



Lesson 13: Writing Division Expressions

Student Outcomes

- Students write numerical expressions in two forms, $\text{dividend} \div \text{divisor}$ and $\frac{\text{dividend}}{\text{divisor}}$, and note the relationship between the two.

Lesson Notes

This is day one of a two-day lesson.

Classwork

Discussion (8 minutes)

The discussion will serve as a chance for students to show what they know about division and what division looks like. The discussion should conclude with the overall idea that writing $a \div b$ as $\frac{a}{b}$ is a strategic format when working algebraically.

- How can we write or show 8 divided by 2? (You may allow students to explain or even draw examples for class to see).
 - Answers will vary. Students can draw models, arrays, use the division symbol, and some may even use a fraction.*
- When working with algebraic expressions, are any of these expressions or models more efficient than others?
 - Writing a fraction to show division is more efficient.*
- Is $\frac{8}{2}$ the same as $\frac{2}{8}$?
 - No, they are not the same. $\frac{8}{2} = 4$, while $\frac{2}{8} = \frac{1}{4}$.*
- How would we show a divided by b using a fraction?
 - $\frac{a}{b}$

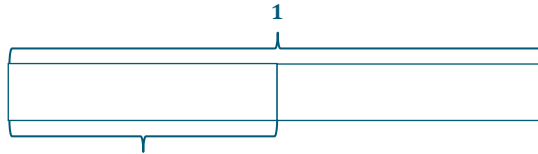
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Example 1 (5 minutes)

Example 1

Write an expression showing $1 \div 2$ without the use of the division symbol.

- Let's start by looking at a model of $1 \div 2$.
 - We can make a bar diagram.



What can we determine from the model?

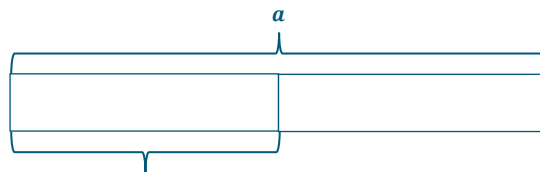
$1 \div 2$ is the same as $\frac{1}{2}$.

Example 2 (5 minutes)

Example 2

Write an expression showing $a \div 2$ without the use of the division symbol.

- Here we have a variable being divided by 2. Let's start by looking at a model of $a \div 2$.
 - We can make a bar diagram.



What can we determine from the model?

$a \div 2$ is the same as $\frac{a}{2}$.

When we write division expressions using the division symbol, we represent dividend $\div$ divisor.

How would this look when we write division expressions using a fraction?

dividend
divisor

Example 3 (8 minutes)

Example 3

- Write an expression showing $a \div b$ without the use of the division symbol.

- How can we use what we just learned in Examples 1 and 2 to help us with this example?

- *The dividend is the numerator, and the divisor is the denominator.*

$$\frac{a}{b}$$

- b. Write an expression for g divided by the quantity h plus 3.

- How would this look with the division symbol?

- $g \div (h + 3)$

- Now, let's rewrite this using a fraction.

$$\frac{g}{h + 3}$$

- c. Write an expression for the quotient of the quantity m reduced by 3 and 5.

- Let's start again by writing this using a division symbol first.

- $(m - 3) \div 5$

- Next, we will rewrite it using the fraction bar.

$$\frac{m - 3}{5}$$

Exercises (10 minutes)

Have students use a white board or small board to practice the following questions.

Exercises

Write each expression two ways: using the division symbol and as a fraction.

- a. 12 divided by 4.

$$12 \div 4 \text{ and } \frac{12}{4}$$

- b. 3 divided by 5.

$$3 \div 5 \text{ and } \frac{3}{5}$$

- c. a divided by 4.

$$a \div 4 \text{ and } \frac{a}{4}$$

- d. The quotient of 6 and m .

$$6 \div m \text{ and } \frac{6}{m}$$

- e. Seven divided by the quantity x plus y .

$$7 \div (x + y) \text{ and } \frac{7}{x + y}$$

- f. y divided by the quantity x minus 11.

$$y \div (x - 11) \text{ and } \frac{y}{x - 11}$$

- g. The sum of the quantity h and 3 divided by 4.

$$(h + 3) \div 4 \text{ and } \frac{h + 3}{4}$$

- h. The quotient of the quantity k minus 10 and m .

$$(k - 10) \div m \text{ and } \frac{k - 10}{m}$$

Closing (4 minutes)

- Explain to your neighbor how you would rewrite any division problem using a fraction.
 - *The dividend would become the numerator, and the divisor would become the denominator.*

Exit Ticket (5 minutes)

Name _____

Date _____

Lesson 13: Writing Division Expressions

Exit Ticket

Rewrite the expressions using the division symbol and as a fraction.

1. The quotient of m and 7.
2. Five divided by the sum of a and b .
3. The quotient of k decreased by 4 and 9.

Exit Ticket Sample Solutions

Rewrite the expressions using the division symbol and as a fraction.

1. The quotient of m and 7.

$$m \div 7 \text{ and } \frac{m}{7}$$

2. Five divided by the sum of a and b .

$$5 \div (a + b) \text{ and } \frac{5}{a+b}$$

3. The quotient of the quantity k decreased by 4 and 9.

$$(k - 4) \div 9 \text{ and } \frac{k-4}{9}$$

Problem Set Sample Solutions

1. Rewrite the expressions using the division symbol and as a fraction.

- a. Three divided by 4.

$$3 \div 4 \text{ and } \frac{3}{4}$$

- b. The quotient of m and 11.

$$m \div 11 \text{ and } \frac{m}{11}$$

- c. 4 divided by the sum of h and 7.

$$4 \div (h + 7) \text{ and } \frac{4}{h+7}$$

- d. The quantity x minus 3 divided by y .

$$(x - 3) \div y \text{ and } \frac{x-3}{y}$$

2. Draw a model to show that $x \div 3$ is the same as $\frac{x}{3}$.

