

Teacher Notes

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?

3

Demonstrate the value of z using tape diagrams.



How can we demonstrate this algebraically?

$$3z \div 3 = 9 \div 3$$

$$z = 3$$

How does this get us the value of z ?

The left side will equal z because we know the identity property, where $a \cdot b \div b = a$.

The right side of equation will be 3 because $9 \div 3 = 3$.

Therefore, the value of $z = 3$.

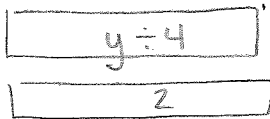
How can we check our answer?

$$\begin{aligned} \checkmark: 3(3) &= 9 \\ 9 &= 9 \end{aligned}$$

Example 2

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

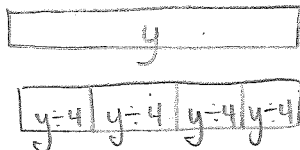
First, draw two tape diagrams, one to represent each side of the equation.



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

The tape diagram to represent y should be 4 sections of the size $y \div 4$.

Draw this tape diagram.



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

Each $y \div 4$ section represents a value of 2. We know this from our original tape diagram.

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

Draw 4 sections of 2 which will give y the value of 8.



How can we demonstrate this algebraically?

$$\frac{y}{4} \cdot 4 = 2 \cdot 4$$

How does this help us find the value of y ?

The left side of the equation will equal y , so the right side will equal 8.

Therefore, the value of y is 8.

How can we check our answer?

✓. Substitute 8 for y

$$\frac{y}{4} = 2$$

$$\frac{8}{4} = 2$$

$$2 = 2$$

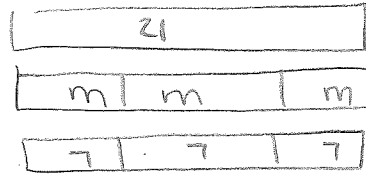
Exercises

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

$$3m = 21$$

$$3m \div 3 = 21 \div 3$$

$$m = 7$$



$$m = 7$$

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

$$15 = \frac{n}{5}$$

$$15 \cdot 5 = \frac{n}{5} \cdot 5$$

$$75 = n$$

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

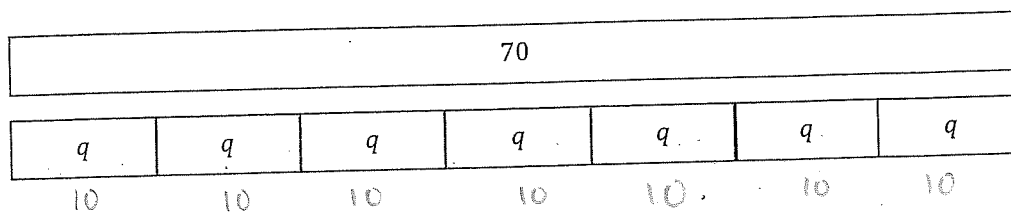
$$4p = 36$$

$$4p \div 4 = 36 \div 4$$

$$p = 9$$

Solve using a method...

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



$$7q = 70$$

$$7q \div 7 = 70 \div 7$$

$$q = 10$$

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

$$6x = 12$$

$$4x = 12$$

$$x = 2$$

$$3x = 12$$

$$2x = 12$$

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

$$\frac{1}{2}x = 12$$