie's age.

10 years old

4. Andrew has three boxes of holiday decorations. There are 12 decorations in each box. Write and solve an expression for the number of decorations in each box. Then solve the expression.

Let \( d = \) decorations; \( 3 \times d = 36 \) decorations

5. George and his brother have a total of 8 CDs. Each CD has the same amount of songs. If there are 88 total songs, how many songs are on each CD? Write an expression to find the number of songs on each CD. Then solve the expression.

Let \( s = \) songs; \( s \div 8 = 11 \) songs

6. Each of Mrs. Fairview's children need 3 books for school. She has 4 children. If each book costs $8, what will be the total cost for all of the books? Write an expression to find the total amount the books will cost. Then solve the expression.

Let \( c = \) cost; \( (3 \times 4) \times c = 96 \)
Eight Expressions

Choose one of these expressions for each arm of the octopus. Write the expression on the arm that contains the matching word phrase.

Arm 1  forty divided by two times a number
Arm 2  five times a number
Arm 3  six times a number decreased by seven
Arm 4  thirty-six divided by three times a number
Arm 5  seven times a number, divided by 5
Arm 6  two more than forty-nine divided by seven
Arm 7  eleven less than three times a number
Arm 8  nine more than twice a number

Algebraic Expressions

\[
\begin{align*}
40 & \div (2 \times n) \\
5 & \times n \\
6 & \times (n - 7) \\
36 & \div (3 \times n) \\
(7 \times n) & \div 5 \\
2 & + (49 \div 7) \\
(3 \times n) - 11 & \\
9 & + (2 \times n)
\end{align*}
\]

Choose the expression that matches each word phrase:

Arm 1  forty divided by two times a number
Arm 2  five times a number
Arm 3  six times a number decreased by seven
Arm 4  thirty-six divided by three times a number
Arm 5  seven times a number, divided by 5
Arm 6  two more than forty-nine divided by seven
Arm 7  eleven less than three times a number
Arm 8  nine more than twice a number

Work Backward

Tim had $5 more yesterday than he does today. Yesterday he had $10. How much does Tim have today?

Step 1. Understand
Be sure you understand the problem. Read carefully.

- What do you know?
  - Tim had $5 more yesterday than he does today.
  - Yesterday Tim had $10.
- What do you need to find?
  - You need to find how much Tim has today.

Step 2. Plan
Make a plan.
Choose a strategy.
You can work backward to solve the problem.
Start with how much Tim had yesterday.
Then work backward to find how much he has today.

Make a plan.
Choose a strategy.
You can work backward to solve the problem.
Start with how much Tim had yesterday.
Then work backward to find how much he has today.
Reteach  (continued)

Problem-Solving Strategy

Step 3. Solve

Carry out your plan.

You know Tim had $10 yesterday.
You know Tim had $5 more yesterday than he does today.
Think: Tim had $10 yesterday, which is $5 more than he has today.
Subtract to find how much Tim has today.

$10 – $5 = $5
Tim has $5 today.

Step 4. Check

Is the solution reasonable?

Reread the problem.
Work forward to check your answer.
Start with your answer. Add $5.
Did you end with $10?

Answers may vary.

What other strategies could you use to solve the problem?

Possible answer: Write an equation.

Practice

1. Patti had $10 less yesterday than she does today. Yesterday she had $1. How much does Patti have today?  $11

2. Fred and Ed walk to the library. Fred walks twice as far as Ed. Ed walks 2 miles. How far does Fred walk?  4 miles
**Solve. Use the work backward strategy.**

1. Paige gave 12 barrettes to her sister. Jordan gave Paige 5 more barrettes. Then Paige gave 6 barrettes to Maria. Now Paige has 8 barrettes. How many barrettes did Paige have to start with?

   **21 barrettes**

2. Luis bought 6 new baseball cards on Tuesday. On Thursday he bought three times as many. He now has 35 baseball cards. How many cards did he have originally?

   **11 cards**

3. Mary practiced playing the piano twice as long Monday than Tuesday. Tuesday she practiced 30 minutes less than Wednesday. Wednesday she practiced for 30 minutes. How long did Mary practice playing the piano on Monday?

   **20 minutes**

4. In Jared’s school, 6 more fourth-graders use blue pens than black. Four times as many fourth-graders use pencils than blue pens. If 5 fourth-graders use black pens, how many fourth-graders use pencils?

   **44 fourth-graders**

**Spiral Review**

Find the value of each expression if \( q = 15 \) and \( r = 5 \). (Lesson 6-1)

5. \( q ÷ 5 \)

   **3**

6. \( 4 \times r \)

   **20**

7. \( 5 \times (q ÷ 5) \)

   **15**

8. \( (20 ÷ r) ÷ 2 \)

   **2**

**Write an expression for each situation.**

9. 6 multiplied by a number \( 6 \times n \)

10. a number divided by 5 \( n ÷ 5 \)

11. Each of three friends can decorate 3 pencil boxes a day. Write an expression to show how many pencil boxes the friends can decorate in \( d \) days.

   **(3 \times 3) \times d**

---

**Enrich First and Last**

- $60
- $85
- $164

*Use two of the numbers in the box to fill in the first and last blanks in the story. Use your head to fill in all the other blanks!*

**Sample answer given.**

Larry loves lemons. He has saved up **$164**. He wants to use his money to buy a bag of lemons every week. There are **52** weeks in a year. A large bag of Larry’s favorite kind of lemons costs **$2**.

If he follows his plan, by the end of one year, Larry will have spent **$104** on lemons. If he doesn’t add to his savings, Larry will have **$60** left.

Can you find another way? Use a different number for the first blank and last blanks.

Larry loves lemons. He has saved up **$85**. He wants to use his money to buy a bag of lemons every week. There are **52** weeks in a year. A large bag of Larry’s favorite kind of lemons costs **48¢**. If he follows his plan, by the end of one year, Larry will have spent **$25** on lemons. If he doesn’t add to his savings, Larry will have **$60** left.
**6-3**

**Reteach**

**Order of Operations**

Always use the order of operations to simplify expressions. The rules for the order in which you should perform operations are given below.

1. Simplify \((20 + 8) \div 4 - 2\).

   **Step 1:**
   Do the operations in parentheses first.
   \((20 + 8) = 28\)
   \(28 \div 4 = 7\)
   \(7 - 2 = 5\)

   **Step 2:**
   Multiply and divide from left to right.
   \(28 \div 4 = 7\)
   \(7 - 2 = 5\)

   **Step 3:**
   Add and subtract from left to right.
   \(5\)

**Write which operation should be done first.**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>division</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>subtraction</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>multiplication</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>addition</td>
<td>7</td>
</tr>
</tbody>
</table>

**Find the value of each expression.**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>(3 \times (2 + 5)) = 21</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>(14 \div 7 + 2) = (\frac{14}{4} = 3.5)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>(9 + (6 - 2)) = 13</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>(4 \times 2 \times 5) = 14</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>(8 \div 2 - 2) = 2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>(10 - 8 \div 4) = 8</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>(12 \div 3 - 2) = (\frac{2}{24} = \frac{1}{12})</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>(1 + 5) \times 4 = 6</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>(8 - 8 \div 4) = 6</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>(5 + 5) \div 2 = (\frac{10}{2} = 5)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>(14 - 10 + 2) = 6</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>(16 \div 4 \div 2) = 2</td>
<td></td>
</tr>
</tbody>
</table>

**Solve.**

31. Tamara buys 6 toys for $2 each. She has a $1-off coupon. How much does Tamara spend? Write an expression and simplify.

\[6 \times \$2 - \$1 = \$11\]

32. Steven has 126 photos in an album. He adds 18 more photos to the album. Each page holds 12 photos. Write an expression and simplify to find out how many pages Steven fills.

\[(126 + 18) \div 12 = 12\]
Find the value of each expression.

1. \((3 + 2) \times 5 = 25\)
2. \((13 - 5) \div 4 = 2\)
3. \(7 \times (12 - 9) = 21\)
4. \(18 \div (4 + 5) = 2\)
5. \((24 \div 8) + (5 \times 6) = 33\)
6. \((8 \times 6) - (25 - 7) = 30\)

13. Juan collects shells. He had 15 before he went on vacation. On vacation he found 4 shells per day for 3 days. Then he found 6 shells on the fourth day. Write an expression and solve it to find out how many shells he has after vacation.

\[15 + (4 \times 3) + 6; \text{ 33 shells}\]

14. Michelle practices dribbling the soccer ball for 10 minutes each day during the school week. She practices for 30 minutes each day on the weekend. How many minutes does she practice during a whole week?

\[(10 \times 5) + (30 \times 2); \text{ 110 min or 1 hr 50 min}\]

Write which operation should be done first. Then solve.

1. Tod buys 4 packs of batteries. Each pack has 4 batteries. He gives 6 batteries to his sister. How many batteries does he have left?

\[4 \times 4 - 6 = 10 \text{ batteries}\]

Which operation should be done first? **Multiplication**

2. Ryan has 36 stickers. He buys 6 more stickers. Then he divides the stickers into 6 groups. How many stickers are in each group?

\[(36 + 6) \div 6 = 7 \text{ stickers}\]

Which operation should be done first? **Addition**

3. Jen had 6 blank CDs, but needed to buy more. She bought 2 packs of blank CDs. Each pack has 8 CDs. How many blank CDs does she have now?

\[6 + 2 \times 8 = 22 \text{ CDs}\]

4. Sara has 20 stickers. She buys 5 packs of stickers. Each pack has 8 stickers. She adds the stickers to her collection. How many stickers does she have in her collection now?

\[20 + 5 \times 8 = 60 \text{ stickers}\]

5. Coach Coleman has 32 softballs left from last season, but 3 are torn and cannot be used. He buys 2 boxes of softballs to start the new season. Each box has 12 softballs. How many good softballs does he have in all? Show your work.

\[53 \text{ softballs}; \quad 32 - 3 + (2 \times 12) = 53\]

6. Coach Coleman is ordering hats for this year’s teams. There are 6 teams. Each team has 12 players on the roster. He orders 12 more hats for the team managers. How many hats does he order in all? Show your work.

\[84 \text{ hats}; \quad 6 \times 12 + 12 = 84\]
Enrich
My Dear Aunt Sally

You know to simplify expressions inside parentheses first, but what if there are no parentheses? Good mathematicians work from left to right, but they often think of "My Dear Aunt Sally" as a reminder.

Multiply and Divide before Adding or Subtracting.

Decide whether each of the following expressions has been simplified correctly. For those that are correct, mark a C. For those that are incorrect, write the correct answer.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Simplified</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $15 + 2 \times 10$</td>
<td>170</td>
<td>35</td>
</tr>
<tr>
<td>2. $20 \div 10 - 2$</td>
<td>0</td>
<td>C</td>
</tr>
<tr>
<td>3. $2 \times 1 \times 4 \times 3$</td>
<td>24</td>
<td>C</td>
</tr>
<tr>
<td>4. $4 + (6 \times 8) \div 2$</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>5. $24 \div 3 + 1$</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>6. $36 \div 6 \times 2$</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

Write out each equation in words. The first problem has been done for you.

1. $2 \times v = 18$ 2 times what number equals 18?
2. $x \times 7 = 42$ What number times 7 equals 42?
3. $8 \times p = 64$ 8 times what number equals 64?
4. $9 \times y = 63$ 9 times what number equals 63?
5. $g \div 6 = 9$ What number divided by 6 equals 9?
6. $35 \div f = 7$ 35 divided by what number equals 7?
7. $45 \div h = 9$ What number divided by 12 equals 8?
8. $s \div 12 = 8$ What number divided by 12 equals 8?

Write the missing number.

9. $\underline{6} \times 8 = 48$
10. $60 \div \underline{5} = 12$
11. $\underline{9} \times 6 = 54$
12. $5 \times \underline{3} = 15$
13. $\underline{50} \div 5 = 10$
14. $77 \div \underline{7} = 11$
15. $\underline{9} \times 3 = 27$
16. $2 \times \underline{11} = 22$
17. $81 \div \underline{9} = 9$
Skills Practice
Solve Equations Mentally

Solve each equation mentally.

1. \(2 \times d = 8\) \[d = \frac{8}{2} = 4\]
2. \(b \times 7 = 42\) \[b = \frac{42}{7} = 6\]
3. \(5 \times c = 40\) \[c = \frac{40}{5} = 8\]
4. \(d \times 10 = 120\) \[d = \frac{120}{10} = 12\]
5. \(9 \times e = 99\) \[e = \frac{99}{9} = 11\]
6. \(f \times 4 = 36\) \[f = \frac{36}{4} = 9\]
7. \(8 \div g = 4\) \[g = \frac{8}{4} = 2\]
8. \(42 \div h = 6\) \[h = \frac{42}{6} = 7\]
9. \(56 \div i = 7\) \[i = \frac{56}{7} = 8\]
10. \(j \div 12 = 8\) \[j = 8 \times 12 = 96\]
11. \(24 \div k = 2\) \[k = \frac{24}{2} = 12\]
12. \(72 \div l = 8\) \[l = \frac{72}{8} = 9\]

Write an equation for each situation. Then solve.

13. A number multiplied by 6 is 48. What is the number?
\[n \times 6 = 48\]
\[n = \frac{48}{6} = 8\]

14. 3 times a number is 21. What is the number?
\[3 \times n = 21\]
\[n = \frac{21}{3} = 7\]

15. A number divided by 5 equals 8. What is the number?
\[n \div 5 = 8\]
\[n = 8 \times 5 = 40\]

16. 64 divided by a number equals 8. What is the number?
\[64 \div n = 8\]
\[n = \frac{64}{8} = 8\]

17. The product of a number and 4 is 48. What is the number?
\[n \times 4 = 48\]
\[n = \frac{48}{4} = 12\]

18. 120 divided by a number equals 10. What is the number?
\[120 \div n = 10\]
\[n = \frac{120}{10} = 12\]

19. Kelly and her family rode bikes for \(x\) hours yesterday. They rode 36 miles at a speed of 12 miles per hour. Write and solve an equation to find how many hours they rode yesterday.
\[36 \div x = 12\]
\[x = \frac{36}{12} = 3\]

20. Each of Caleb’s \(y\) friends brings 8 snacks to his house. They have 32 snacks. Write and solve an equation to find out how many friends came to Caleb’s house.
\[y \times 8 = 32\]
\[y = \frac{32}{8} = 4\]

Homework Practice
Solve Equations Mentally

Solve each equation mentally.

1. \(5 \times q = 45\) \[q = \frac{45}{5} = 9\]
2. \(h \times 4 = 32\) \[h = \frac{32}{4} = 8\]
3. \(6 \times u = 36\) \[u = \frac{36}{6} = 6\]
4. \(5 \times r = 60\) \[r = \frac{60}{5} = 12\]
5. \(11 \times c = 77\) \[c = \frac{77}{11} = 7\]
6. \(56 \div j = 8\) \[j = \frac{56}{8} = 7\]
7. \(y \div 8 = 9\) \[y = 9 \times 8 = 72\]
8. \(k \div 7 = 5\) \[k = 5 \times 7 = 35\]
9. \(27 \div d = 9\) \[d = \frac{27}{9} = 3\]

Write an equation for each situation. Then solve.

10. A number multiplied by 9 equals 36. What is the number?
\[n \times 9 = 36\]
\[n = \frac{36}{9} = 4\]

11. 8 times a number equals 48. What is the number?
\[8 \times n = 48\]
\[n = \frac{48}{8} = 6\]

12. A number divided by 7 equals 4. What is the number?
\[n \div 7 = 4\]
\[n = 4 \times 7 = 28\]

13. 132 divided by a number equals 11. What is the number?
\[132 \div n = 11\]
\[n = \frac{132}{11} = 12\]

14. Devin has saved twice as much money as Gabrielle. Devin has saved $20. Write and solve a multiplication equation to find how much Gabrielle has saved.
\[g \times 2 = 20\]
\[g = \frac{20}{2} = 10\]

15. Mark takes 4 times as long to get to school as Alicia. Mark takes 28 minutes to get to school. Write and solve an equation to find how long it takes Alicia to get to school.
\[a \times 4 = 28\]
\[a = \frac{28}{4} = 7\] minutes

Spiral Review
Find the value of each expression. (Lesson 6-3)

16. \((4 + 3) \times 6\) \[42\]
17. \((12 - 8) \div 2\) \[2\]
18. \((7 \times 3) - (23 - 7)\) \[5\]
19. \(5 \times 2 - 6\) \[4\]
20. \(7 - 18 \div 3\) \[1\]
21. \(16 \div 4 + 7 - 2\) \[9\]
22. Miguel found T-shirts for $6 each. His mother bought him 5 shirts. Then she used a coupon for $7 off the total price. Write an expression and solve it to find how much the 5 T-shirts cost.
\[(5 \times 6) - 7\]
\[= 30 - 7\]
\[= 23\]
Write an equation for each situation. Then solve.

1. Mrs. Jones needs to say how many people, including chaperones, will be on the school trip. Each of the 4 fourth-grade classrooms is sending 11 students. The school is sending 5 chaperones. Write and solve an equation to find how many total people are going on the school trip. 
\[5 + (11 \times 4) = t; \]
**49 people**

2. Nathan went hiking for 2 hours with his older brother. He covered \(n\) miles at a speed of 4 miles each hour. Write and solve an equation to find how many miles Nathan hiked. 
\[n \div 2 = 4; \]
**8 miles**

3. Tiffany can hold her breath 5 times longer than Marcus can. Tiffany held her breath for 60 seconds. Write and solve an equation to find how long Marcus held his breath. 
\[m \times 5 = 60; \]
**12 seconds**

4. Four friends went apple picking. Each friend picked the same number of apples. The whole group picked a total of 44 apples. Write and solve an equation to find how many apples each friend picked. 
\[4 \times f = 44; \]
**11 apples**

5. Ricardo has 5 times as many perfect papers in math as Sean does. Sean has 7 perfect papers. Write and solve an equation to find how many perfect papers Ricardo has. 
\[r \div 5 = 7; \]
**35 perfect papers**

6. Cheyenne baked 48 cookies. It is enough for a number of friends to have 4 cookies each. Write and solve an equation to find how many friends can have cookies. 
\[48 \div f = 4; \]
**12 friends**

---

**Enrich**

Odd Circles

Each circle has a specific value. The products of their values appear where two or more circles overlap. Find the value of each circle.

<table>
<thead>
<tr>
<th>Circle</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
</tr>
<tr>
<td>D</td>
<td>9</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
</tr>
</tbody>
</table>
**Choose a Strategy**

Fernando picked 18 apples to make applesauce. It will take 9 apples for each batch of sauce. How many batches of sauce can Fernando make?

**Step 1. Understand**

Be sure you understand the problem.

What do you know?
- Fernando picked 18 apples.
- It will take 9 apples to make a batch of applesauce.

What do you need to find?
- You need to find how many batches of applesauce Fernando can make.

**Step 2. Plan**

Make a plan.

Choose a strategy.

To find the answer, you can draw a picture.

Draw a picture of 18 apples. Circle groups of 9 apples to see how many batches Fernando can make.

**Step 3. Solve**

Carry out your plan.

You know that you need to find out how many batches of applesauce Fernando can make with 18 apples.

Draw 18 circles to represent the apples. Circle groups of 9.

OR: You can also write a division equation.

Fernando has 18 apples. He will use 9 apples in each batch.

Write a division equation. \(18 \div 9 = 2\)

Camille uses 20 cones.

**Step 4. Check**

Is the solution reasonable?

Reread the problem.

Does your answer make sense? Yes No

Which method do you prefer? Explain. Answers may vary.

**Practice**

1. Stanley has 25 marbles, and he wants to share them with 5 friends. If each friend gets the same number of marbles, how many will each friend get?

   **5 marbles**

2. Robin spent 15 minutes reading on Monday. She spent 25 minutes reading on Tuesday and 35 minutes on Wednesday. If the pattern continues, how many minutes will she read on Friday?

   **55 minutes**
Skills Practice

Problem-Solving Investigation

Choose a strategy. Use it to solve the problem.

1. Laura went to the playground with 7 friends. Three of them left early and one got hurt. How many are left to play with Laura?
   3 friends

2. There are 10 puppies at the puppy daycare. The puppies are fed 3 times a day. If they are given 1 cup of food each time, how much food will the puppy daycare use in one day?
   30 cups of food

3. There are 25 students going to a volleyball tournament. Each van carries 10 students. How many vans are needed?
   3 vans

4. Mr. Smith has 36 golf balls. He puts 18 golf balls in a large display case. Mr. Smith has 3 smaller display cases. If he puts the same number of golf balls in each of the smaller display cases, how many golf balls will be in each case?
   6 golf balls

Tell what strategy you used to solve the problem.

5. Caroline swims for 1 hour each day after school and 3 hours each day on the weekend. How many hours does Caroline swim in 2 weeks?
   22 hours
   Sample answer: Make a table

6. Jonathan has 4 snakes in an aquarium. The second snake is twice as long as the first. The third snake is 2 inches shorter than the second and the fourth snake is 5 inches longer than the third. The first snake is 6 inches long. How long is the longest snake? Which snake is it?
   15 inches; fourth snake
   Sample answer: work backward

Homework Practice

Problem-Solving Investigation

Use any strategy below to solve. Tell what strategy you used.

Problem-Solving Strategies

- Make a table
- Choose an operation
- Work backward

1. Christina and her 3 friends want to play mini golf. It costs $4 per person per round of golf. The friends all play 3 rounds of golf. How much change will the friends get back if they pay with $50?
   Strategy: sample answer: choose an operation

2. A playground has three times as many swings as monkey bars. There are 4 more monkey bars than slides. There are 3 slides at the playground. How many swings are at the playground?
   21 swings
   Strategy: sample answer: work backwards

3. Carlos gets to choose the family dinner 3 times for every week that he completes his homework each night. There are 4 weeks each month and 9 months in the school year. How many times could Carlos get to choose the dinner?
   108 times
   Strategy: sample answer: make a table

Spiral Review

Solve each equation mentally. (Lesson 6-4)

4. \(6 \times q = 48\)
   \(q = 8\)

5. \(h \times 3 = 27\)
   \(h = 9\)

6. \(7 \times u = 42\)
   \(u = 6\)

7. \(6 \times r = 72\)
   \(r = 12\)

8. \(11 \times c = 77\)
   \(c = 7\)

9. \(56 \div j = 8\)
   \(j = 7\)

10. \(y \div 9 = 9\)
    \(y = 81\)

11. \(k \div 4 = 8\)
    \(k = 32\)

12. \(24 \div d = 8\)
    \(d = 3\)
The number cube below has faces labeled 0 through 5. How many different products can you make by multiplying any two numbers on this number cube?

There are 11 different products: 0, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20

To find the answer, make an organized list or table in the space below.

Question 1: _____________________________________________________________________

Question 2: _____________________________________________________________________

Sample question: How many different sums can you make by adding any two numbers on this number cube? How many of these sums are even numbers?

The number cube below has faces labeled 5 through 10. Create two questions for a classmate that uses the number cube. Try to challenge your classmate!

Question 1: _____________________________________________________________________

Question 2: _____________________________________________________________________

Sometimes in math there is a pattern to the answers. Once you find the pattern, you can make a rule that will solve the problem for any input.

Use this problem to learn more about finding a pattern and making a rule.

No matter how many hats Vanessa has, Holly always has 4 times as many.

This problem tells you the rule: Vanessa's hats × 4 = Holly's hats. If Vanessa has 5 hats, how many hats does Holly have? Holly will have 5 × 4, or 20 hats.

Now see the same problem written a different way.

Rule: \( 4v = h \)

1. Identify the pattern: \( 3 \times \_ = 12 \) \( 5 \times \_ = 20 \)

   The pattern is to multiply each number by 4.

2. Identify the rule and write it as an equation.

   \( v \times 4 = h \)

   So the next numbers in the table are 28 and 36.

3. Write an equation that describes the pattern. Then use the equation to find the next two numbers.

4. Write an equation that describes the pattern. Then use the equation to find the next two numbers.
Skills Practice  
Algebra: Find a Rule

Write an equation that describes the pattern. Then use the equation to find the next two numbers.

1. Rule: \( f = g \)
   - Input (f): 3, 4, 5, 6, 7
   - Output (g): 18, 24, 30, 36, 42

2. Rule: \( h = i \)
   - Input (h): 5, 6, 7, 8, 9
   - Output (i): 40, 48, 56, 64, 72

3. Rule: \( q ÷ 9 = a \)
   - Input (q): 27, 36, 45, 54, 63
   - Output (a): 3, 4, 5, 6, 7

4. Rule: \( t ÷ 7 = u \)
   - Input (t): 7, 14, 21, 28, 35
   - Output (u): 1, 2, 3, 4, 5

5. My class has to form teams of five. Make a table to find how many teams we can make if there are 15, 20, 25, and 30 of us.
   - 3, 4, 5, and 6 teams

Homework Practice  
Algebra: Find a Rule

Write an equation that describes the pattern. Then use the equation to find the next three numbers.

1. Rule: \( y = 2 \times w \)
   - Input (y): 8, 12, 16
   - Output (w): 4, 6, 8

2. Rule: \( 3y = v \)
   - Input (x): 5, 6, 7, 8, 9
   - Output (v): 15, 18, 21, 24, 27

3. Shannon found out there are four yellow pencils for every one blue pencil. Make a table to find how many yellow pencils there would be if she found 4, 6, 8, 10, and 12 blue pencils.
   - Blue Pencils: 4, 6, 8, 10, 12
   - Yellow Pencils: 16, 24, 32, 40, 48

4. In Alexa’s neighborhood, there are 3 times as many dogs as birds. There are 5 more cats than birds. There are 24 cats. How many dogs are there? 57 dogs
   - Strategy: work backwards
Jorge and his dad make sandwiches for a party. The table shows grilled cheese and turkey sandwiches.

1. Write an equation that describes the relationship between grilled cheese and turkey sandwiches. $c \div 4 = t$

2. How many turkey sandwiches will Jorge make if he is making 28 grilled cheese sandwiches? 7

Chloe is helping plan the class field trip. Her teacher asked her to figure out how many students can come. The table shows the students and chaperones for the field trip.

3. Write an equation that describes the relationship between chaperones and students. $c \times 6 = s$

4. How many students can come if 9 chaperones go on the field trip? 54 students

5. How many people in all will go if 66 students go on the trip? 77 people
Reteach
Balanced Equations

Equations are balanced when both sides are equal (=). They are not balanced when the two sides are not equal (≠).

Think about holding a T-shirt in one hand and something heavier, like a pair of boots, in the other hand. You can tell that they are not the same weight.

T-shirt ≠ boots

If the two sides have the same totals, they are equal. They are equal even if the numbers on each side are different:

2 × 8 = 4 × 4
(16) = (16)

Sometimes you have to figure out what number to add or subtract from one side to make the two sides equal, or balanced.

(1 + 2) × _ = 5 × 6

First, simplify:
3 × _ = 30

You need to multiply 3 by 10 to balance the equation.

(1 + 2) × 10 = 5 × 6

Write = or ≠.

1. 1 + 5 __ 5 + 1
2. 5 × 3 __ 10 + 5
3. 5 + 2 × 4 __ 28
4. 18 ÷ 6 __ 18 ÷ 3

Explain what you need to do to balance each equation. The first problem has been done for you.

5. 4 × (5 + 6) = 6 × __
   Multiply the right side by 6.

6. __ + 3 = 5 × 2
   Add 7 to the left side.

7. (6 + 2) × 8 = 4 × 2 × __
   Multiply the right side by 8.

Skills Practice
Balanced Equations

Complete each equation to make it balanced.

1. 2 × (9 - 6) = (8 - 6) × __
2. 72 ÷ (4 + 5) = 9 - 1
3. 15 - 4 × __ = 27 ÷ 9
4. 4 + 6 × 3 = __ - 3 × 4
5. Colin walks 4 miles 3 days each week. Ana walks 12 miles each week for 5 weeks. How many weeks does Colin walk in order to go the same distance as Ana? __ weeks
6. Ann earns $10 per hour delivering newspapers. Dominique earns $8 per hour delivering newspapers. Ann delivered newspapers for 4 hours. Use the equation $10 × 4 = $8 × h to find how many hours Dominique must deliver papers to earn the same amount of money. __ hours

Tell whether each equation is balanced. Explain.

7. 8 × 6 = 2 × 4 × 6
   yes; 48 = 48
8. 3 × 10 ÷ 5 = 28 ÷ 4
   no; 6 ≠ 7 c
9. 3 × 6 ÷ 2 = 2 × 9 ÷ 2
   yes; 9 = 9
10. 3 × 3 ÷ 3 = 2 × 6 ÷ 2
    yes; 27 ≠ 24
11. 10 ÷ 4 = 5 ÷ 2 × 2
    yes; 40 = 40
12. 20 ÷ 4 = 5 ÷ 2 × 2
    no; 20 ≠ 24
13. 36 ÷ 3 = (12 × 3) ÷ 3
    yes; 12 = 12
14. 24 ÷ 7 = 8 ÷ 7
    no; 7 ≠ 6
Homework Practice
Balanced Equations

Tell whether each equation is balanced. Explain.
1. \(4 \times 4 = 2 \times 2 \times 4\) yes; \(16 = 16\)
2. \(4 \times 6 \div 8 = 8 \times 2 \div 8\) no; \(3 \neq 2\)
3. \(8 \times 3 \times 2 = 6 \times 4 \times 2\) yes; \(48 = 48\)
4. \(48 \div 4 = (8 \times 3) \div 2\) yes; \(12 = 12\)

Complete each equation to make it balanced.
5. \(4 \times (7 - 3) = \frac{8}{2}\)
6. \(12 \div (8 - 5) = (3 - 2) \times 4\)

7. Megan scores 5 baskets every quarter. Alexis scores 3 baskets every quarter. Megan played 6 quarters this week. Use the equation \(5 \times 6 = 3 \times q\) to find how many quarters Alexis must play to score the same number of baskets. 10 quarters

Spiral Review
Write a rule as an equation for the pattern in each table. Then find the next two numbers in each pattern. (Lesson 6-6)

8. Rule: \(a \div 3 = b\)

<table>
<thead>
<tr>
<th>Input (a)</th>
<th>Output (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>

9. Rule: \(4c = d\)

<table>
<thead>
<tr>
<th>Input (c)</th>
<th>Output (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>15</td>
<td>60</td>
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</tbody>
</table>

Problem-Solving Practice
Balanced Equations

Michael and Jessica are going shopping.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>$1</td>
</tr>
<tr>
<td>Milk</td>
<td>$3</td>
</tr>
<tr>
<td>Pizza</td>
<td>$6</td>
</tr>
<tr>
<td>Chicken Meal</td>
<td>$12</td>
</tr>
</tbody>
</table>

1. Jessica's bill is $35. How many milks did she buy?
   Chicken meal + Pizza + Milk + Apple
   \(\$12 + (2 \times \$6) + (m \times \$3) + (2 \times \$1)\) 3 milks

2. Michael's bill is $49. How many pizzas did he buy?
   Chicken meal + Pizza + Milk + Apple
   \((1 \times \$12) + (p \times \$6) + (5 \times \$3) + (4 \times \$1)\) 3 pizzas

3. Michael and Jessica want to spend the same amount of money. What can Jessica buy to equal Michael's bill? sample answer: 1 chicken, 2 apples

Hannah does certain activities at different speeds.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>jogging</td>
<td>5 mph</td>
</tr>
<tr>
<td>walking</td>
<td>3 mph</td>
</tr>
<tr>
<td>hiking</td>
<td>2 mph</td>
</tr>
<tr>
<td>bicycling</td>
<td>6 mph</td>
</tr>
</tbody>
</table>

4. If Hannah walks 1 hour one day and rides her bike 2 hours another day, did she travel the same distance? Explain.
   no; \(3 \text{ miles} \neq 12 \text{ miles}\)

5. Hannah jogged for 1 hour. On her way back, she walked and hiked. If Hannah walked for 1 hour, for how long did she hike? 1 hour
**Enrich**

**Both Sides**

For each problem below, look at the first equation. Then write what was done to both sides of the first equation in order to get to the next equation. Here is an example.

Start with: divide by 4

\[(4 \times n) = 24\]
\[n = 6\]

1. Start with: subtract 5
divide by 3

\[3p + 5 = 20\]
\[3p = 15\]
\[p = 5\]

2. Start with: add 1
divide by 10

\[79 = (10 \times s) - 1\]
\[80 = 10s\]
\[8 = s\]

3. Start with: divide by 2

\[2t = 24\]
\[t = 12\]

4. Start with: divide by 8

\[56 = 8r\]
\[7 = r\]

5. Start with: subtract 4
divide by 6

\[6q + 4 = 40\]
\[6q = 36\]
\[q = 6\]

**Vocabulary Test**

Using the word bank below, complete each sentence by writing the correct word or words in the blank.

- equation
- expression
- multiplication
- divide
- variable
- order of operations

1. order of operations are rules that tell what order to follow in evaluating expressions.

2. A(n) equation is a mathematical sentence that contains an equals sign, =, indicating that the left side of the equal sign has the same value as the right side.

3. A letter or symbol used to represent an unknown quantity. variable

4. A combination of numbers, variables, and operation symbols that represents a mathematical quantity. expression

5. To separate into equal groups. divide

6. An operation on two numbers to find their product. It can be thought of as repeated addition. multiplication
Oral Assessment

Place 8 blue paper clips, 9 red paper clips, a paper cut out of the letter "X", a paper cut out of a minus sign, a paper cut out of a plus sign, and a paper cut out of an equals sign on the table. 8 blue paper clips will always be used. "X" will represent the number of red paper clips used. Use the materials to formulate the equations below.

Read each question aloud to the student. Then write the student's answers on the lines below the question.

1. How many blue paper clips are there?
   **8 blue paper clips**

2. What is $20 + x$ if $x = 5$?
   **25**

3. What is $14 + x$ if $x = 8$?
   **22**

4. Tell how you got your answer.
   **$14 + 8 = 22$**

5. What would $2 + x$ equal if $x = 3$?
   **5**

6. Tell how you got your answer.
   **$2 + 3 = 5$**

7. What is the expression for the total height of $b$ male bears?
   **$9b$**

8. What is the total height of $b$ male bears if $b = 4$?
   **$3b$**

9. Tell how you got your answer.
   **$9 \times 4 = 36$**

10. What is the expression for the total length of $c$ front claws?
    **$9c = 36$**

11. What is the expression for the total length of $c$ front claws if $c = 2$?
    **$6 \times 2; \ 12 \text{ inches}$**

12. Tell how you got your answer.
    **multiplied 6 by 2**

### Facts About Polar Bears

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum running speed</td>
<td>30 mph</td>
</tr>
<tr>
<td>Maximum height of males</td>
<td>9 feet</td>
</tr>
<tr>
<td>Maximum weight</td>
<td>1,600 pounds</td>
</tr>
<tr>
<td>Length of front claws</td>
<td>almost 6 inches</td>
</tr>
</tbody>
</table>
Chapter 6 Assessment Answer Key

Diagnostic Test
Page 44

1. 16
2. 9
3. 13
4. 16
5. 6
6. 6

7. 7

6 - x = 2; 4 packs of gum

8. 15 + n = 27; 12 points

9. 5 × n
10. 2
11. 12
12. 6

13. 8
14. 6
15. 6
16. 17

Chapter Pretest
Page 45

1. n + 6
2. 13 × n
3. 35 ÷ n
4. 10 × n
5. 78 + n
6. 27 - n

7. 42
8. 2
9. 5
10. 2
11. 14
12. 7

13. 8
14. 6
15. 6
16. 17

Quiz 1
Page 46

1. 2
2. 12
3. 6
4. 24
5. 16

6. 5 × n
7. n × 9
8. (3 × 6) ÷ f; 2
9. 36 crayons
10. 17 stickers

(continued on the next page)
## Chapter 6 Assessment Answer Key

### Quiz 2

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>33</td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>12</td>
</tr>
<tr>
<td>6.</td>
<td>48</td>
</tr>
<tr>
<td>7.</td>
<td>(n \times 5 = 40); 8</td>
</tr>
<tr>
<td>8.</td>
<td>(84 \div n = 12); 7</td>
</tr>
<tr>
<td>9.</td>
<td>(12 \times s = 96) (8) staircases</td>
</tr>
<tr>
<td>10.</td>
<td>(5 \times a = 60); 12</td>
</tr>
</tbody>
</table>

### Quiz 3

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>(4f = g) (44, 52)</td>
</tr>
<tr>
<td>2.</td>
<td>(n \div 3 = o) (13, 16)</td>
</tr>
<tr>
<td>3.</td>
<td>yes; 40 = 40</td>
</tr>
<tr>
<td>4.</td>
<td>no; 60 ≠ 35</td>
</tr>
<tr>
<td>5.</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>96</td>
</tr>
<tr>
<td>7.</td>
<td>63</td>
</tr>
<tr>
<td>8.</td>
<td>65 minutes sample answer: work backward</td>
</tr>
<tr>
<td>9.</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>17</td>
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### Mid-Chapter Review

<table>
<thead>
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<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>1.</td>
<td>B</td>
</tr>
<tr>
<td>2.</td>
<td>F</td>
</tr>
<tr>
<td>3.</td>
<td>D</td>
</tr>
<tr>
<td>4.</td>
<td>12</td>
</tr>
<tr>
<td>5.</td>
<td>42</td>
</tr>
<tr>
<td>6.</td>
<td>(n \times 4 = 20); 5</td>
</tr>
<tr>
<td>7.</td>
<td>(42 \div n = 6); 7</td>
</tr>
<tr>
<td>8.</td>
<td>3</td>
</tr>
<tr>
<td>9.</td>
<td>5</td>
</tr>
<tr>
<td>10.</td>
<td>17</td>
</tr>
<tr>
<td>11.</td>
<td>30 students</td>
</tr>
<tr>
<td>Form 1 Page 55</td>
<td>Form 1 Page 56</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>3. B</td>
<td></td>
</tr>
<tr>
<td>4. H</td>
<td></td>
</tr>
<tr>
<td>5. C</td>
<td></td>
</tr>
<tr>
<td>6. F</td>
<td></td>
</tr>
<tr>
<td>7. B</td>
<td></td>
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<tr>
<td>8. J</td>
<td></td>
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<tr>
<td>10. G</td>
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(continued on the next page)
## Chapter 6 Assessment Answer Key

<table>
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<tr>
<th>Form 2A (continued)</th>
<th>Form 2B</th>
<th>Page 59</th>
<th>Page 60</th>
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<tbody>
<tr>
<td><strong>13.</strong> C</td>
<td>1.</td>
<td>A</td>
<td>13.</td>
</tr>
<tr>
<td><strong>14.</strong> J</td>
<td>2.</td>
<td>F</td>
<td>14.</td>
</tr>
<tr>
<td><strong>16.</strong> F</td>
<td>4.</td>
<td>H</td>
<td>16.</td>
</tr>
<tr>
<td><strong>17.</strong> B</td>
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<td>A</td>
<td>17.</td>
</tr>
<tr>
<td><strong>18.</strong> H</td>
<td>6.</td>
<td>F</td>
<td>18.</td>
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<tr>
<td><strong>19.</strong> C</td>
<td>7.</td>
<td>A</td>
<td>19.</td>
</tr>
<tr>
<td><strong>11.</strong> C</td>
<td>9.</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td><strong>12.</strong> H</td>
<td>10.</td>
<td>G</td>
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</tbody>
</table>
# Chapter 6 Assessment Answer Key

**Form 2C**  
*Page 61*

<p>| | |</p>
<table>
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<td>1.</td>
<td>24</td>
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<td>2.</td>
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<td>3.</td>
<td>18</td>
</tr>
<tr>
<td>4.</td>
<td>8</td>
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<td>5.</td>
<td>12</td>
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<td>36</td>
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<td>2</td>
</tr>
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<td>8.</td>
<td>6</td>
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<tr>
<td>9.</td>
<td>30</td>
</tr>
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<td>10.</td>
<td>12</td>
</tr>
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<td>11.</td>
<td>7</td>
</tr>
<tr>
<td>12.</td>
<td>50</td>
</tr>
<tr>
<td>13.</td>
<td>3</td>
</tr>
<tr>
<td>14.</td>
<td>6</td>
</tr>
<tr>
<td>15.</td>
<td>6 canoes</td>
</tr>
<tr>
<td>16.</td>
<td>5 CDs</td>
</tr>
</tbody>
</table>

**Form 2D**  
*Page 63*

<p>| | |</p>
<table>
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</thead>
<tbody>
<tr>
<td>1.</td>
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<td>2.</td>
<td>7</td>
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<tr>
<td>3.</td>
<td>6</td>
</tr>
<tr>
<td>4.</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>36</td>
</tr>
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<td>6.</td>
<td>30</td>
</tr>
<tr>
<td>7.</td>
<td>50</td>
</tr>
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<td>8.</td>
<td>6</td>
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<td>9.</td>
<td>7</td>
</tr>
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<td>10.</td>
<td>3</td>
</tr>
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<td>11.</td>
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<td>12.</td>
<td>8</td>
</tr>
<tr>
<td>13.</td>
<td>24</td>
</tr>
<tr>
<td>14.</td>
<td>18</td>
</tr>
<tr>
<td>15.</td>
<td>4 outlets</td>
</tr>
<tr>
<td>16.</td>
<td>9 players</td>
</tr>
</tbody>
</table>

(continued on the next page)
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1. | 8  | 2. | 18 | 3. | 22 | 4. | 6  | 5. | 50 | 6. | 6  | 7. | 36 | 8. | 13 | 9. | 30 | 10. | 6  |
| 11. | 9  | 12. | 7  | 13. | 4  | 14. | 8  | 15. | 4  | 16. | $15 | 17. | 120 | 18. | $15 | 19. | 5 CDs | 20. | 6 canoes |
## Chapter 6 Assessment Answer Key

**Page 67, Extended-Response Test**

**Scoring Rubric**

<table>
<thead>
<tr>
<th>Level</th>
<th>Specific Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The student demonstrates a <strong>thorough understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student has responded correctly to the task, used mathematically sound procedures, and provided clear and complete explanations and interpretations. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.</td>
</tr>
<tr>
<td>3</td>
<td>The student demonstrates an <strong>understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student’s response to the task is essentially correct with the mathematical procedures used and the explanations and interpretations provided demonstrating an essential but less than thorough understanding. The response may contain minor errors that reflect inattentive execution of the mathematical procedures or indications of some misunderstanding of the underlying mathematics concepts and/or procedures.</td>
</tr>
<tr>
<td>2</td>
<td>The student has demonstrated only a <strong>partial understanding</strong> of the mathematics concepts and/or procedures embodied in the task. Although the student may have used the correct approach to obtaining a solution or may have provided a correct solution, the student’s work lacks an essential understanding of the underlying mathematical concepts. The response contains errors related to misunderstanding important aspects of the task, misuse of mathematical procedures, or faulty interpretations of results.</td>
</tr>
<tr>
<td>1</td>
<td>The student has demonstrated a <strong>very limited understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student’s response to the task is incomplete and exhibits many flaws. Although the student has addressed some of the conditions of the task, the student reached an inadequate conclusion and/or provided reasoning that was faulty or incomplete. The response exhibits many errors or may be incomplete.</td>
</tr>
<tr>
<td>0</td>
<td>The student has provided a <strong>completely incorrect</strong> solution or uninterpretable response, or no response at all.</td>
</tr>
</tbody>
</table>
Chapter 6 Assessment Answer Key

Page 67, Extended-Response Test

Sample Answers

In addition to the scoring rubric found on page A27, the following sample answers may be used as guidance in evaluating open-ended assessment items.

1. $3 \times (18 \div x)$
   
   $3 \times (18 \div 3)$

   $3 \times 6$

   18

2. $(40 \div 5) - y$, If $y = 2$, Jane’s sister’s age is 6.
   
   a. If $y = 4$, Jane’s sister’s age is 4.

   b. If $y = 1$, Jane’s sister’s age is 7.

3. Answer will vary. Example Answer: The order of operations tells you which order to do things in a problem. The first thing you should do is complete the operations in parentheses. Second, you should multiply and divide from left to right. Third, you should add and subtract from left to right.

4. Answer will vary. Example Answer: For $5 \times (5 + 4)$, the order of operations tells me to add $5 + 4$ first since it is in parentheses. I find that the sum of $5 + 4$ is 9. Then I multiply $5 \times 9$ to get 45. So, the value of $5 \times (5 + 4)$ is 45.
Chapter 6 Assessment Answer Key

STP
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1. B

2. F

9. D

3. B

10. J

11. 29

4. F

12. 3

13. y = 2x + 1

14. 12

15. 9 pages

6. G

7. C

8. G

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