Important Concepts . . .

Preview Review

Mathematics Grade 4 *TEACHER KEY*

W1 - Lesson 4: Fractions and Decimals

V5-07

Important Concepts of Grade 4 Mathematics

W1 - Lesson 1 ..... Number Concepts
W1 - Lesson 2 ..... Addition and Subtraction
W1 - Lesson 3 ..... Patterns
W1 - Lesson 4 ..... Fractions and Decimals
W1 - Lesson 5 ..... Data Management
W1 - Quiz
W2 - Lesson 1 ..... Multiplication 1
W2 - Lesson 2 ..... Multiplication 2
W2 - Lesson 3 ..... Division 1
W2 - Lesson 4 ..... Division 2
W2 - Lesson 5 ..... Exploring Outcomes
W2 - Quiz
W3 - Lesson 1 ..... Measurement 1
W3 - Lesson 2 ..... Measurement 2
W3 - Lesson 3 ..... Geometry 1
W3 - Lesson 4 ..... Geometry 2
W3 - Lesson 5 ..... Problem Solving
W3 - Quiz

Materials Required

Mathematics Grade 4
Version 5
Preview/Review W1 - Lesson 4 TEACHER KEY

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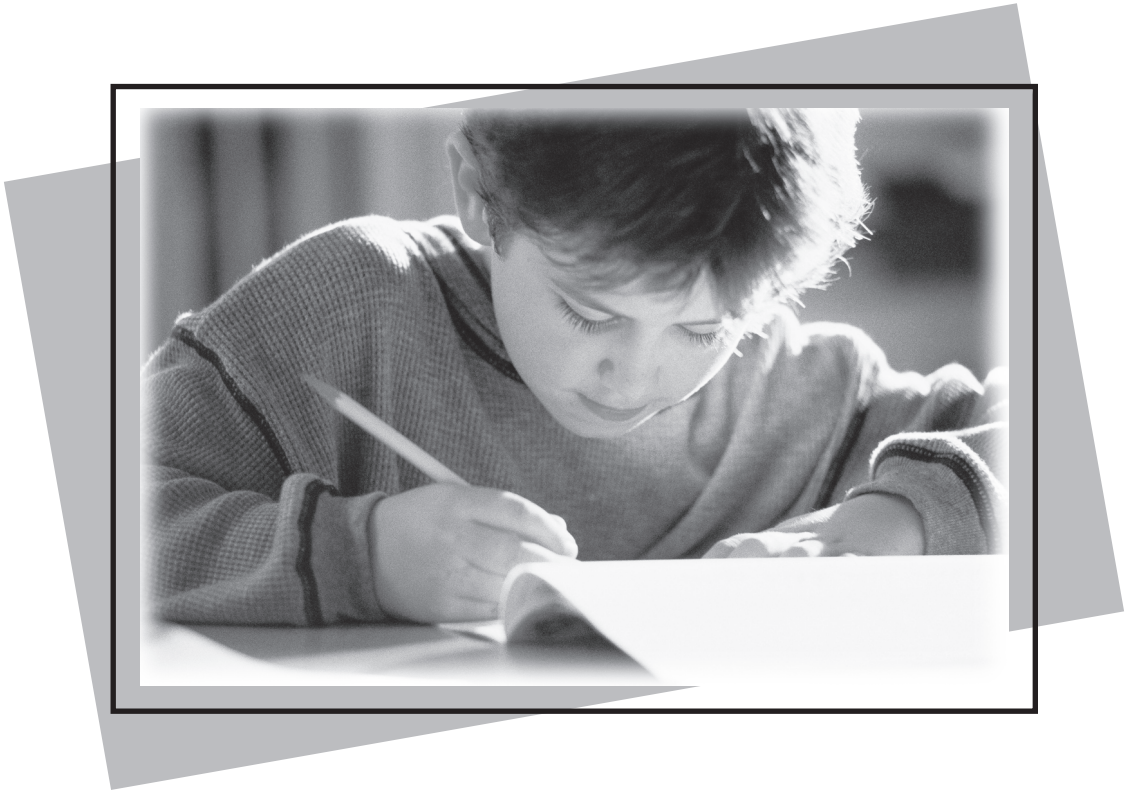
Preview/Review Concepts for Grade Four Mathematics

TEACHER KEY



W1 - Lesson 4: Fractions and Decimals

OBJECTIVES

By the end of this lesson, you should

- define fractions as equal parts of a whole figure or whole set
- name fractions by the number of parts the whole or set is divided into
- identify the numerator and the denominator
- draw fractions as parts of a set or parts of a whole
- describe simple fractions as equivalent when presented pictorially
- relate decimals and fractions using pictures, symbols, and words (tenths and hundredths)
- use place value charts to describe decimal numbers (tenths and hundredths)
- use base ten drawings to represent decimals (tenths and hundredths)
- write money amounts using decimal numbers with dollar and cents signs
- add and subtract money amounts using decimals
- use the *Guess-and-Check* Strategy to solve problems

GLOSSARY

decimal number - a number made up of a whole-number part and a fraction part that are separated by a decimal point (e.g., 8.43)

decimal point - a dot that separates the ones place and the tenths place in a decimal number

denominator - the lower number in a fraction (It tells the total number of parts in the whole.)

figure - a two-dimensional geometric shape

fraction - a number that shows parts of a whole or an amount less than one

numerator - the upper number in a fraction (It tells how many parts are being looked at.)

W1 - Lesson 4: Fractions and Decimals

A. Introduction

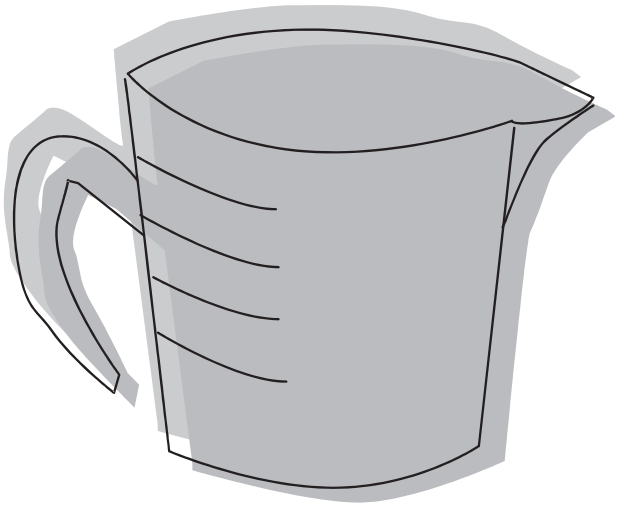
So far, most of your work in Math has been done using whole numbers (0, 1, 2, 3, etc.). For counting and calculating, whole numbers were all that you needed to use.

Sometimes, we use numbers that show parts of an object or group of objects:

- dividing a pizza equally among 5 people
- saving one quarter of your weekly allowance so you can buy a bike
- calculating the price of an item on sale for "half price"

Working with part of an object, part of a group, or part of a sum of money involves working with fractions or decimals.

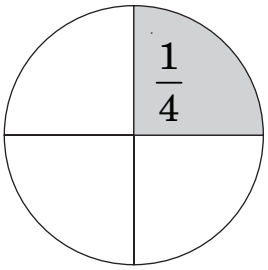
In Grade Three, you were introduced to fractions and learned about fifths and tenths. In this lesson you will be learning more about fractions, and you'll also be introduced to decimal numbers.



B. Fractions as Part of a Whole or a Set

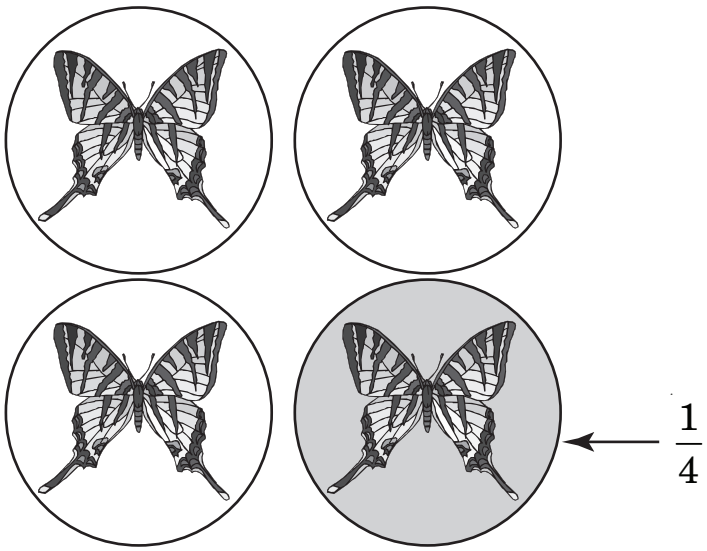
Fractions are **equal parts** of a whole figure or a whole set.

Parts of a Whole



This circle is divided into four parts. All of the parts are **exactly the same size**. Each part of the circle is a fraction of the whole circle. Each part is one quarter (1/4) or one fourth (1/4) of the circle.

Parts of a Set

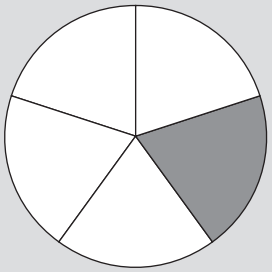


This set of objects has four parts. Each object of the set is a fraction of the whole set. Each object is one-fourth (1/4) or one quarter (1/4) of the set.

Your Turn!

1. Look at each drawing, and fill in the blanks next to it.

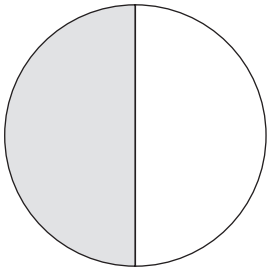
Example:



This circle is divided into __5__ equal parts. Each part is __1__ of __5__ equal parts. Each part is

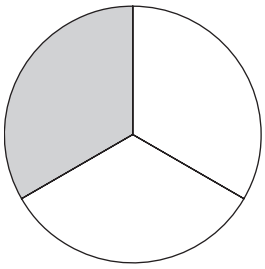
__one fifth__ or $\frac{1}{5}$ of the circle.

a. This circle is divided into ***2*** equal parts. Each part is ***1*** of ***2*** equal parts. Each part is ***one half*** or $\frac{1}{2}$ of the circle.

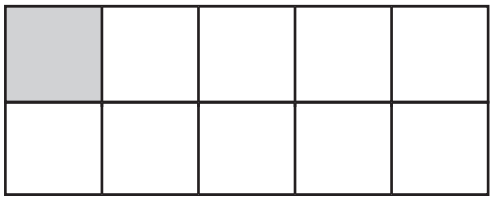


b. This rectangle is divided into ***4*** equal parts. Each part is ***1*** of ***4*** equal parts. Each part is ***one fourth (one quarter)*** or $\frac{1}{4}$ of the rectangle.

c. This circle is divided into ***3*** equal parts. Each part is ***1*** of ***3*** equal parts. Each part is ***one third*** or $\frac{1}{3}$ of the circle.



d. This rectangle is divided into ***10*** equal parts. Each part is ***1*** of ***10*** equal parts. Each part is ***one tenth*** or $\frac{1}{10}$ of the rectangle.



e. Divide this set of thirty stars into 10 equal parts or groups.

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆
☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆
☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆

How many stars are there in each group? ***3***

This set of stars is divided into ***10*** equal parts. Each part is ***1*** of ***10*** equal parts. Each part is ***one tenth*** or $\frac{1}{10}$ of the set.

Identifying the Parts of a Fraction

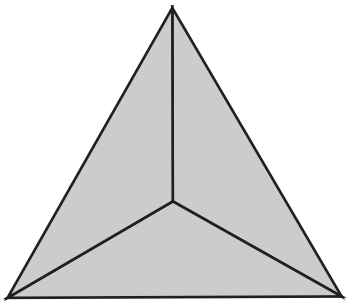
Fractions consist of two parts.

- The bottom number is called the **denominator**. The denominator tells how many equal parts the object is divided into.
- The top number is called the **numerator**. The numerator tells how many parts are shaded, or how many parts you are working with.

$\frac{\mathbf{3}}{\mathbf{5}}$ ← **the numerator** (tells the number of parts out of the total)

5 ← **the denominator** (tells the total number of parts)

Sometimes the numerator and the denominator are exactly the same number. When that happens, it means that the fraction is the same as **1** whole thing or **1** set of objects.



$\frac{3}{3}$ = 1 (whole)

This fraction is read as "three thirds". All three parts, or one whole object, are shaded.

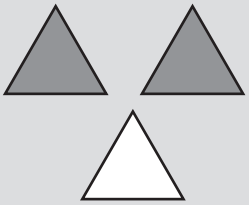
$\frac{5}{5}$ = 1 (whole set)

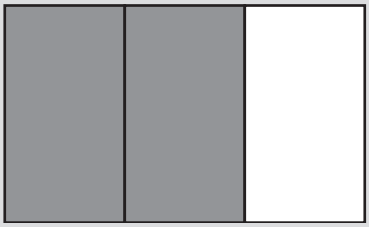
This fraction is read as "five fifths". All five equal parts, or one whole set, are shaded.

2. For each fraction below, illustrate the fraction in two ways. First, draw a set of objects with part of the objects shaded. Second, shade part of a whole figure.

Example:

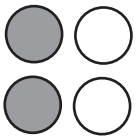
$\frac{2}{3}$

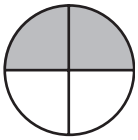




Answers will vary, but each answer should include two drawings, one set of objects and one whole figure, each with the correct number of fractional parts shaded. Sample answers are given.

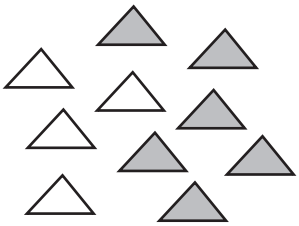
a. $\frac{2}{4}$

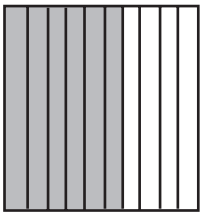




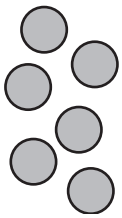
b. $\frac{3}{8}$

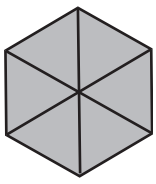
c. $\frac{6}{10}$





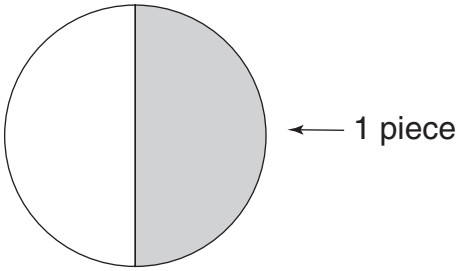
d. $\frac{6}{6}$



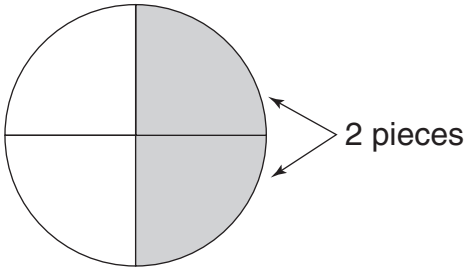


C. Equivalent Fractions

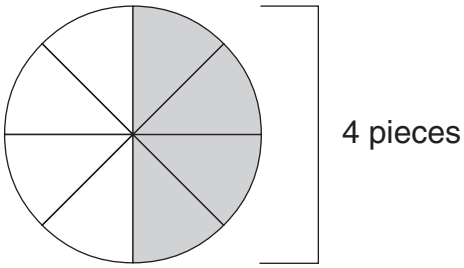
When you divide a small pizza into 2 equal pieces and eat 1 piece, you will have eaten $\frac{1}{2}$ of the pizza.



If you divide the same pizza into 4 equal pieces and eat 2 pieces, you will also have eaten exactly $\frac{1}{2}$ of the pizza.

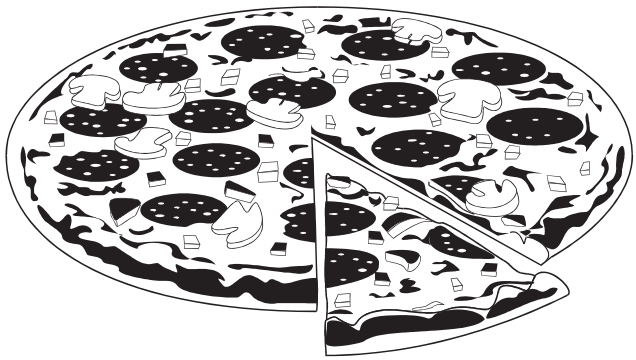


If you divide the same pizza into 8 equal pieces and eat 4 pieces, you will still have eaten exactly $\frac{1}{2}$ of the pizza.



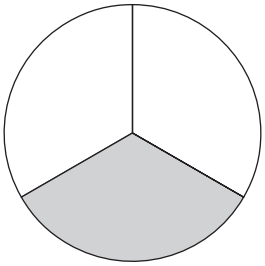
$$\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$$

These three fractions all mean the same thing. They are equal to each other. Each of these fractions is equal to $\frac{1}{2}$ of the pizza. They are called **equivalent fractions**.

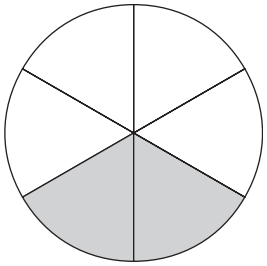


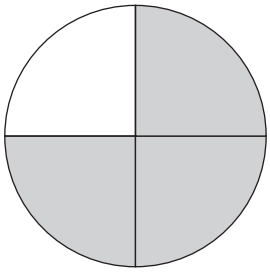
Your Turn!

Directions: Make the second fraction equivalent to the first fraction.

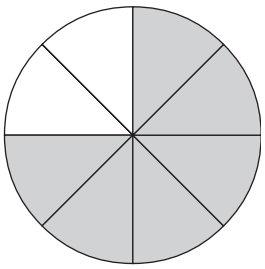
1. 

$\frac{1}{3}$ is equivalent to $\frac{\boldsymbol{2}}{6}$



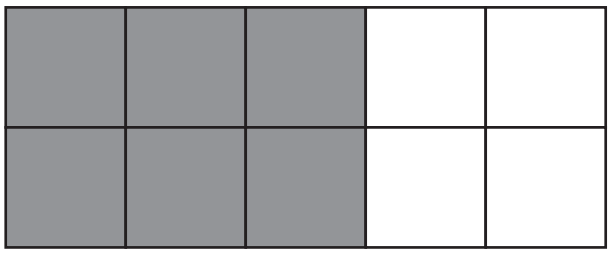
2. 

$\frac{3}{4}$ is equivalent to $\frac{\boldsymbol{6}}{8}$



D. Decimals

Decimals and fractions are very much alike. Decimals are another way of showing a **part** of something. As you learn about decimals in this lesson, you will be thinking about fractions called **tenths** and **hundredths**.

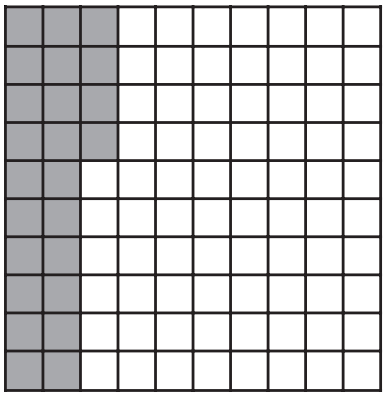


You already know how to write the fraction that describes this figure: $\frac{6}{10}$

This fraction can also be written as a decimal: 0.6

Both are read as "six tenths".

This is a picture of a 10 x 10 grid that has 100 squares. 24 of the squares are shaded.



The fraction that describes this picture is $\frac{24}{100}$

The decimal number is 0.24

Both are read as "twenty-four hundredths".

Your Turn!

1. Complete the chart below with the required fractions, decimal numbers, or words. The first line is done for you.

Fraction	Decimal Number	Number in Words
$\frac{3}{10}$	0.3	three tenths
$\frac{9}{10}$	***0.9***	***nine tenths***
$\frac{\mathbf{5}}{\mathbf{10}}$	0.5	***five tenths***
$\frac{\mathbf{2}}{\mathbf{10}}$	***0.2***	two tenths
$\frac{\mathbf{7}}{\mathbf{10}}$	0.7	***seven tenths***
$\frac{4}{10}$	***0.4***	***four tenths***

You already know the place value for **whole numbers**—the ones, the tens, the hundreds, and the thousands. Look at the number 2 738.

Thousands	Hundreds	Tens	Ones
2	7	3	8

2. Fill in each blank below.

   a. The value of the 8 is 8 ones or ***8*** .

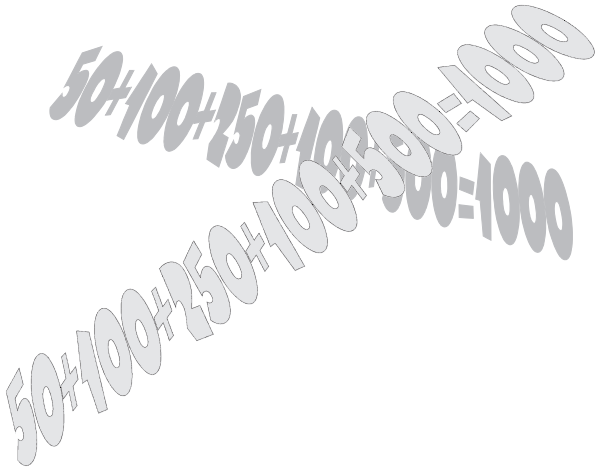
   b. The value of the 3 is 3 ***tens*** or 30.

   c. The value of the 7 is 7 hundreds or ***700*** .

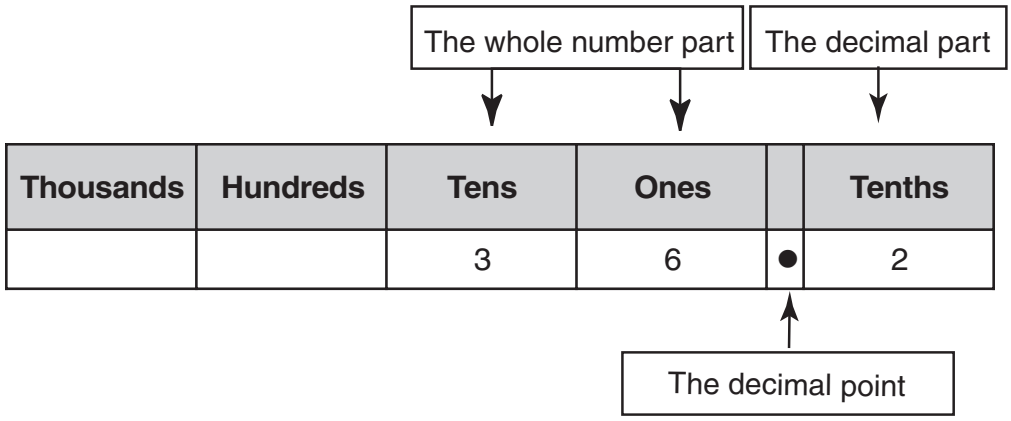
   d. The value of the 2 is 2 ***thousands*** or 2 000.

Although they are not shown on the chart above, more place value columns are to the right of the ones column.

The first place value column to the right of the ones is the **tenths**. You already know that a **tenth** is part of a whole. In fact, you learned that it takes 10 **tenths** to make **one whole**.



Look at the number **36.2**. We use a **decimal point** to separate the whole number from the decimal part (the part that is less than one).



The number **36.2** has ___3___ tens, ___6___ ones, and ___2___ tenths.

36.2 can also be written as **36** $\frac{2}{10}$.

Note that we READ the decimal point as "and".
We read the number as "thirty-six and two-tenths".

3. Write the number **4.8** in the place value chart.

Hundreds	Tens	Ones		Tenths
		4	●	*8*

In this number there are ___*4*___ ones and ___*8*___ tenths.

4.8 can also be written as **4** $\frac{8}{10}$

We say "four and ___*eight*___ tenths".

4. Write the number **0.9** in the place value chart. This number has no ones, tens, or hundreds. There is only a decimal part. However, all decimal numbers **must** have a digit in front of the decimal, so a zero is placed in the ones column.

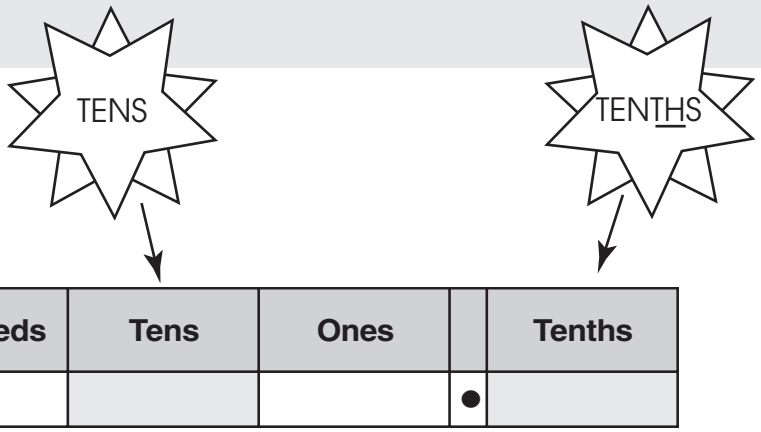
Hundreds	Tens	Ones		Tenths
		0	●	*9*

In this number there are ___*0*___ ones and ___*9*___ tenths.

0.9 can also be written as $\frac{\mathbf{9}}{\mathbf{10}}$

We say " ___*nine*___ tenths".

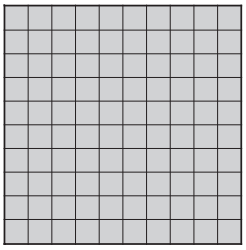
Be careful not to confuse tens with ten**th**s. Tens are whole numbers. Tenths are fractions or decimal numbers. **Tens** are two places to the left of the decimal point. **Tenths** are one place to the right of the decimal point.



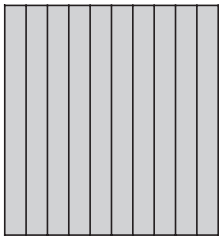
Hundreds	Tens	Ones		Tenths
			●	

Let's Talk about Tenths

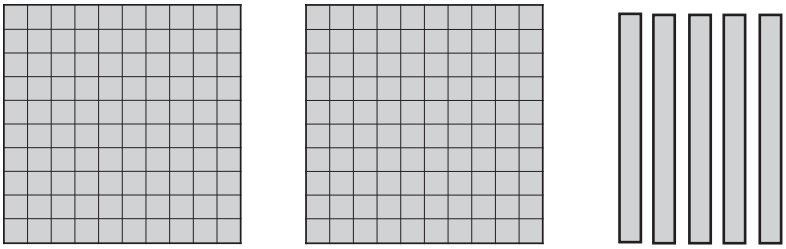
We can show decimal numbers by using base ten blocks. The hundreds flat is used to stand for **one whole**. It is used instead of the small unit cube so that it can be divided into smaller decimal number parts.

Let the hundreds flat  stand for 1.

What part of the flat would stand for one tenth (1/10)? You already know this. The answer is we need to divide the flat into ten parts (called rods) and use one of those rods to stand for one tenth.

Ten rods is 10 tenths  One rod is 1 tenth. 

We can show a decimal number like 2.5 using base ten blocks this way:



Hundreds	Tens	Ones		Tenths
		2	●	5

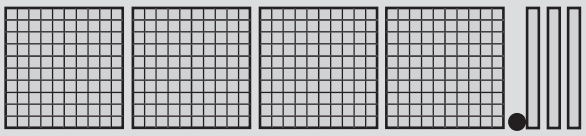
Two flats and five rods stand for 2 **ones** and 5 **tenths**.

The number is read as "**two and five tenths**".

Your Turn!

5. Look at each set of base ten blocks. Decide what decimal number is shown and write it in the place value chart.

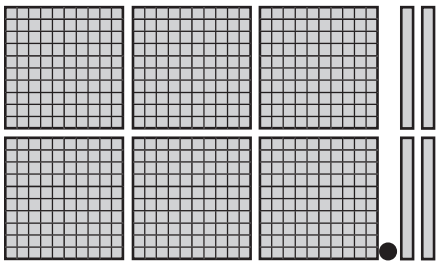
Example:



Tens	Ones		Tenths
	4	●	3

Read the number aloud: "Four and three tenths."

a. 6.4

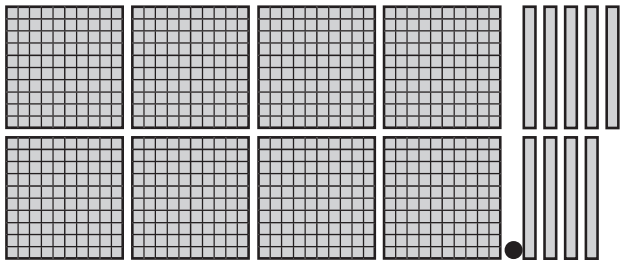


Tens	Ones		Tenths
	6	●	***4***

Read: "Six and four tenths"

Read the number aloud.

b. 8.9

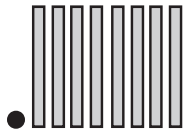


Tens	Ones		Tenths
	8	●	***9***

Read: "Eight and nine tenths"

Read the number aloud.

c. 0.8



Tens	Ones		Tenths
	0	●	*8*

Read: "Eight tenths"

Read the number aloud.

Meet the Hundredths

So far, we have extended the place value chart one place to the right of the decimal. We called this place value column the **tenths**. In the next column to the right of the tenths are the **hundredths**.

Hundreds	Tens	Ones		Tenths	Hundredths
3	4	2	●	5	8

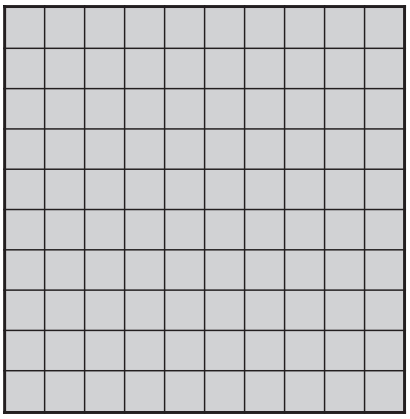
This number has

- 3 hundreds
- 4 tens
- 2 ones
- 5 tenths
- 8 hundredths

This number is read as "three hundred forty-two and fifty-eight hundredths".

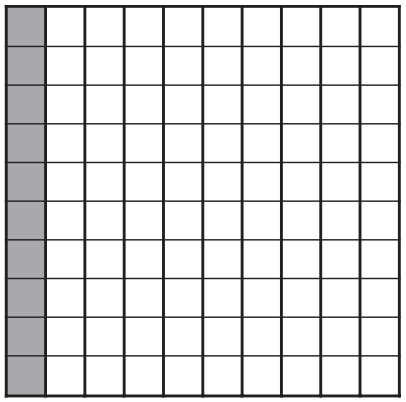
We can also show hundredths with base ten blocks. Remember that we use the hundreds flat to represent **one whole**.

One Whole →



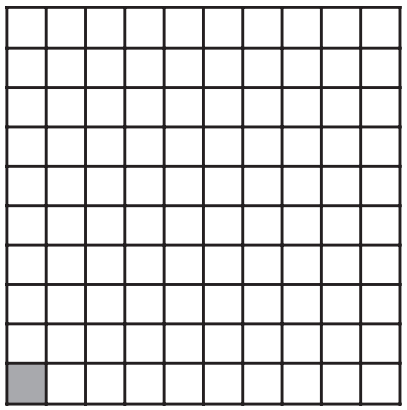
If we divide the **whole** into ten parts, each part is called a **tenth**.

One Tenth →

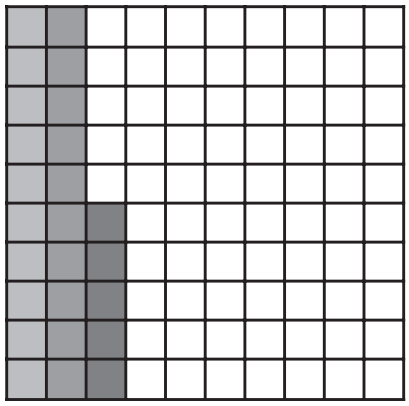


If we divide the **whole** into one hundred parts, each part is called a **hundredth**.

One Hundredth →



Look at the number 0.25. This number is read as "twenty-five hundredths". If we show this number on a hundreds grid, it looks like this. →



Can you see that 0.25 (twenty-five hundredths) is the same as 2 tenths and 5 hundredths? Each tenth is made up of 10 hundredths.

$$\frac{25}{100} = \frac{10}{100} + \frac{10}{100} + \frac{5}{100}$$

one tenth one tenth

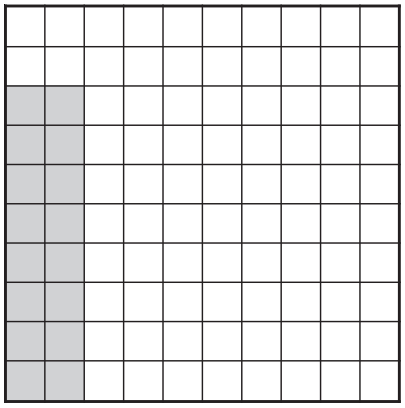
one tenth $\left[\frac{10}{100}\right]$ one tenth $\left[\frac{10}{100}\right]$ five hundredths $\left[\frac{5}{100}\right]$

Putting 0.25 onto a place value chart also shows that there are two tenths and 5 hundredths in twenty-five hundredths.

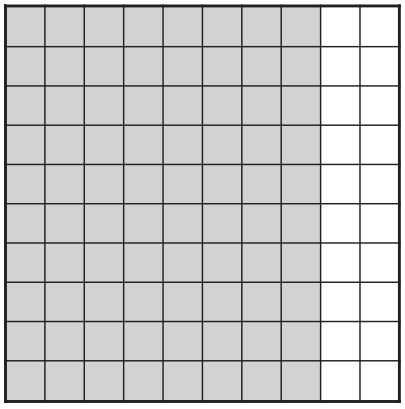
Hundreds	Tens	Ones		Tenths	Hundredths
		0	●	2	5

6. Write each fraction as a decimal number. Then shade the grid to show the tenths or hundredths.

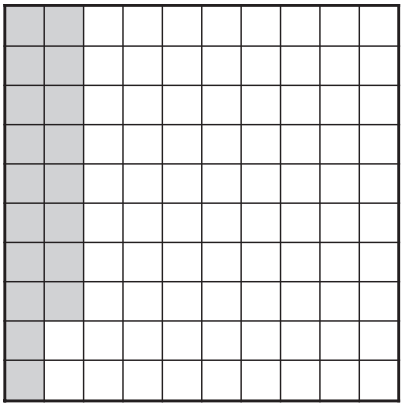
a. $\frac{8}{100}$ = ***0.08***



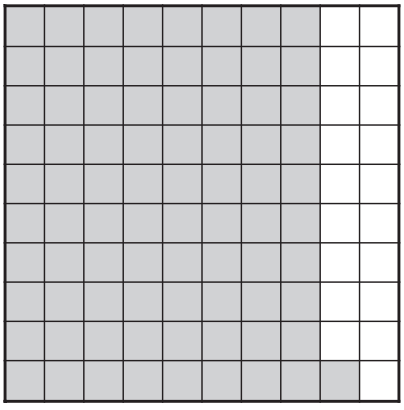
b. $\frac{8}{10}$ = ***0.8***



c. $\frac{18}{100}$ = ***0.18***

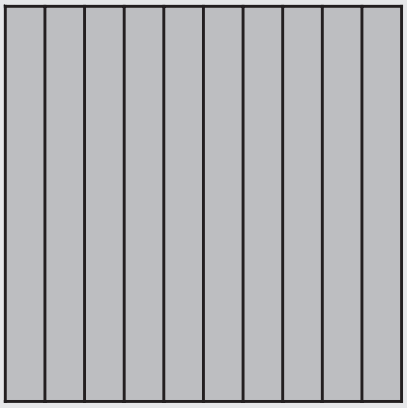


d. $\frac{81}{100}$ = ***0.81***

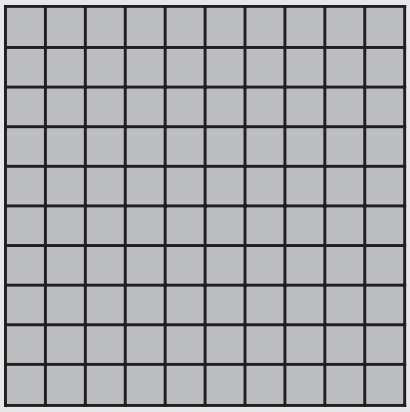


Remember:

If you have ten tenths,
*you have **one whole** or **1**.*

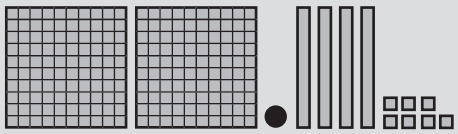


If you have 100 hundredths,
*you have **one whole** or **1**.*



To show decimals that have whole numbers, use a shaded 10 x 10 grid to stand for a **one**.

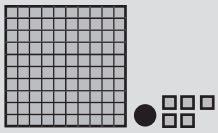
Example 1:



= 2 ones + 4 tenths + 7 hundredths
= 2.47

We read: Two and forty-seven hundredths

Example 2:

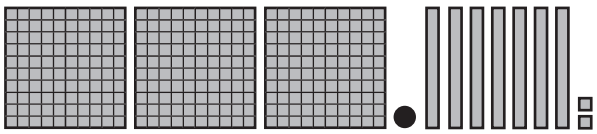


= 1 one + 0 tenths + 5 hundredths
= 1.05

We read: One and five hundredths

Your Turn!

7. Fill in the blanks with the correct place values and decimal numbers.

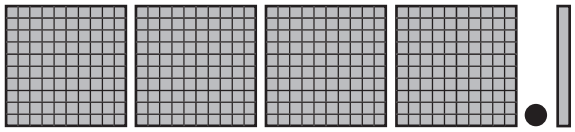


a. = 3_____***ones***_____ + ___***7***___ tenths + __***2***__ hundredths

= __***3.72***__

Read this number aloud.

Read: "Three and seventy-two hundredths"



b. = __***4***__ ones + 1 _____***tenth***_____ +__***0***__ hundredths

= __***4.1***__

Read this number aloud.

Read: "Four and ten hundredths" or "Four and one tenth"

c. = __***0***__ ones + ____***6***____ tenths + 9 _____***hundredths***_____

= __***0.69***__

Read this number aloud.

Read: "Sixty-nine hundredths"

8. Write each number in the place value chart provided. Then write the number on the line below.

Example:

two hundred thirty-six and forty-five hundredths

Hundreds	Tens	Ones		Tenths	Hundredths
2	3	6	●	4	5

The number is 236.45

a. one hundred twenty-three and twenty-three hundredths

Hundreds	Tens	Ones		Tenths	Hundredths
1	*2*	*3*	●	*2*	*3*

The number is *123.23*

b. thirty-one and sixty-seven hundredths

Hundreds	Tens	Ones		Tenths	Hundredths
	3	*1*	●	*6*	*7*

The number is *31.67*

c. fifty-six and two hundredths

Hundreds	Tens	Ones		Tenths	Hundredths
	5	*6*	●	*0*	*2*

The number is *56.02*

9. Write each number below as a fraction and as a decimal number. The first one is done for you.

NUMBER IN WORDS	FRACTION	DECIMAL NUMBER
thirty-five hundredths	$\frac{35}{100}$	0.35
fifty-six hundredths	$\frac{\boldsymbol{56}}{\boldsymbol{100}}$	***0.56***
eleven hundredths	$\frac{\boldsymbol{11}}{\boldsymbol{100}}$	***0.11***
seventy-five hundredths	$\frac{\boldsymbol{75}}{\boldsymbol{100}}$	***0.75***
nine hundredths	$\frac{\boldsymbol{9}}{\boldsymbol{100}}$	***0.09***
twenty-one hundredths	$\frac{\boldsymbol{21}}{\boldsymbol{100}}$	***0.21***

E. Using Decimals With Money Numbers

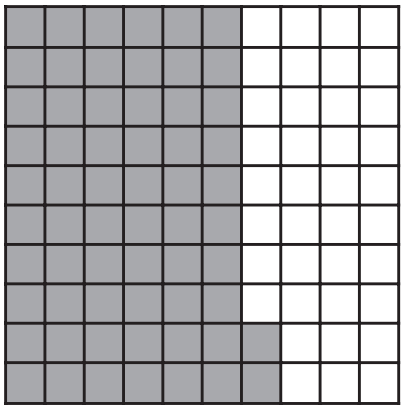
You have already used decimals many times in your life. Every time you talk about or use money you are actually using decimal numbers.

Look at this amount: **$5.62**

The $5 is the whole number.	The 62 cents is the decimal number part.

Each dollar is divided into 100 equal parts. Each of these parts is called a cent. There are 100 cents in every dollar.

We can show 62 cents on a 10 x 10 grid by shading in 62 of the 100 squares.



0.62 is the same as $\frac{62}{100}$.

62 cents is $\frac{62}{100}$ of a dollar.

The 0 in $0.62 is important. If you write only $.62, it might easily be confused with $62. What a difference that could make! The 0 shows clearly the difference between 62 dollars and 62 cents.

15 hundredths	=	15 cents	=	$0.15
76 hundredths	=	76 cents	=	$0.76
23 hundredths	=	23 cents	=	$0.23
5 hundredths	=	5 cents	=	$0.05

Your Turn!

1. Use decimals and then fractions to show the following numbers.

   a. six and eight tenths

   6.8 ***$6\frac{8}{10}$***

   b. two and thirteen hundredths

   2.13 ***$2\frac{13}{100}$***

   c. twelve and five hundredths

   12.05 ***$12\frac{5}{100}$***

   d. ninety-eight cents

   $0.98 ***$\frac{98}{100}$***

   e. twenty eight dollars and fifteen cents

   $28.15 ***$28\frac{15}{100}$***

2. Solve the following questions dealing with money amounts. Be sure to keep the decimal points lined up. Don't forget the dollar signs!

   a. $\begin{array}{r} \$14.35 \\ +\ 48.23 \\ \hline \end{array}$ ***$62.58***

   b. $\begin{array}{r} \$103.47 \\ -\ 35.46 \\ \hline \end{array}$ ***$68.01***

   c. $\begin{array}{r} \$5.11 \\ +\ 0.99 \\ \hline \end{array}$ ***$ 6.10***

   d. $\begin{array}{r} \$72.30 \\ -\ 65.12 \\ \hline \end{array}$ ***$ 7.18***

   e. $\begin{array}{r} \$87.12 \\ +\ 3.50 \\ \hline \end{array}$ ***$ 90.62***

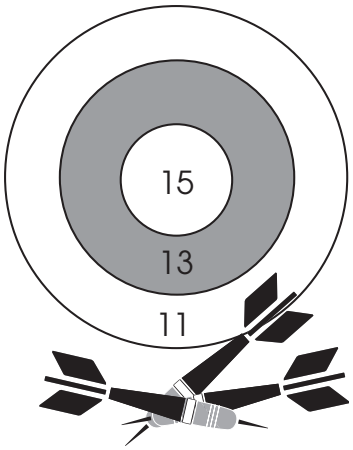
F. Problem Solving

Using the *Guess-and-Check* Strategy

In W1 - Lesson 3, you were introduced to the *Guess-and-Check* Strategy. Remember, this strategy works best if you make reasonable guesses based on the information given in the problem.

Use the *Guess-and-Check* strategy to solve each problem below.

1. Alex threw five darts at the dartboard shown. All five darts landed on the board. His score was 63. Tell one way the darts could have landed on the dartboard.



Answer to the Problem: ***There are three possible answers.***
The five darts could have landed on
11 + 13 + 13 + 13 + 13 = 63
11 + 11 + 13 + 13 + 15 = 63
11 + 11 + 11 + 15 + 15 = 63

2. An ice-cream store sold 68 ice cream cones in one day.
   It sold 35 chocolate cones.
   It sold twice as many strawberry cones as vanilla cones.

   How many cones of each kind did the ice cream store sell?

Hint: Think about the problem this way.

Chocolate Cones	+	Strawberry Cones	+	Vanilla Cones	=	Total Cones

Answer to the Problem: ***The store sold 35 chocolate cones***
22 strawberry cones
11 vanilla cones
Total 68 cones

3. John has a jar of pennies, nickels, and dimes. He has 64 coins altogether.
   He has 24 pennies.
   He has 3 times as many dimes as he has nickels.

   How many coins of each kind does he have?

Hint: Think about the problem this way.

Number of Pennies	+	Number of Nickels	+	Number of Dimes	=	Total Number of Coins

Answer to the Problem:

John has	***24***	***pennies***
	10	***nickels***
	30	***dimes***
Total	***64***	***coins***

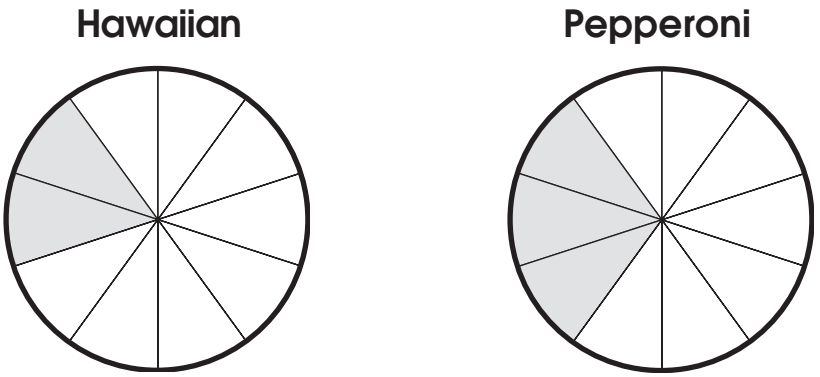
Homework

1. Solve the following word problems.

   a. Sam has saved $43.25 to spend on his summer holiday trip. His sister, Janet, has saved $50.75. How much have they saved together?

   Sentence Answer: ***They have saved $94.00 together.***

   b. Two different types of pizzas are served at a party. All the pizzas have been cut into 10 equal pieces. After everyone had left, two pieces of Hawaiian pizza and three pieces of Pepperoni pizza were left over. Shade each pizza to show how many pieces were left.



   What fraction of the Hawaiian pizza was eaten?

   Sentence Answer: ***Eight tenths*** $\left(\frac{8}{10}\right)$ ***of the Hawaiian pizza was eaten.***

   What fraction of the Pepperoni pizza was eaten?

   Sentence Answer: ***Seven tenths*** $\left(\frac{7}{10}\right)$ ***of the Pepperoni pizza was eaten.***

2. Complete the chart below by filling in the required fraction, decimal number, or written numbers. The first line is done for you.

FRACTION	DECIMAL NUMBER	NUMBER IN WORDS
$\frac{38}{100}$	0.38	thirty-eight hundredths
$\frac{9}{10}$	***0.9***	***nine tenths***
$\frac{\boldsymbol{36}}{\boldsymbol{100}}$	0.36	***thirty-six hundredths***
$\frac{\boldsymbol{2}}{\boldsymbol{100}}$	***0.02***	two hundredths
$\frac{\boldsymbol{60}}{\boldsymbol{100}}$	0.60	***sixty hundredths***
$\frac{\boldsymbol{4}}{\boldsymbol{10}}$	***0.4***	four tenths