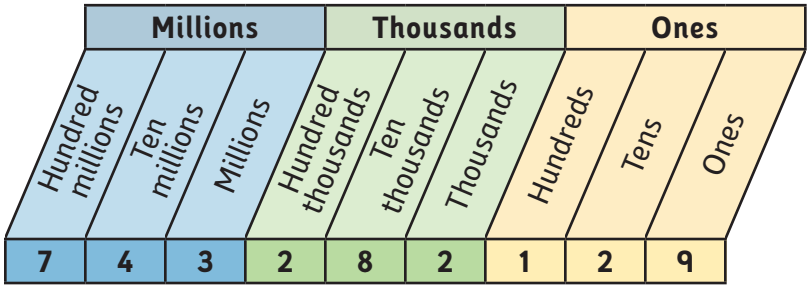
Lesson 15 | Unit Review
▶Whole Numbers and Fractions
Problem Solving: ▶Working With Data

▶Whole Numbers and Fractions

Why is place value important?

Our number system is a base-10 number system. Each place value is a multiple of 10. Let's take a look at the following place-value chart.



Millions			Thousands			Ones		
Hundred millions	Ten millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
7	4	3	2	8	2	1	2	9

Review 1

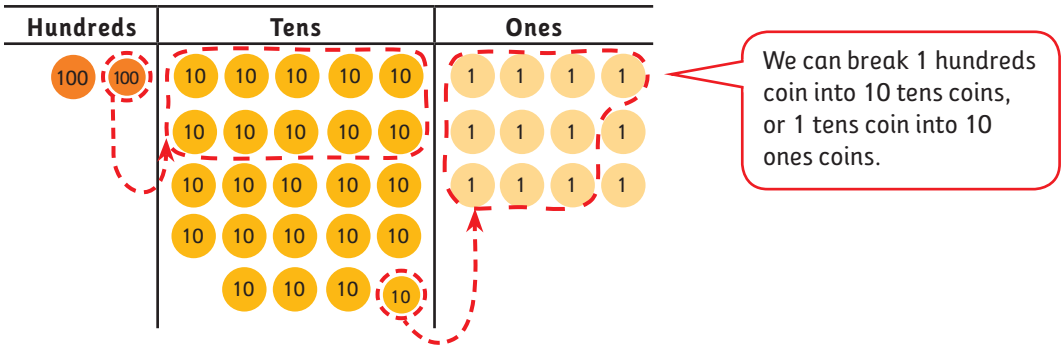
Write the value of each digit in the number 743,282,129.

7 represents	700,000,000
4 represents	40,000,000
3 represents	3,000,000
2 represents	200,000
8 represents	80,000
2 represents	2,000
1 represents	100
2 represents	20
9 represents	9

Place value is important when we work with numbers that require regrouping.

Review 2

How do we use place-value coins to show regrouping?



Why do we use traditional algorithms?

We add, subtract, multiply, and divide every day using traditional algorithms. They are fast and easy to use. Look at some examples:

$$\begin{array}{r} 843 \\ +\,129 \\ \hline 972 \end{array} \qquad \begin{array}{r} 765 \\ -\,327 \\ \hline 438 \end{array} \qquad \begin{array}{r} 427 \\ \times\quad 2 \\ \hline 854 \end{array} \qquad 4\overline{)321} = 80 \text{ R1}$$

Using these algorithms sometimes gets us in trouble. We can get confused and make mistakes. In these cases, expanded form becomes important because it shows us place value.

Review 1

How do we use place value to add whole numbers?

Writing each number in expanded form helps us use place value when we add.

$$\begin{array}{r} 338 \\ +\,219 \\ \hline 557 \end{array} \qquad \begin{array}{r} 300 \\ +\,200 \\ \hline 500 \end{array} \quad \begin{array}{r} {\scriptstyle 10} \\ 30 \\ 10 \\ \hline 50 \end{array} \quad \begin{array}{r} 8 \\ 9 \\ \hline 7 \end{array}$$

Review 2

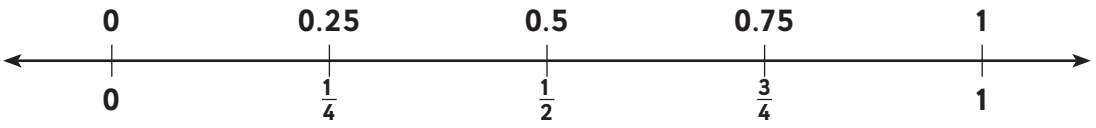
How do we use place value to subtract whole numbers?

		60	13
473	400	~~70~~	~~3~~
− 324	− 300	20	4
149	100	40	9

Where do we find fractions and decimal numbers on a number line?

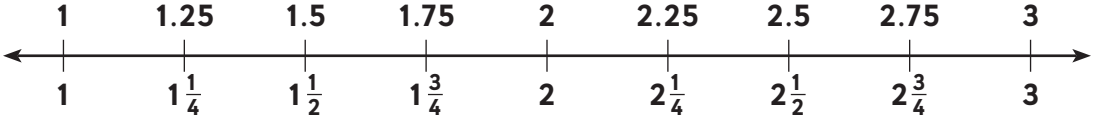
We know how to recognize whole numbers on a number line. If we just keep adding forward or backward by 1, we can find a number's location on the number line. Other numbers that fit between the whole numbers are called fractions and decimal numbers. The fractions and decimal numbers align with each other because for every fraction, we can find a decimal number that is equal to it.

For example, look at the fractions $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ on the number line.



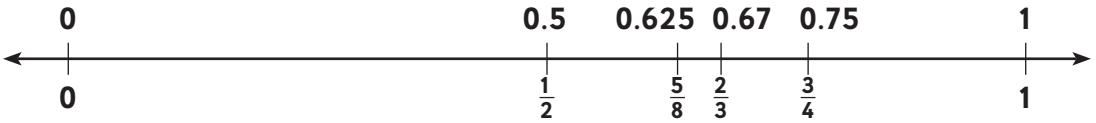
Review 1

How do we match the decimal numbers to the fractions on the number line?



Review 2

How do we match the fractions to the decimal numbers on the number line?



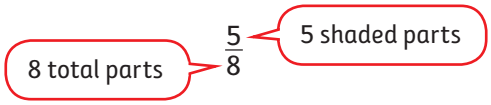
What are the different parts of a fraction?

The numerator is the top number on the fraction, and the denominator is the number down below. The denominator tells us the total number of parts. The numerator tells us the number of parts we have.

Review 1

How do we use fraction bars to show fractions?
In a fraction bar, the total parts tell us the denominator of the fraction. The shaded parts tell us the numerator.

eighths

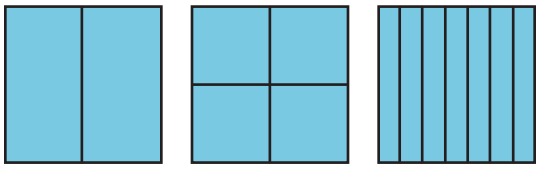


We can also represent whole numbers as fractions:

For example: $2 = \frac{2}{1}$

Review 2

How do we use shapes to show fractions equal to 1?
In a fraction equal to 1, all of the parts are shaded. This tells us that the parts we have and the total parts are the same.



$\frac{2}{2}$ $\frac{4}{4}$ $\frac{7}{7}$

How do fraction bars help us see what fractions look like?

Fraction bars help us understand the part-to-whole relationship of fractions. We can compare fraction bars to see which is bigger. This relationship is difficult to understand sometimes when we just view the numbers.

Review 1

How do we compare fraction bars to decide which fraction is larger?

$\frac{3}{5}$

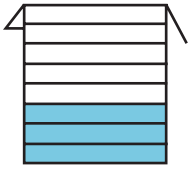
$\frac{7}{8}$

The fraction $\frac{7}{8}$ is larger.

Estimating fractions is a skill that we use every day. For example, we are cooking lasagna, and the recipe calls for $\frac{3}{4}$ of 1 tablespoon. But we do not have a $\frac{3}{4}$ tablespoon. So we take the 1 tablespoon measure, and estimate what $\frac{3}{4}$ of the amount might be.

Review 2

How do we estimate the amount $\frac{3}{8}$ in the measuring cup?



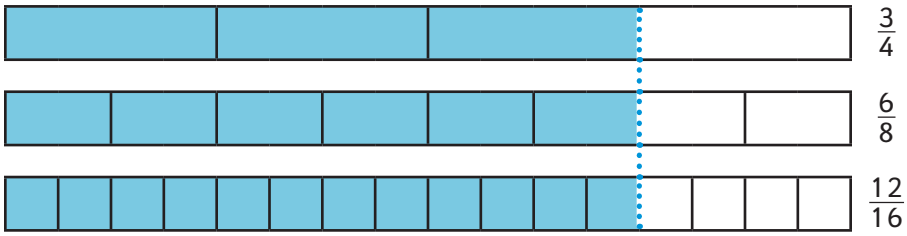
We know that $\frac{2}{8} = \frac{1}{4}$, so $\frac{3}{8}$ is a bit more than $\frac{1}{4}$.

How do fraction bars show equivalent fractions?

Fraction bars can show fair shares. We might have different fair shares displayed for each fraction. But we can illustrate how these fractions are the same, or equivalent. We see in the next illustration that the same area in each fraction bar is shaded. We call these fractions equivalent fractions.

Review 1

How do we use fraction bars to show that $\frac{3}{4}$, $\frac{6}{8}$, and $\frac{12}{16}$ are equivalent?



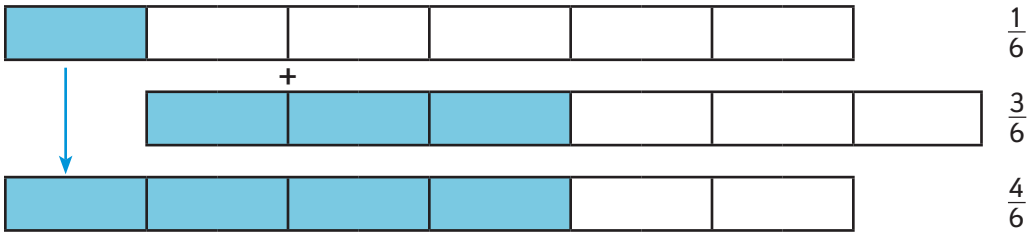
The fractions $\frac{3}{4}$, $\frac{6}{8}$, and $\frac{12}{16}$ are equivalent fractions.

How do we add and subtract fractions with like denominators?

When we think of adding or subtracting fractions with like denominators, we need to remember we are just counting out or taking away a part of the fractional whole—whether it is thirds, fifths, or eighths. The denominator always stays the same. It is the numerator that changes.

Review 1

How do we use fraction bars to add $\frac{1}{6} + \frac{3}{6}$?



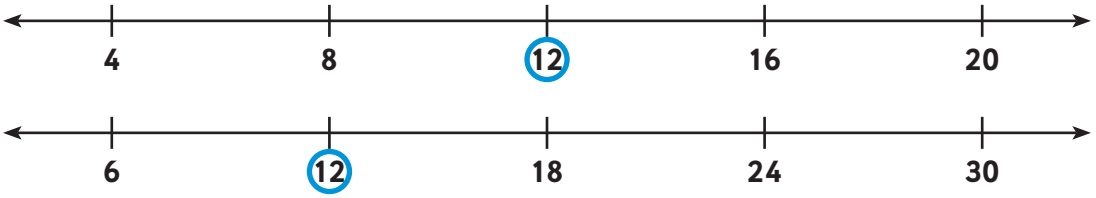
The answer is $\frac{1}{6} + \frac{3}{6} = \frac{4}{6}$.

What is the least common multiple?

When two or more numbers have the same multiple, we call this a common multiple. The least common multiple is the smallest of the multiples. We can look for multiples in two ways: using a number line or counting in our heads by the numbers. The following illustration shows us how to use a number line.

Review 1

How do we use number lines to find the least common multiple for the numbers 4 and 6?



The least common multiple of 4 and 6 is 12.

Apply Skills
Turn to ***Interactive Text***, page 42.

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

What kinds of graphs are there and what do they do?

There are four basic kinds of graphs:

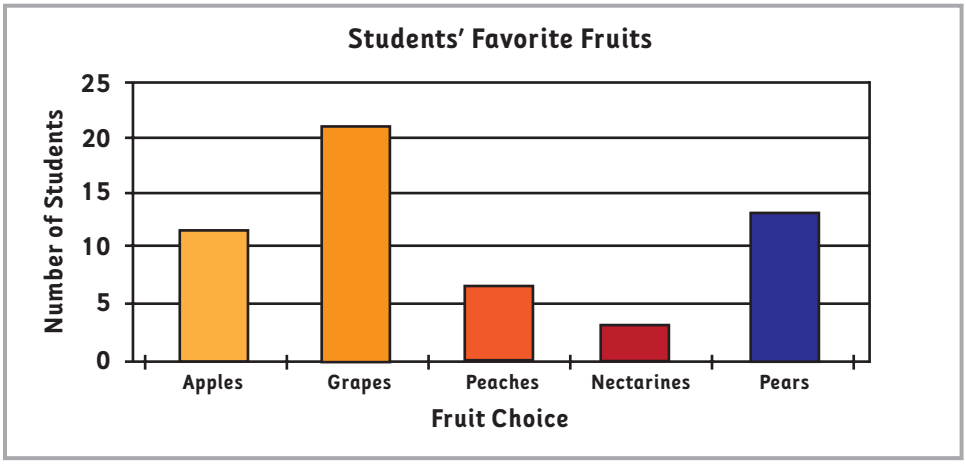
Type of Graph	Best For
horizontal bar graph	relationships among data
vertical bar graph	relationships among data
line graph	changes over time
pictograph	general idea, not exact data

Let's review a bar graph. Students were asked their favorite fruits. Their choices appear below.

Review 1

How do we use a bar graph to plot the students' favorite fruits?

Fruits	Student Favorite
Apples	12
Grapes	22
Peaches	7
Nectarines	4
Pears	14

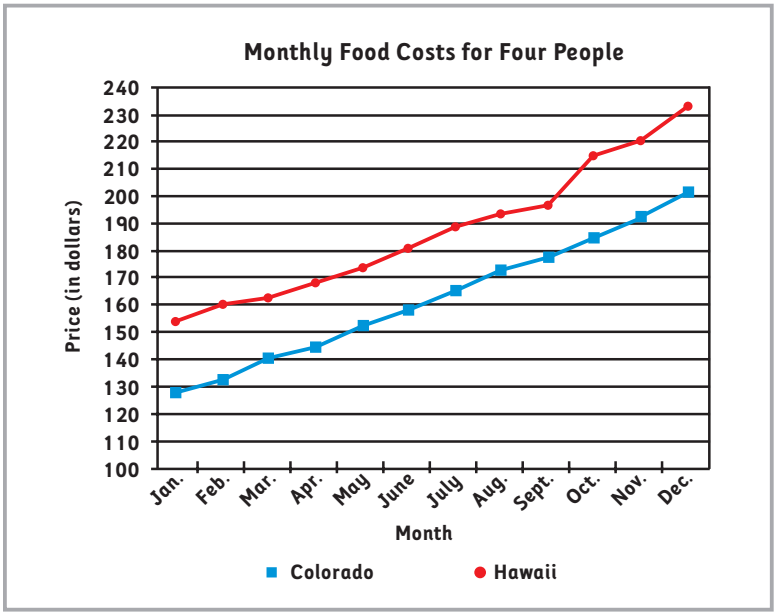


Review 2

Line graphs are often used in business because they show trends in data over time.

Monthly Food Costs for Four People (in dollars)

Month	Colorado (in dollars)	Hawaii (in dollars)
Jan.	127	154
Feb.	132	160
Mar.	140	162
Apr.	145	168
May	152	174
June	159	181
July	165	189
Aug.	172	193
Sept.	177	196
Oct.	185	215
Nov.	192	220
Dec.	201	234



Be careful when reading a line graph. It can show more than one set of data.

Problem-Solving Activity
Turn to ***Interactive Text***, page 44.

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