

Unit 1 Lesson 9: Missing Numbers in Addition, Subtraction, Multiplication, and Division

Student Objectives:

- Know and use the distributive property in equations and expressions with variables.
- Use a letter to represent an unknown number, writing and evaluating simple algebraic expressions in one variable by substitution.
- Work backwards (i.e., use inverse operations to solve problems).

Worldview Integration:

Continue to connect lessons to underlying worldview assumptions and/or biblical principles. Although not every lesson needs to contain *explicit* integrations of biblical worldview, every new unit should.

Materials:

Note that one or two class sessions may be devoted to creating/organizing unit materials, as significant portions of this process can be shared with students. *Preparation for teaching is itself a learning experience.*

- Flash Cards Sets A and B
- Fact Practice 5.1.9
- Worksheet 1.9A and 1.9B

Introduction:

A variable is used to take the place of a missing number. In addition the numbers that are added together are called addends. To find a missing addend, you can work backwards and subtract.

$$13 + w = 21 \quad \text{Think: } 21 - w = 13, \text{ so } w = 8$$

In subtraction you can work backwards and add to find a missing number. The missing number will either be the minuend or the subtrahend. The minuend is the number you begin with (the larger number), and the subtrahend is the amount subtracted from it (the smaller number).

$$28 - a = 14 \quad \text{Think: } 14 + a = 28, \text{ so } a = 14$$

In multiplication the numbers multiplied together are called factors. To solve a multiplication problem with a missing factor, you can work backwards and divide.

$$15 \cdot g = 75 \quad \text{Think: } 75 \div g = 15, \text{ so } g = 5$$

Division can be solved by using its inverse, multiplication. The number that is being divided is called the dividend, and the number doing the dividing is called the divisor.

$$99 \div s = 9 \quad \text{Think: } 9 \cdot s = 99, \text{ so } s = 11$$

Addition and subtraction are inverses; that is, they are opposites of each other. Multiplication and division are also inverses.

Key Vocabulary:

variable, addend, minuend, subtrahend, factor, divisor, dividend, inverses

Methods:

Readiness and Review

Fact Practice

1. Flash Cards Set B. Run through the flash cards by covering the answers. Have students give the quotient to each problem.

Elapsed Time

1. Sarah needs to take a practice test at home. She has to time herself for 90 minutes. If she wants to finish in time for dinner at 5:45 p.m., what is the latest time she should begin her test? (4:15 p.m.)
2. At 6:13 a.m. Paul woke and began preparing for his day. He got dressed, ate breakfast, and walked to school. If he arrived at school at 8:29 a.m., how much time did it take him to get ready and get to school? (2 hours 16 minutes)

Group Practice

1. Ask students to write down four math problems on a sheet of paper, one problem each of addition, subtraction, multiplication, and division. Next, have students completely erase one of the addends in the addition problem, erase either the minuend or subtrahend in the subtraction problem, one factor in the multiplication problem, and either the divisor or dividend in the division problem.
2. Substitute the missing number with a variable of their choice.
3. Exchange papers and have students solve all four problems.
4. Call on a few students to write one of their problems on the board.
5. Walk through each problem and ask students how to find the value of the variable, or missing number. Students should work backwards and use the inverse operation to solve.
6. Go back through Flash Cards Set B. Cover the dividend and have students give the value of the missing dividend. Repeat and cover the divisor.
7. Flash Cards Set A. Cover one of the factors as you go through the set of cards and have students give the value of the missing factor.

Guided Practice

1. Complete worksheet 1.9A. Circulate to check students' answers.
2. Have students exchange papers and check answers. They should circle any incorrect answers and write the number correct at the top of the page. When students receive their paper back, have them correct any problems they got incorrect.

Independent Practice

Worksheet 1.9B is homework.

Assessment:

Informal: Did students meet the lesson's objectives?

Student Reflection: How can you solve a problem to find a missing number? How does working backwards help?

Teacher Reflection: What went well in today's lesson? What did not? What changes should be made before teaching it again?

Helpful, though not strictly required:

Modifications:

Gifted students: Students create word problems using time and temperature. Each problem needs a missing number, designated by a variable. Have them include an answer key, also.

Special needs students: Provide choices for the value of the variables. For example: In the problem $4 + z = 11$, give three or four choices for students to test and choose from: $z = 3$, $z = 7$, $z = 8$. Students can test all three values of z to determine the correct answer.

Worksheet 1.9A Answers

Name _____ Date _____

Solve to find the value of the variable.

<p>1. $9 \cdot w = 72$ $9w = 72$ $w = 8$</p>	<p>2. $p \div 8 = 5$ $5 \cdot 8 = p$ $p = 40$</p>
<p>3. $15 + s = 47$ $47 - s = 15$ $s = 32$</p>	<p>4. $7 + c = 21$ $21 - c = 7$ $c = 14$</p>
<p>5. $6 \cdot g = 66$ $6g = 66$ $g = 11$</p>	<p>6. $k - 18 = 52$ $52 + 18 = k$ $k = 70$</p>
<p>7. $m + 23 = 102$ $102 - 23 = m$ $m = 79$</p>	<p>8. $40 \div y = 8$ $8 \cdot y = 40$ $y = 5$</p>
<p>9. $12 \cdot r = 96$ $12r = 96$ $r = 8$</p>	<p>10. $30 - e = 14$ $14 + e = 30$ $e = 16$</p>
<p>11. $56 \div h = 7$ $7 \cdot h = 56$ $h = 8$</p>	<p>12. $48 + a = 164$ $164 - a = 48$, or $164 - 48 = a$ $a = 116$</p>

Worksheet 1.9B Answers

Name _____ Date _____

Solve to find the value of the variable.

<p>1. $120 \div k = 15$ $15 \bullet k = 120$ $k = 8$</p>	<p>2. $b - 14 = 31$ $31 + 14 = b$ $b = 45$</p>
<p>3. $p + 8 = 27$ $27 - 8 = p$ $p = 19$</p>	<p>4. $z \div 4 = 48$ $48 \bullet 4 = z$ $z = 192$</p>
<p>5. $11 \bullet q = 66$ $11q = 66$ $q = 6$</p>	<p>6. $6 \bullet v = 42$ $6v = 42$ $v = 7$</p>
<p>7. $46 - a = 17$ $17 + a = 46$ $a = 29$</p>	<p>8. $14 + g = 30$ $30 - g = 14$ $g = 16$</p>
<p>9. $t \bullet 9 = 36$ $9t = 36$ $t = 4$</p>	<p>10. $57 - e = 29$ $29 + e = 57$ $e = 28$</p>
<p>11. $4 + h + 21 = 32$ $25 + h = 32$ $h = 7$</p>	<p>12. $j \div 12 = 8$ $8 \bullet 12 = j$ $j = 96$</p>

13. Abraham bought six bags of rice at the local market. In total, the bags weighed 18 kg. Use the variable 'r' to write an equation to find the weight of *each* bag of rice. Then solve the equation.

$$6 \bullet r = 18$$

$$6r = 18$$

$$r = 3 \text{ kg}$$

Find the product.

$$\begin{array}{r} 1. \quad 7 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 4 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 5 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 9 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 3 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 1 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 3 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 2 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 7 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 7 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 6 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 1 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 13. \quad 3 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 5 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 6 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 2 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad 3 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 3 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 19. \quad 5 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 20. \quad 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 21. \quad 5 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 22. \quad 4 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 23. \quad 6 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 24. \quad 2 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 25. \quad 2 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 26. \quad 6 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 27. \quad 7 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 28. \quad 7 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 29. \quad 5 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 30. \quad 4 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 31. \quad 7 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 32. \quad 2 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 33. \quad 4 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 34. \quad 8 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 35. \quad 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 36. \quad 4 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 37. \quad 2 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 38. \quad 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 39. \quad 3 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 40. \quad 8 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 41. \quad 2 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 42. \quad 4 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 43. \quad 7 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 44. \quad 9 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 45. \quad 4 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 46. \quad 5 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 47. \quad 8 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 48. \quad 5 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 49. \quad 6 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 50. \quad 9 \\ \times 5 \\ \hline \end{array}$$