

Name: Key
Date: _____

Mr. Johnson
Math 8

Lesson 3.1 – Using Models to Multiply Fractions & Whole Numbers

Definitions:

Fraction: An indicated quotient of two quantities

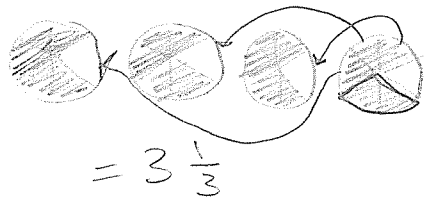
Whole Number: the set of numbers 0, 1, 2, 3, ...

Investigate:

Complete the Investigation activity on pg. 104 of your textbook with a partner. Use any of the manipulatives at the front of the class to model your solution. Be prepared to show your solution to the class in a couple minutes. Draw a picture of your solution below.

Questions to ask students during activity

- How could you represent the problem using fraction circles?
- Any other strategies?
- How does your strategy relate to addition?



$$\begin{aligned} & \frac{5}{6} + \frac{5}{6} + \frac{5}{6} + \frac{5}{6} \\ &= \frac{20}{6} \\ &= 3 \frac{2}{3} \\ &= 3 \frac{1}{3} \end{aligned}$$

Multiplication represents repeated addition

Notes:

There are many ways to model the multiplication of fractions and whole numbers

Method #1: Using repeated addition

Repeated addition can be written as multiplication.

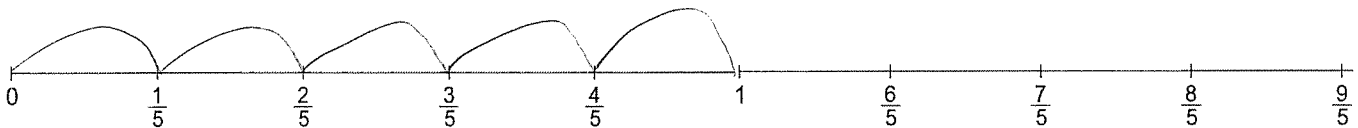
For example: $3 \times \frac{1}{4}$ can be modeled as the repeated addition of $\frac{1}{4}$ three times.

$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4} \quad \text{So,} \quad 3 \times \frac{1}{4} = \frac{3}{4}$$

Method #2: Using a number line.

Number lines have turned into being your favorite method of modeling. I think you will like this one too! We treat multiplication of fractions with whole numbers on a number line the same way we did integers.

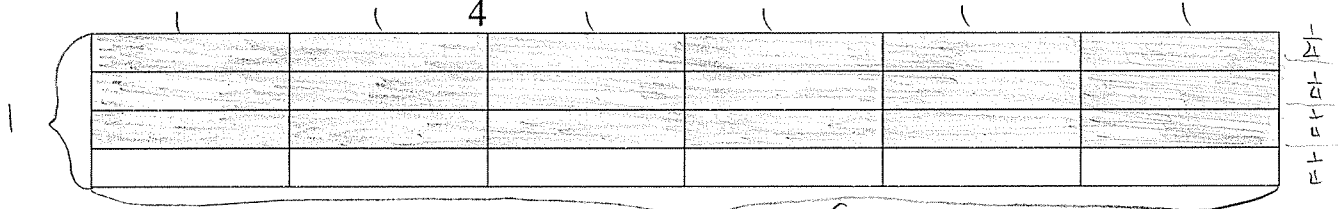
For example: $5 \times \frac{1}{5}$ can be modeled as 5 steps where each step is one fifth of a unit.



$$\text{So, } 5 \times \frac{1}{5} = 1$$

Method #3: Using rectangles

Below is a model of $6 \times \frac{3}{4}$

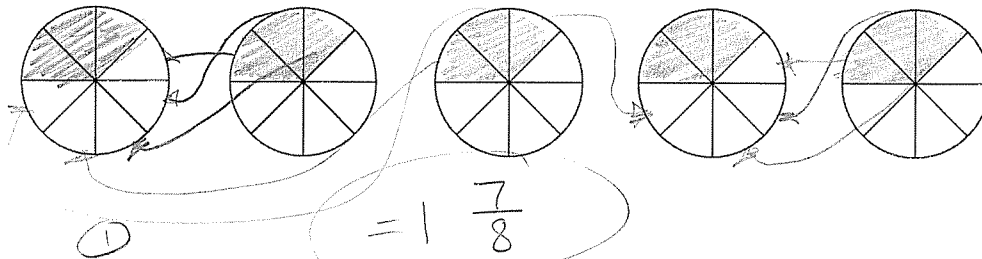


If each column represents one unit, and we have 6 columns, then we have 6 units. Go ahead and shade $\frac{3}{4}$ of each unit. Simply add up the number of shaded parts and you'll have your solutions.

$$\begin{aligned} &= \frac{18}{4} \\ &= 4 \frac{1}{2} \end{aligned}$$

Method #4: Using Fraction Circles

Shade the diagram to show $5 \times \frac{3}{8}$.



Now put the eighths together to make wholes. What is your solution?

Think it out:

Which method will you use to model most of your solutions? Why did you pick this method?

student's choice

Example:

Model $3 \times \frac{2}{3}$ however you want. Be prepared to demonstrate your solution in front of the class.

good question to let student do!

Assignment:

Pg. 107-109
#s 1-2, 5-18

