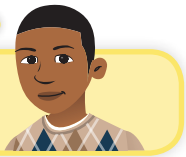
Understand Fractions on a Number Line

Think It Through



How do number lines help us understand numbers?

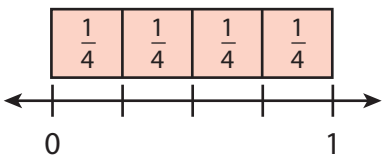
You are used to seeing a number line show whole numbers.

The numbers on this number line are the same distance apart. The distance from one number to the next number is 1 whole. Each time you add another whole, you count another whole number on the number line.

Think **You can show more than whole numbers on a number line.**

Fractions show equal parts of a whole. You can see this on a number line too.

The section between 0 and 1 on a number line shows 1 whole. If you mark this section to show equal parts, it is the same as dividing a whole into equal parts.

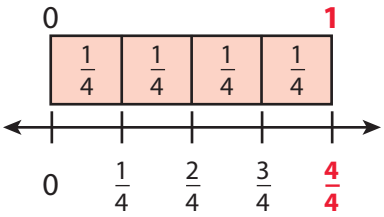


The section between 0 and 1 is marked off into 4 equal parts, so each part shows $\frac{1}{4}$.

Underline the sentence that tells why each part of the number line shows $\frac{1}{4}$.

Think Number lines can help us understand fractions greater than 1.

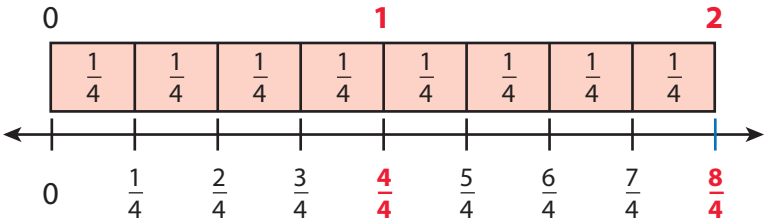
You can count fractions on a number line just like you can count whole numbers.



When you count whole numbers, you say 1, 2, 3, 4, . . . When you count fourths, you say $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}, \ldots$

You can also use number lines to show fractions greater than 1.

To do this, mark off each section between pairs of whole numbers (like 0 and 1 and 1 and 2), into the same number of equal parts. Then count the fractions.



The distance from zero to 2 on the number line can be named as 2, or $\frac{8}{4}$.

Reflect

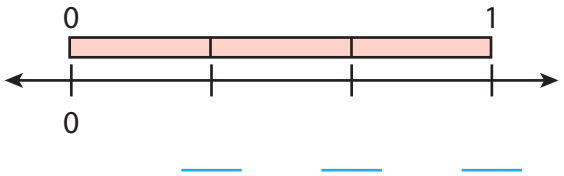
1 How many $\frac{1}{3}$s or "thirds" are there between 0 and 1 on a number line? How do you know?

Think About Fractions as Equal Groups on a Number Line

Let's Explore the Idea

Looking at the number of equal parts helps you think about fractions on a number line.

2 Look at the section between 0 and 1 on the number line below.

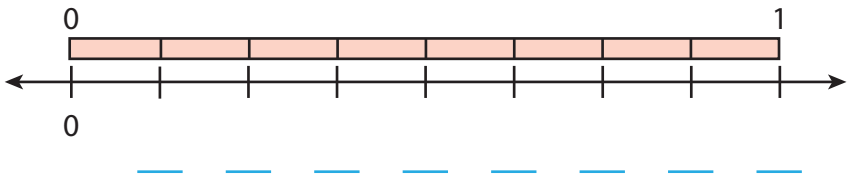


How many equal parts are there? _____

What fraction does each part show? _____

Write the missing labels on the number line.

3 Look at the section between 0 and 1 on the number line below.

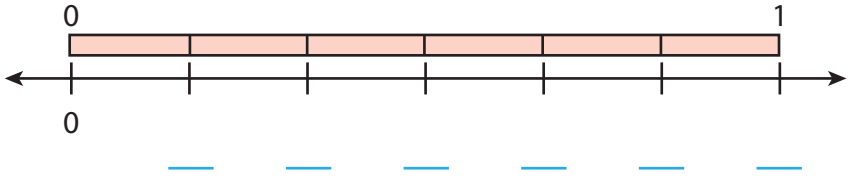


How many equal parts are there? _____

What fraction does each part show? _____

Write the missing labels on the number line.

4 Look at the section between 0 and 1 on the number line below.



How many equal parts are there? _____

What fraction does each part show? _____

Write the missing labels on the number line.

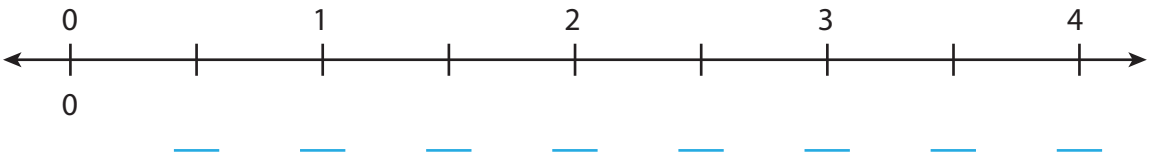
Let's Talk About It

Solve the problems below as a group.

5 Look at the number lines in problems 2–4. How is showing fractions on a number line like showing fractions using models? _____

_____

6 Look at the sections between the whole numbers on the number line below.



How many equal parts are in each section? _____

What fraction does each part show? _____

Each mark on the number line represents a fraction. What denominator will all the fractions have? _____

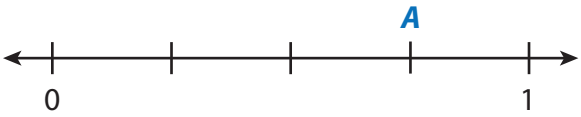
Write the missing labels on the number line.

7 Look at the fractions you wrote on the number line above that are greater than 1. What do you notice about the numerator and denominator in each of these fractions? _____

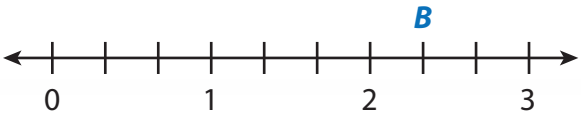
_____

Try It Another Way **Work with your group to identify each fraction.**

8 Look at the number line below. What fraction is at *A*? _____



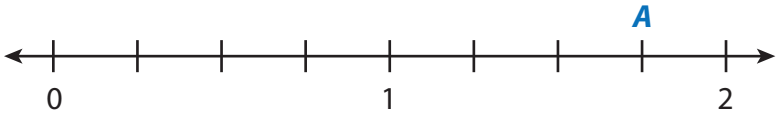
9 Look at the number line below. What fraction is at *B*? _____



Connect Ideas About Fractions on a Number Line

Talk through these problems as a class, then write your answers below.

10 Explain Look at the number line below.



Amira says that *A* is at $\frac{7}{8}$. Is she right? Explain why or why not.

11 Demonstrate Use the number line below to show the fraction $\frac{4}{6}$.

Explain how you knew where to label $\frac{4}{6}$.

12 Illustrate Use the number line below to show that there are 8 eighths in 1 whole.

Apply Ideas About Fractions on a Number Line

13 Put It Together Use what you have learned to complete this task.

Zara and John are hiking on a trail that is 2 miles long. There are signs to mark each eighth of a mile along the trail.

Part A Draw a number line to show the length of the trail. Then mark the number line off to show where each sign is.

Part B Zara stopped for water at the $\frac{3}{8}$-mile sign. Label the $\frac{3}{8}$ mark on the number line with a *Z* for Zara.

Part C John stopped to rest after $\frac{12}{8}$ miles. Label the $\frac{12}{8}$ mark on the number line with a *J* for John.

Part D Who stopped before the 1-mile mark? Who stopped after the 1-mile mark? Explain how you know.