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Lesson 13: Writing Division Expressions

Student Outcomes

* Students write numerical expressions in two forms, $dividend÷divisor$ and $\frac{dividend}{divisor}$, 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 $a÷b$ as $\frac{a}{b}$ is a strategic format when working algebraically.

MP.6

* 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?
	+ $\frac{a}{b}$

Example 1 (5 minutes)

Example 1

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

* Let’s start by looking at a model of $1÷2$.

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* + *We can make a bar diagram.*

$$1$$

What can we determine from the model?

$1÷2$ is the same as $\frac{1}{2}$.

Example 2 (5 minutes)

Example 2

Write an expression showing $a÷2$ 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 $a÷2$.
	+ *We can make a bar diagram.*

$$a$$

What can we determine from the model?

$a÷2$ 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?

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

Example 3 (8 minutes)

 **Example 3**

* 1. Write an expression showing $a÷b$ 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?

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

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

* 1. Write an expression for $g$ divided by the quantity $h $plus$ 3$.
* How would this look with the division symbol?
	+ $g÷(h+3)$
* Now, let’s rewrite this using a fraction.

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

* 1. 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.
	+ $(m-3)÷5$
* 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.

* 1. $12$ divided by $4$.

$12÷4$ and $\frac{12}{4}$

* 1. $3$ divided by $5$.

$3÷5$ ***and*** $\frac{3}{5}$

* 1. $a$ divided by $4$.

$a÷4$ ***and*** $\frac{a}{4}$

* 1. The quotient of $6$ and $m$.

$6 ÷ m$ and $\frac{6}{m}$

* 1. Seven divided by the quantity $x$ plus $y$.

$7÷(x+y)$ and $\frac{7}{x + y}$

* 1. $y$ divided by the quantity $x$ minus $11$.

$y÷\left(x-11\right)$ and $\frac{y}{x-11}$

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

$(h+3)÷4$ and $\frac{h+3}{4}$

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

$(k-10)÷m$ 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 $7$.

$m÷7$ and $\frac{m}{7}$

1. Five divided by the sum of $a$ and $b$.

$5÷(a+b)$ and $\frac{5}{a+b}$

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

$(k-4)÷9$ ***and*** $\frac{k-4}{9}$

Problem Set Sample Solutions

1. Rewrite the expressions using the division symbol and as a fraction.
	1. Three divided by $4$.

$3÷4$ and $\frac{3}{4}$

* 1. The quotient of $m$ and $11$.

$m÷11$ and $\frac{m}{11}$

* 1. $4$ divided by the sum of $h$ and $7$.

$4÷(h+7)$ and $\frac{4}{h+7} $

* 1. The quantity $x$ minus $3$ divided by $y$.

$(x-3)÷y$ and $\frac{x-3}{y}$

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

$$\frac{1}{3}x or \frac{x}{3}$$

$$x$$