

MULTIPLYING FRACTIONS USING A NUMBER LINE OR GRAPHIC

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

GRADE **3-4**

- Teacher Guidelines ▶ pages 1 – 2
- Instructional Pages ▶ pages 3 – 5
- Activity Page ▶ page 6
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Classroom Procedure:

1. Begin by explaining to students that today we will explore the number line and how we multiply fractions by a whole number.
2. While reading the content pages, reinforce vocabulary and give students additional examples of fractions as multiples problems to help them practice the new material. Use the additional resources to enhance understanding.
3. Introduce the notes on fractions as multiples. Have students practice problems with the number line and shapes. Use the additional resources to enhance understanding.
4. Have students practice problems with a partner.
5. Follow the Activity page with students. Have students work individually to model problems provided by the teacher.
6. Distribute Practice page. Check and review the students' responses as a class.
7. Distribute the Homework page. Have students work on a few problems at the beginning of the next class to reinforce the new material.
8. In closing, ask students to explain how using a model helps solve fraction multiplication equations. For example, how are number lines visual aids in learning to multiply fractions?
9. Allow for responses and discussion.

Lesson Title: **Fractions as Multiples**

Subject: **Math**

Approximate Grade Level: **3 – 4**

Objectives: The students understand a fraction a/b as a multiple of $1/b$. Students will use visuals to display multiples of fractions.

State Educational Standards*

LB.Math.3.NF.A.2

LB.Math.C4.NF.B.4.A

Class Sessions (45 minutes):

1 – 2 Classes

Teaching Materials/Worksheets:

Fractions as Multiples content pages (3), Activity pages (1), Practice page, Homework page,

Student Supplies: Colored Pencils

Prepare Ahead of Time:

Copy materials

Questions for the activity for students to model

Options for Lesson: Students can use a dry erase board to write on their fraction number lines, have students color sections with map colors for each problem, have students draw their own number lines and have a partner write the math sentence, have students draw shapes and color them in to practice visual models.

*Lessons are aligned to meet the education objectives and goals of most states. For more information on your state objectives, contact your local Board of Education or Department of Education in your state.

Teacher Notes

In this lesson, students will use number lines and other graphic representations to visualize how to multiply fractions with whole numbers. Multiplying fractions is complex for most students! Using visual aids helps students to grasp abstract concepts and to turn them into concrete solutions. Students will be challenged to accurately represent and multiply fractions using number lines and other graphics.

Fractions as Multiples

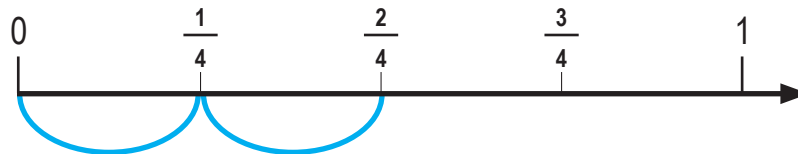
Multiplication is repeated addition. When we can write $3 + 3 + 3 + 3$, we can simplify it to be **3 taken 4 times** or **3 times 4** (3×4), or in math language, the **product of 3 and 4**! But what if we have a fraction instead of a whole number?

Fractions can be multiplied as well, just like whole numbers! If we have the fractions $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$ it can be simplified to $\frac{1}{3}$ taken 4 times or $\frac{1}{3}$ times 4 ($\frac{1}{3} \times 4$).

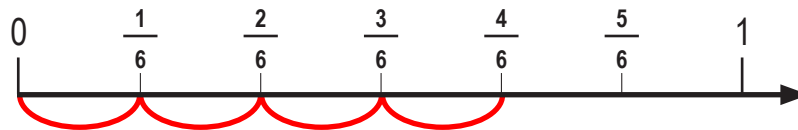
Let's explore this concept using three different models.

Using a number line to solve multiplication equations...

This number line is separated into fourths. Each section represents one-fourth of the whole.



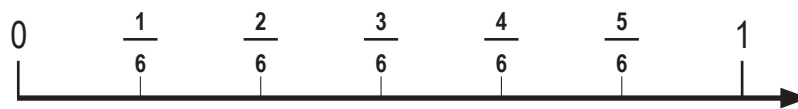
In this example, there are two sections, and each section represents $\frac{1}{4}$. We can make the multiplication sentence $2 \times \frac{1}{4}$.



Here is another example:

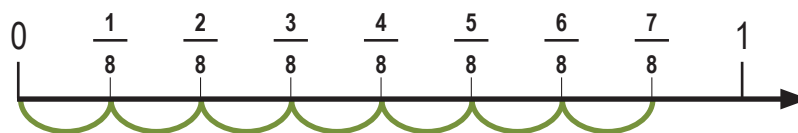
In this example, there are four sections, and each section represents $\frac{1}{6}$. We can make the multiplication sentence $4 \times \frac{1}{6}$. **You try the next one!**

On the number line, represent the multiplication sentence $3 \times \frac{1}{6}$



Using a number line to solve multiplication equations...

Here is one more example:



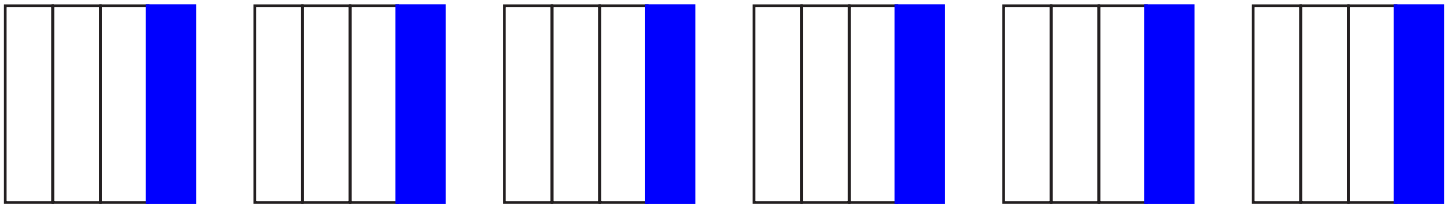
In this example, there are seven sections, and each section represents $\frac{1}{8}$. We can make the multiplication sentence $7 \times \frac{1}{8}$.

Fractions as Multiples

Using a graphic to solve multiplication problems...

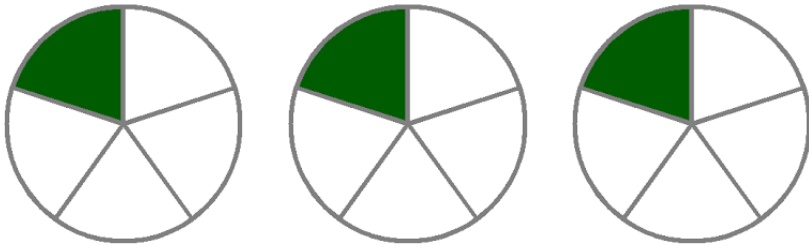
Each shape has the same fractional amount shaded. To write a multiplication sentence using graphics representing fractions, answer two questions.

1. How many times does the shape repeat?
2. What is the amount shaded in each shape?



In this example, the shape repeats 6 times and each section represents $\frac{1}{4}$. We can make the multiplication sentence $6 \times \frac{1}{4}$.

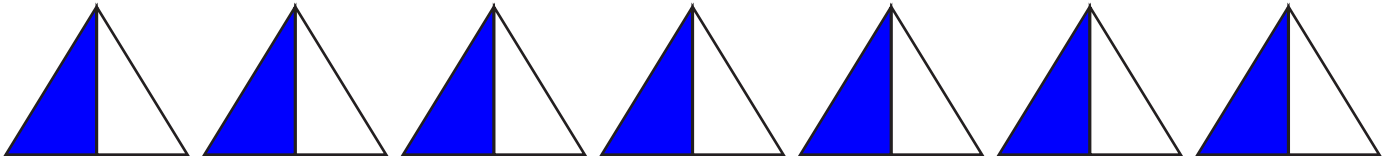
Let's look at another example.



In this example, the shape repeats 3 times and each section represents $\frac{1}{5}$. We can make the multiplication sentence $3 \times \frac{1}{5}$.

Using a graphic to solve multiplication problems...

Let's look at one more example.



In this example, the shape repeats 7 times and each section represents $\frac{1}{2}$. We can make the multiplication sentence $7 \times \frac{1}{2}$. **You try the next one!**

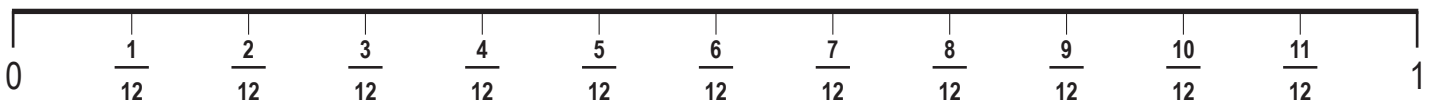
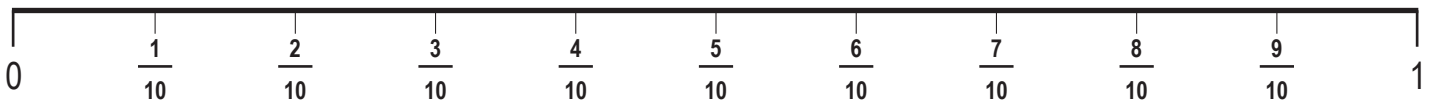
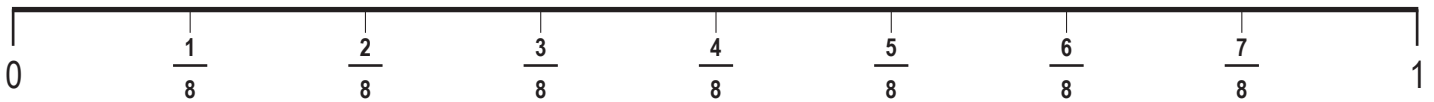
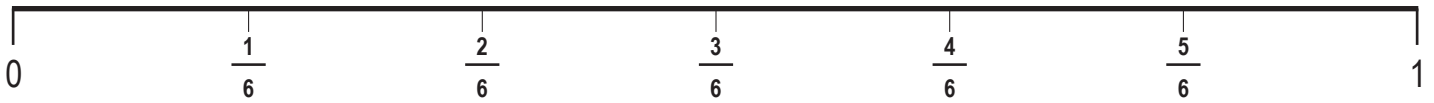
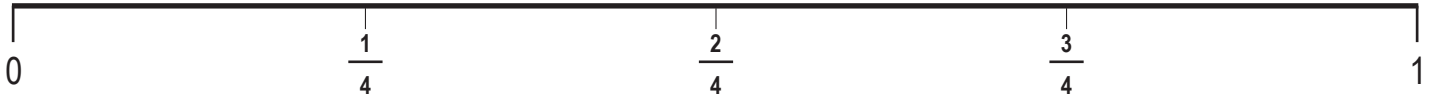
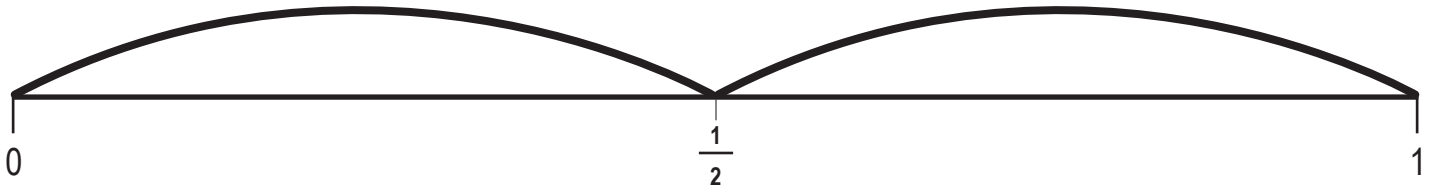
Draw a graphic representation of $3 \times \frac{1}{2}$. Use circles or squares, but not triangles, as you already solved a triangle multiplication equation using fractions.



Activity

Name _____ Date _____

Instructions: Create multiplication equations. For example, $2 \times \frac{1}{2}$. Write the equation under the number line.



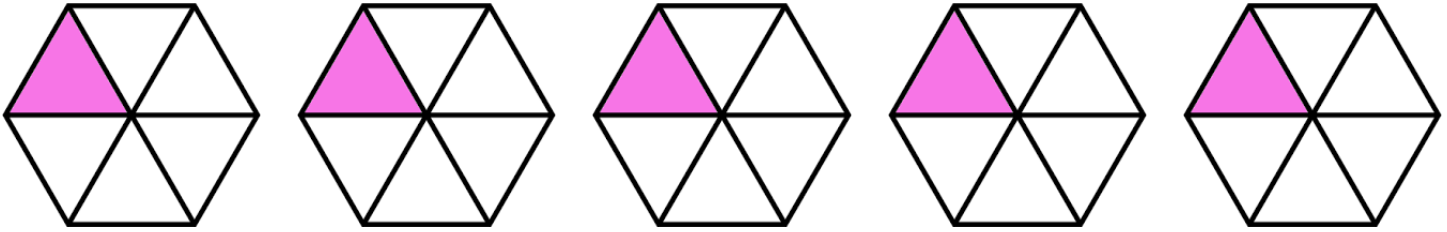


Practice

Name _____ Date _____

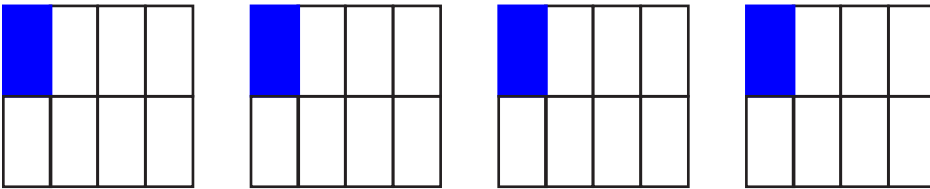


Instructions: What multiplication sentence is represented by the following models?



The shape repeats _____ times and each section represents _____.

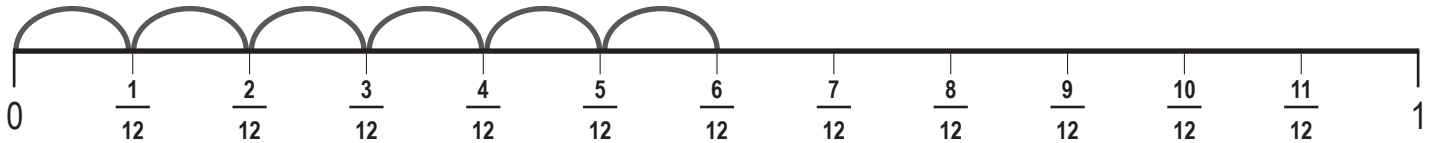
The multiplication sentence is _____.



The shape repeats _____ times and each section represents _____.

The multiplication sentence is _____.

What multiplication sentence is represented by the following number lines?



There are _____ sections, and each section represents _____.

The multiplication sentence is _____.

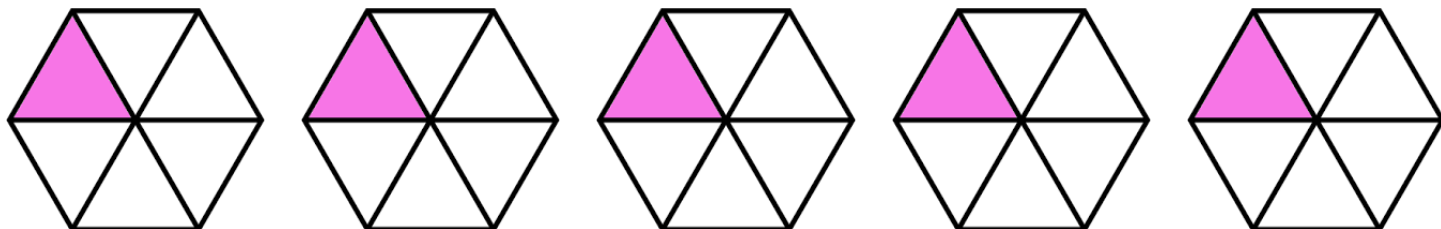


There are _____ sections, and each section represents _____.

The multiplication sentence is _____.

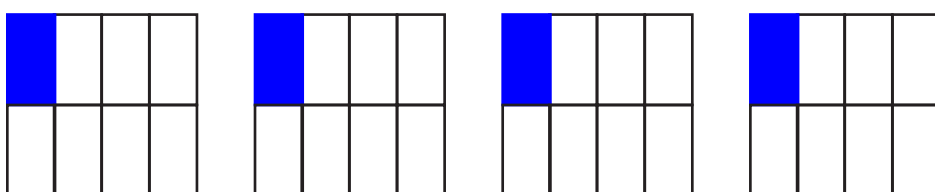


Instructions: What multiplication sentence is represented by the following models?



The shape repeats 5 times and each section represents $\frac{1}{6}$.

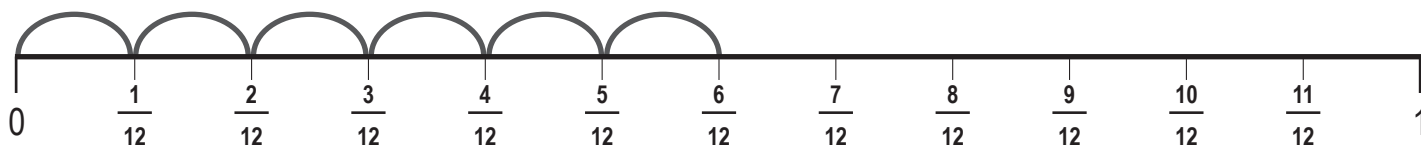
The multiplication sentence is $5 \times \frac{1}{6}$



The shape repeats 4 times and each section represents $\frac{1}{8}$.

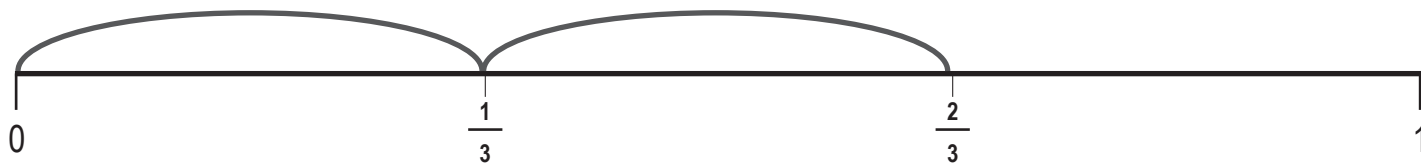
The multiplication sentence is $4 \times \frac{1}{8}$

What multiplication sentence is represented by the following number lines?



There are 6 sections and each section represents $\frac{1}{12}$.

The multiplication sentence is $6 \times \frac{1}{12}$



There are 2 sections and each section represents $\frac{1}{3}$.

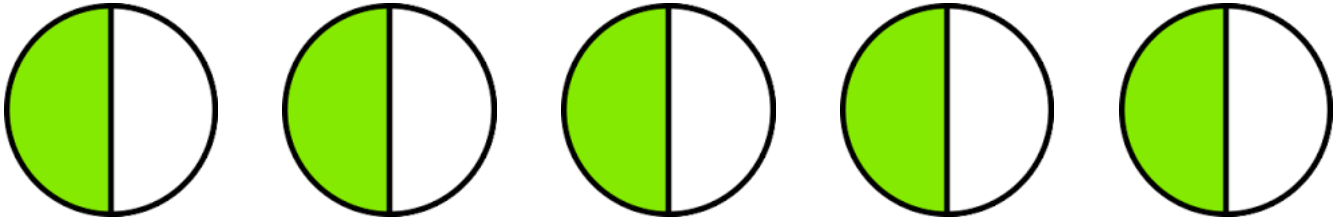
The multiplication sentence is $2 \times \frac{1}{3}$



Homework

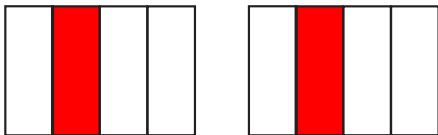
Name _____ Date _____

Instructions: What multiplication sentence is represented by the following models?



The shape repeats _____ times, and each section represents _____.

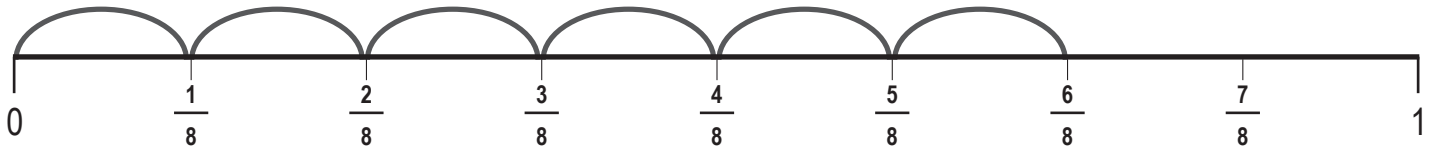
The multiplication sentence is _____.



The shape repeats _____ times, and each section represents _____.

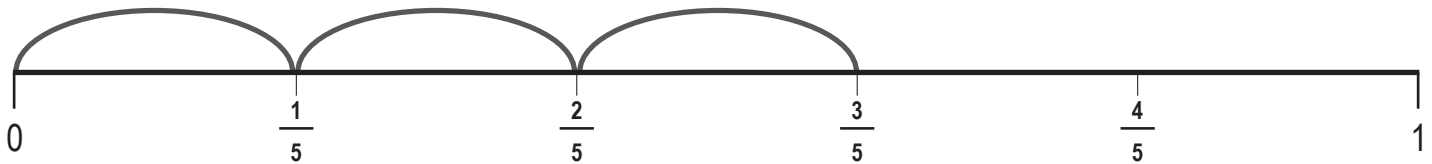
The multiplication sentence is _____.

What multiplication sentence is represented by the following number lines?



There are _____ sections, and each section represents _____.

The multiplication sentence is _____.

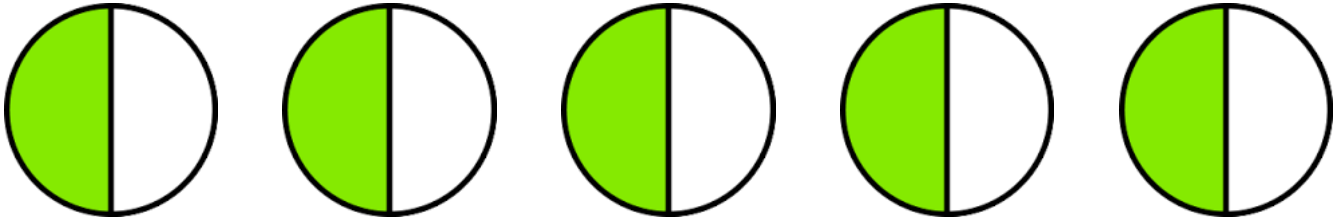


There are _____ sections and each section represents _____.

The multiplication sentence is _____.

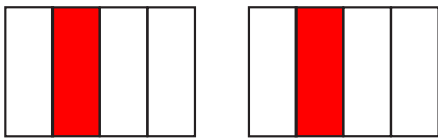


Instructions: What multiplication sentence is represented by the following models?



The shape repeats 5 times and each section represents $\frac{1}{2}$.

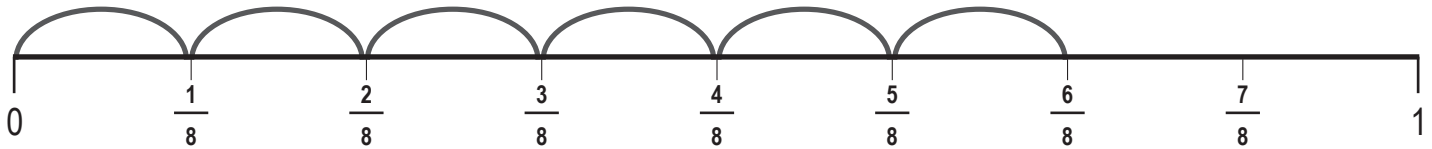
The multiplication sentence is $5 \times \frac{1}{2}$.



The shape repeats 2 times and each section represents $\frac{1}{4}$.

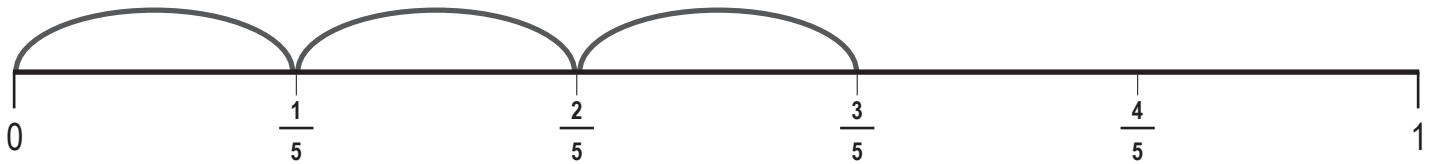
The multiplication sentence is $2 \times \frac{1}{4}$.

What multiplication sentence is represented by the following number lines?



There are 6 sections and each section represents $\frac{1}{8}$.

The multiplication sentence is $6 \times \frac{1}{8}$.



There are 3 sections and each section represents $\frac{1}{5}$.

The multiplication sentence is $3 \times \frac{1}{5}$.