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Lesson 18 Word Problems with Fractions

Focus Lesson

To solve word problems with fractions, determine which operation is needed to answer the problem.

Multiplication of fractions is used:

- to find the area of rectangles and
- to find what fraction of one amount is equal to another amount.

Division of fractions is used:

- to find a dimension of a rectangle when the area and another dimension are known and
- to find fractional amounts that are shared equally among groups.

When dividing fractions, the order the numbers are divided makes a difference. A fraction divided by a whole number does not give the same quotient as the whole number divided by the fraction.

Ian has $\frac{1}{2}$ liter of a fruit smoothie in a container. He pours an equal amount of the entire fruit smoothie into 3 glasses. What part of the liter of fruit smoothie is in each glass? Write your answer as a fraction.

$\frac{\square}{\square}$ liter

1 What operation is used to find the part of the liter of fruit smoothie that is in each glass?

_____

2 Explain how you know. _____

_____

3 Write an expression that can be used to find the part of the liter of fruit smoothie that is in each glass. _____

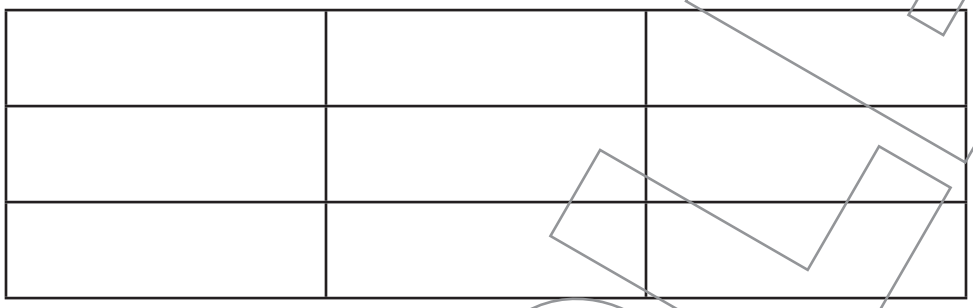
4 Write the whole number in your expression in step 3 as a fraction. _____

What part of the liter of fruit smoothie is in each glass?

Guided Practice

In a survey, $\frac{1}{3}$ of the responders said they read before going to bed the night before. Of those that read, $\frac{2}{3}$ said they read a nonfiction book.

The model shown below represents the total number of responders surveyed.



Use the model to show this situation. Label the part of the model that shows what fraction of the total responders surveyed read a nonfiction book before going to bed the night before.

1 Write an expression to represent the fraction of the total responders surveyed that read a nonfiction book before going to bed the night before. _____

What operation is used to combine the given fractions? 1 1 1 1 1 1

2 How many boxes in the grid represent $\frac{1}{3}$ of the model?

_____

Shade $\frac{1}{3}$ of the model to represent the responders who said they read before going to bed. 2 2 2 2 2 2

3 If boxes in the model are shaded for each fraction, in how many boxes would the shading overlap? _____

How many total boxes are in the model? _____

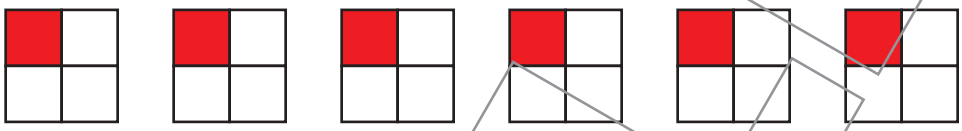
Think of one fraction as rows in the model and the other as columns. 3 3 3 3 3 3

Use the model to show the situation described in this problem.

Solve the following problems.

1 Saul has 6 essay questions to answer. He has at most $\frac{1}{4}$ hour to answer each essay question.

The model shown below can be used to determine the greatest number of hours Saul has to answer all 6 essay questions.



What is the greatest number of hours Saul has to answer all 6 essay questions?

_____ hour(s)

2 A bag of dog food contains 12 pounds of food. Reba's dog eats $\frac{1}{4}$ pound of this food each day. How many days can Reba feed her dog this food?

_____ days

3 The length of a rectangular rug is $2\frac{2}{3}$ yards. The width of the rug is $\frac{2}{3}$ yard.

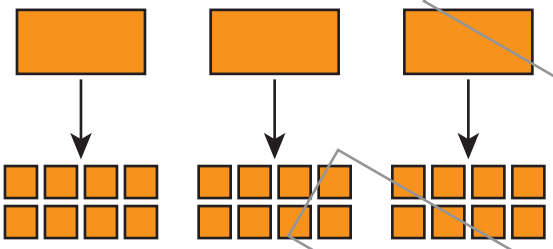
Circle an option in each set to make the following statement true.

The area of the rug is [$1\frac{7}{9}$, 2, $2\frac{4}{9}$, $3\frac{1}{3}$, 4] square yards because this is the

[sum, difference, product, quotient] of $2\frac{2}{3}$ and $\frac{2}{3}$.

4 A baker has 3 bags of flour to make bread. Each loaf of bread uses $\frac{1}{8}$ bag of flour.

This model shows the greatest number of loaves of bread that can be made with all 3 bags of flour.



Based on this model, write a number sentence that shows the greatest number of loaves of bread that can be made with all 3 bags of flour.

_____

5 Two-fifths of the students in the school orchestra are in the fifth grade. Of these students, $\frac{1}{2}$ of them play a string instrument. Which of the following equations shows the fraction of students in the entire school orchestra that are fifth graders who play a string instrument? Select all that apply.

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

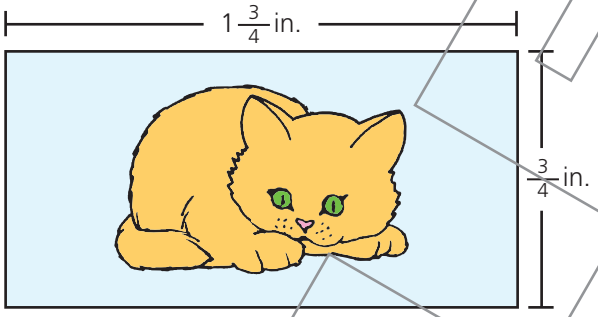
B $\frac{1}{2} \div \frac{2}{5} = \frac{5}{4}$

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

D $\frac{2}{5} \div \frac{1}{2} = \frac{4}{5}$

E $\frac{2}{5} \times \frac{2}{1} = \frac{4}{5}$

6 The figure below shows the dimensions of a rectangular sticker.



Circle an option in each set to make the following statement true.

The area, in square inches, of the sticker is shown by the equation

$1\frac{3}{4}$ [+, ×, ÷] $\frac{3}{4}$ = [$\frac{5}{2}$, $\frac{10}{4}$, $\frac{13}{3}$, $\frac{21}{16}$, $\frac{25}{16}$].

7 Danielle had $\frac{1}{6}$ of a spool of ribbon. She wrapped 3 gifts using all this ribbon. Each gift used the same amount of ribbon. Which **two** of the following equations show the fraction of the entire spool of ribbon Danielle used for each gift? Select the two that apply.

A $\frac{1}{6} \times 3 = \frac{1}{2}$

B $3 \times \frac{1}{6} = \frac{1}{2}$

C $3 \div \frac{1}{6} = \frac{18}{1}$

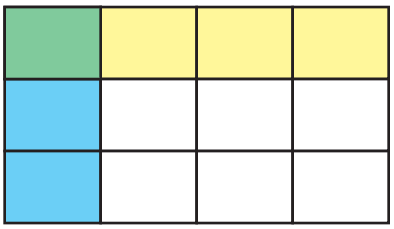
D $3 \times \frac{6}{1} = \frac{18}{1}$

E $\frac{1}{6} \times \frac{1}{3} = \frac{1}{18}$

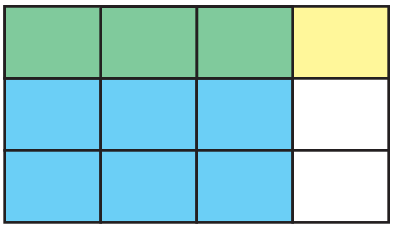
F $\frac{1}{6} \div 3 = \frac{1}{18}$

8 Evan had $\frac{3}{4}$ of a bag of popcorn. He ate $\frac{1}{3}$ of the bag today. Which **two** of the following models show the fraction of the entire bag of popcorn that Evan ate today? Select the two that apply.

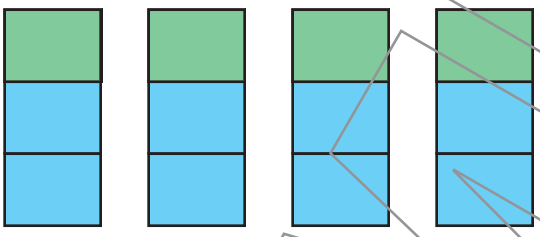
A



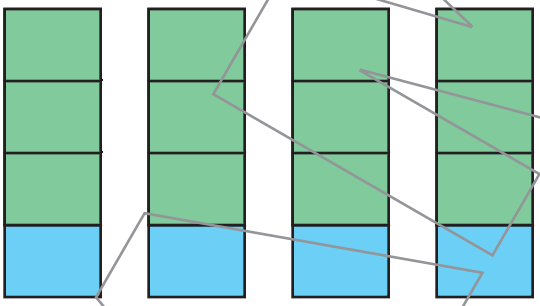
B



C



D



E