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LESSON 26

MGSE5.NF.7c

Word Problems with Division and Fractions

PART 1 Introduction

You can use what you know about dividing with fractions to solve real-world problems. Think about what is being separated or divided. This will help you put the numbers used as the dividend and divisor in the correct order.

Sometimes you will divide a fraction by a whole number.

A bag of trail mix weighed $\frac{1}{2}$ pound. The trail mix was shared evenly by 5 friends. How much trail mix did each friend eat?

The trail mix was separated into 5 equal groups, so divide the weight of the trail mix by 5: $\frac{1}{2} \div 5$.

Multiply by the reciprocal of the divisor, 5, to find the total weight of trail mix each friend ate.

$$\frac{1}{2} \times \frac{1}{5} = \frac{1 \times 1}{2 \times 5} = \frac{1}{10}$$

The reciprocal is the number that multiplies another number for a product of 1.

Each friend ate $\frac{1}{10}$ pound of trail mix.

Sometimes you will divide a whole number by a fraction.

Laila bought 18 yards of ribbon and cut it into pieces that were $\frac{1}{3}$ yard long. How many pieces of ribbon did Laila have?

The 18 yards of ribbon were separated into smaller pieces measuring $\frac{1}{3}$ yard, so divide: $18 \div \frac{1}{3}$.

Multiply by the reciprocal of the divisor, $\frac{1}{3}$, to find the number of pieces of ribbon.

$$18 \times \frac{3}{1} = \frac{18 \times 3}{1} = \frac{54}{1}$$

A number divided by 1 is that number.

There were 54 total pieces of ribbon.

Think About It

Why is it important to have the numbers in the dividend and divisor in the correct place, unlike in multiplication?

_____

_____

PART 2 Focused Instruction

Always read word problems carefully. Think about what you already know and use that to help you find the solution.

➤ Jackie has $40 in quarters. How many quarters does Jackie have?

Is the $40 separated into quarters, or are the quarters separated into smaller units?

_____

Which number is the dividend? _____

What is the fraction value of a quarter, in lowest terms? _____

Which number is the divisor? _____

Write a division expression that can be used to find the number of quarters Jackie has. _____

What is the reciprocal of the divisor? _____

To find the reciprocal, switch the numerator and the denominator.

Write a multiplication expression that can be used to find the number of quarters Jackie has. _____

What is the product of the whole number and the numerator of the fraction? _____

What is the denominator? _____

A number divided by 1 is the number.

How many quarters does Jackie have? _____

➤ Micah is training his dog for a competition. He sets up cones along a sidewalk that is $\frac{1}{8}$ mile long. There are 12 cones that are evenly spaced along the sidewalk. How far apart are the cones from one another?

Is the sidewalk divided into smaller sections or are the cones separated into groups?

_____

What is the dividend of the problem? _____

What is the divisor of the problem? _____

Write a division expression that can be used to find how far apart the cones are from one another. _____

Write a whole number as a fraction by giving it a denominator of 1.

What is the reciprocal of the divisor? _____

Write a multiplication expression that can be used to find how far apart the cones are from one another. _____

What is the product of the numerators? _____

What is the product of the denominators? _____

How far apart are the cones from one another? _____

Use what you know about dividing with fractions to answer these questions.

1 Mrs. Kaplan's class painted $\frac{1}{5}$ of a school mural. There are 17 students in her class. How much of the mural did each student in her class paint on average?

_____

2 Lin had 30 books. How many days did it take her to read them if each day she read $\frac{1}{10}$ of a book?

_____

Solve the following problems.

1 A report is 35 pages long. There is a diagram every $\frac{1}{4}$ page.

The pages are divided into sections of $\frac{1}{4}$ page each.

Part A Write an expression that can be used to find the number of diagrams used in the report.

Answer _____

Part B What is the total number of diagrams used in the report?

Answer _____ diagrams

2 A large rainwater barrel contains 50 gallons of water. Each plant in a garden is given $\frac{1}{8}$ gallon of water. How many plants can be watered if the rain barrel is full? Show your work.

Divide the total amount of water into parts of $\frac{1}{8}$ gallon.

Answer _____ plants

3 Kaijo was preparing for a party. He made $\frac{1}{7}$ pound of seasoning to use on the grilled chicken. He seasoned 16 chicken legs with an equal amount of seasoning. How much seasoning did Kaijo use on each chicken leg?

Is the seasoning being divided or are the chicken legs being divided?

Answer _____ pound

Solve the following problems.

1 Mr. Miner's art classes did yarn art. Each student began with a piece of yarn. Mr. Miner had a spool of yarn with $\frac{1}{20}$ mile of yarn. He gave each of his 66 students an equal length of yarn.

Part A What is the length of yarn that each student received? Show your work.

Answer _____ mile

Part B One student cut her piece of yarn into 3 pieces of equal length. What was the length of each piece of yarn? Explain how you found your answer.

_____

_____

_____

2 Lenore is performing a violin solo at a concert in a week. She set a goal to practice her song for at least 15 hours before her performance. The song she will play is $\frac{1}{5}$ hour long. Which equations show how many times Lenore will play the song in her 15 hours of practice time? Select the **two** correct answers.

A $\frac{1}{5} + 15 = \frac{1}{75}$

B $\frac{1}{5} \times \frac{15}{1} = \frac{15}{5}$

C $15 \div \frac{1}{5} = 75$

D $15 \times \frac{5}{1} = 75$

E $\frac{1}{5} \times \frac{1}{15} = \frac{1}{75}$

F $15 \times \frac{5}{1} = \frac{75}{15}$

3 Complete the equation that describes each situation.

Situation	Equation
3 feet of fabric cut into $\frac{1}{6}$-foot strips	$3 \div \frac{1}{6} = 3 \times \frac{\square}{\square}$
10 lasagnas served in pieces that are $\frac{1}{9}$ of a pan	$\square \div \frac{\square}{\square} = \square \times \square$
$\frac{1}{11}$ of a packet of construction paper split among 22 students	$\frac{1}{11} \div \square = \frac{\square}{\square} \times \frac{\square}{\square}$

4 A banana bread recipe calls for the ingredients shown for 1 small loaf.

Banana Bread

$\frac{1}{4}$ c butter	$\frac{3}{4}$ c flour
$\frac{1}{2}$ c sugar	$\frac{1}{4}$ tsp baking soda
1 egg	$\frac{1}{8}$ tsp salt
2 bananas	$\frac{1}{4}$ tsp vanilla

Part A If the recipe were split into 4 mini loaf pans, how much butter and sugar would be used in each pan? Show your work.

Butter _____ cup

Sugar _____ cup

Part B Would there be more baking soda or salt in each pan? Explain how you know.

_____

_____

_____

_____