Lesson 27: One-Step Equations—Multiplication and Division

Classwork

Example 1

Solve $3z = 9$ using tape diagrams and algebraically. Then, check your answer.

First, draw two tape diagrams, one to represent each side of the equation.

If 9 had to be split into three groups, how big would each group be?

Demonstrate the value of z using tape diagrams.

How can we demonstrate this algebraically?

How does this get us the value of z?

How can we check our answer?

Example 2

Solve $\frac{y}{4} = 2$ using tape diagrams and algebraically. Then, check your answer.

First, draw two tape diagrams, one to represent each side of the equation.

If the first tape diagram shows the size of $y \div 4$, how can we draw a tape diagram to represent y?

Draw this tape diagram.

What value does each $y \div 4$ section represent? How do you know?

How can you use a tape diagram to show the value of y?

How can we demonstrate this algebraically?

How does this help us find the value of y?

How can we check our answer?

Exercises

1. Use tape diagrams to solve the following problem: $3m = 21$.

2. Solve the following problem algebraically: $15 = \frac{n}{5}$.

3. Calculate the solution of the equation using the method of your choice: $4p = 36$.

4. Examine the tape diagram below, and write an equation it represents. Then, calculate the solution to the equation using the method of your choice.

70

q	q	q	q	q	q	q
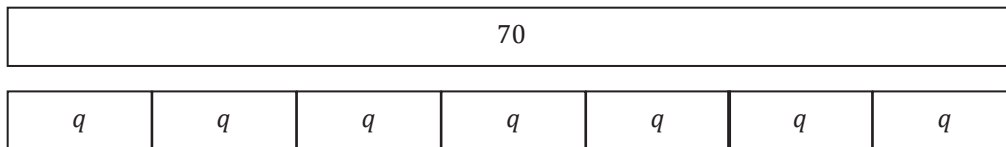
5. Write a multiplication equation that has a solution of 12. Use tape diagrams to prove that your equation has a solution of 12.

6. Write a division equation that has a solution of 12. Prove that your equation has a solution of 12 using algebraic methods.

Problem Set

1. Use tape diagrams to calculate the solution of $30 = 5w$. Then, check your answer.

2. Solve $12 = \frac{x}{4}$ algebraically. Then, check your answer.

3. Use tape diagrams to calculate the solution of $\frac{y}{5} = 15$. Then, check your answer.

4. Solve $18z = 72$ algebraically. Then, check your answer.

5. Write a division equation that has a solution of 8. Prove that your solution is correct by using tape diagrams.

6. Write a multiplication equation that has a solution of 8. Solve the equation algebraically to prove that your solution is correct.

7. When solving equations algebraically, Meghan and Meredith each got a different solution. Who is correct? Why did the other person not get the correct answer?

Meghan	Meredith
$\dfrac{y}{2} = 4$	$\dfrac{y}{2} = 4$
$\dfrac{y}{2} \cdot 2 = 4 \cdot 2$	$\dfrac{y}{2} \div 2 = 4 \div 2$
$y = 8$	$y = 2$