Lesson 13: Writing Division Expressions

Student Outcomes

- Students write numerical expressions in two forms, dividend ÷ 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.

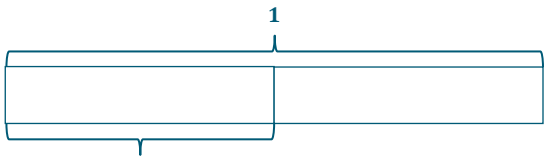
- How can we write or show 8 divided by 2? (You may allow students to explain or even draw examples for class to see).
  - *Answers will vary. Students can draw models, arrays, use the division symbol, and some may even use a fraction.*
- When working with algebraic expressions, are any of these expressions or models more efficient than others?
  - *Writing a fraction to show division is more efficient.*
- Is $\frac{8}{2}$ the same as $\frac{2}{8}$? MP.6
  - *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?
  - $\frac{a}{b}$

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* $\frac{1}{2}$.

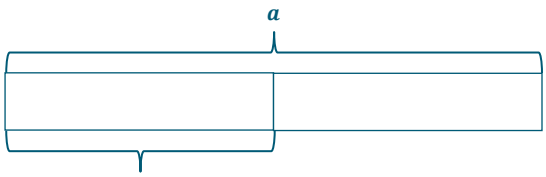
Example 2 (5 minutes)

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.*

MP.6



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 ÷ divisor.

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

$\frac{\text{dividend}}{\text{divisor}}$

Example 3 (8 minutes)

Example 3

a. **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.

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

b. 3 divided by 5.

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

c. a divided by 4.

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

d. The quotient of 6 and m.

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

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

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

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

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

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

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

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

$(k - 10) \div m$ *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.**

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

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

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

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

   $(k - 4) \div 9$ *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.**

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

   b. **The quotient of m and 11.**

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

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

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

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

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

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