▶**Fraction Bars and Estimation**

Problem Solving:
▶**Finding Averages on a Graph**

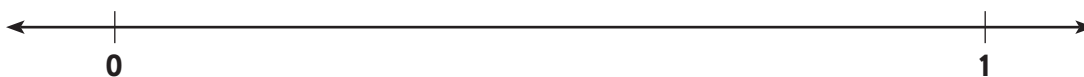---

▶**Fraction Bars and Estimation**

Vocabulary
estimate fraction bar

How do we estimate fractions on a number line?

Look at the number line below.

Without measuring, we can **estimate** the locations of some fractions on a number line. Let's estimate where $\frac{1}{2}$ is on the number line.

The word "half" is our clue. The mark for $\frac{1}{2}$ should be in the middle between 0 and 1.

Now let's estimate where $\frac{1}{4}$ is. Think: Is $\frac{1}{4}$ bigger or smaller than $\frac{1}{2}$? Finally, we estimate where $\frac{3}{4}$ is on the number line. Think: Is $\frac{3}{4}$ bigger or smaller than $\frac{1}{4}$?
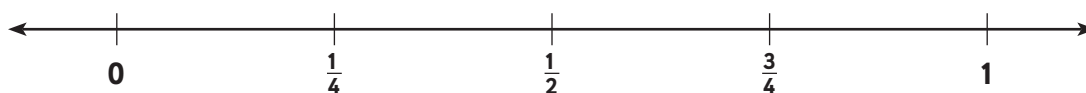
We see that $\frac{1}{4}$ belongs here because it is smaller than $\frac{1}{2}$.

We see that $\frac{1}{2}$ belongs here because it is in the middle between 0 and 1.

We see that $\frac{3}{4}$ belongs here because it is larger than both $\frac{1}{4}$ and $\frac{1}{2}$.

It's important to be able to picture these common benchmark fractions to make sense of other, more complex fractions.

How do we use fraction bars to estimate fractions?

We can use a **fraction bar** to make estimations. A fraction bar is divided into parts that represent a fraction. Example 1 shows a shaded fraction bar. The bar is not divided into equal parts, or fair shares, so we cannot tell what the fraction is. We have to estimate.

Example 1

Compare the two fraction bars to determine the fractions.

$\frac{1}{2}$
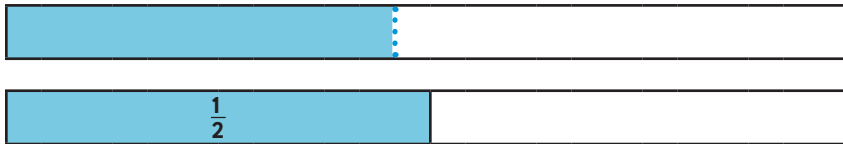
A good guess would be $\frac{1}{2}$.

We can be sure that it is about $\frac{1}{2}$ when we line it up with an actual fraction bar that shows $\frac{1}{2}$.

Compare the two fraction bars to determine the fraction.

$\frac{3}{4}$

A good guess would be $\frac{3}{4}$.

We can be sure that it is about $\frac{3}{4}$ when we line it up with an actual fraction bar that shows $\frac{3}{4}$.
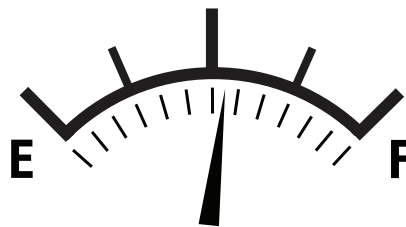
Estimating fractions is an important skill that we use every day. When we look at a gas gauge in a car, we are estimating how much fuel the gas tank contains.
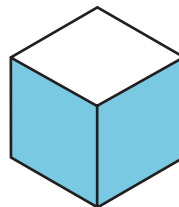
The driver would say, "It's about $\frac{1}{2}$ full."

How do fraction bars help us understand fractions?

Different shapes help us understand that fractions represent part-to-whole relationships. Here are some examples showing the fraction $\frac{2}{3}$. The last shape is a fraction bar.

Let's compare two different fraction bars to see which fraction is larger.

Example 1

Compare the fractions $\frac{1}{2}$ and $\frac{1}{4}$.

The fraction bar for $\frac{1}{2}$ looks like this:

The fraction bar for $\frac{1}{4}$ looks like this:

The fraction bars make it easy to see that $\frac{1}{2}$ is bigger than $\frac{1}{4}$.

Look at Example 2. The fraction bars help us see which fraction is bigger.

Example 2

Compare the fractions $\frac{3}{5}$ and $\frac{5}{8}$.

$\frac{3}{5}$

$\frac{5}{8}$

The fraction bars make it easy to see that $\frac{5}{8}$ is bigger than $\frac{3}{5}$.

Apply Skills
Turn to *Interactive Text*, page 16.

Reinforce Understanding
Use the *mBook Study Guide* to review lesson concepts.

▶Problem Solving: **Finding Averages on a Graph**

# How do we find the averages of different categories of data?

Remember that the mean is the average of a set of numbers. If we look at a set of student scores on a test, we can even out the scores so that we find the average.

Example 1

Determine the average of the test data.
We see the scores of 10 students who all took the same test. The test scores run from 50 to 100. The arrows indicate how we can figure the average.

Student	Grade
A	70
B	75
C	100
D	85
E	80
F	80
G	85
H	50
I	100
J	75

Students' Grades
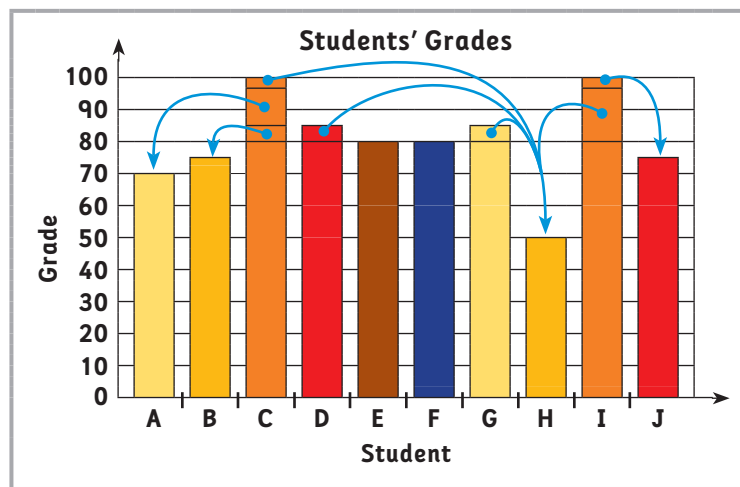
We see from the arrows that the average of all the scores is 80.

This figure tells the teacher how well the students in the class understand the information he teaches. It also tells the students how well they are performing in the class.

Averages are an important statistic in the everyday world.

- We can figure the average temperature over a week or a month.
- We can determine a favorite baseball player's batting average.
- We can add our grades in one class and figure our average.

Learning to find the average helps us in many areas.

Problem-Solving Activity
Turn to *Interactive Text*,
page 17.

mBook Reinforce Understanding
Use the *mBook Study Guide*
to review lesson concepts.

Homework

Activity 1

Look at the fraction bars. Then tell which fraction is the smallest.

1. Which fraction is smallest: $\frac{1}{2}$ or $\frac{1}{3}$?

2. Which fraction is smallest: $\frac{1}{3}$ or $\frac{1}{4}$?

3. Which fraction is smallest: $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$?

4. Which fraction is smallest: $\frac{2}{3}$, $\frac{3}{4}$, or $\frac{1}{2}$?

Activity 2

Look at the fraction bars and tell the best estimate for the fraction.

1. $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$

2. $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$

3. $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$

4. $\frac{1}{3}$, $\frac{1}{4}$, or $\frac{2}{3}$

5. $\frac{3}{4}$, $\frac{2}{3}$, or $\frac{1}{4}$

6. $\frac{2}{4}$, $\frac{1}{3}$, or $\frac{3}{4}$

Activity 3 • Distributed Practice

Solve.

1. $\begin{array}{r} 4,071 \\ -\ 2,709 \\ \hline \end{array}$

2. $\begin{array}{r} 5,891 \\ +\ 8,019 \\ \hline \end{array}$

3. $\begin{array}{r} 47 \\ \times\ 98 \\ \hline \end{array}$

4. $\begin{array}{r} 627 \\ \times\ \ \ 8 \\ \hline \end{array}$

5. $4\overline{)369}$