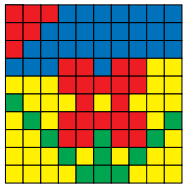
Many Ways to Show Decimals

Hundredths on Grids

In an art class, Frank used colored tiles to make a mosaic using a 10 × 10 grid. He used a data table to keep track of the number of tiles he used for each color.



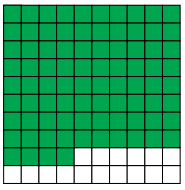
Number of Each Color

Color	Number of Tiles
blue	30
green	12
yellow	32
red	20
orange	6

1. Make a chart to show what fraction of the grid is colored by each color. Write a common fraction, decimal fraction, and words in a chart.

Color	Common Fraction	Decimal Fraction	Number in Words
blue	$\frac{30}{100}$	.30	thirty hundredths

Mr. Moreno displayed a 10 × 10 grid that was partially shaded and asked the students to decide how much of the grid was shaded.



Lee Yah's group wrote 0.84 as their answer.

Michael'group wrote $\frac{84}{100}$.

Nila's group wrote 0.8 + 0.04 as their response, and Ming's group wrote eighty-four hundredths as their answer.

2. Mr. Moreno said that they were all correct. Explain how each answer can be correct.

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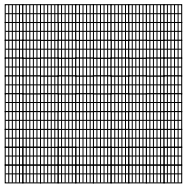
Use the *Decimal Grids: Hundredths* pages in the *Student Activity Book* to practice representing decimals.

Thousandths on Grids

3. **A.** Mr. Moreno divided each square in the 10 × 10 grid into tiny rectangles. How many tiny rectangles are in each small square?

B. How many tiny rectangles are there in one row of small squares?

C. How many tiny rectangles are there in one whole grid?



Each tiny rectangle represents one-thousandths ($\frac{1}{1000}$) of the whole. This is written 0.001 as a decimal. Grids like this can be used to model thousandths.

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Student Guide

Many Ways to Show Decimals (SG pp. 368–374) Questions 1–12

1.

Color	Common Fraction	Decimal Fraction	Number in Words
blue	$\frac{30}{100}$	.30	thirty hundredths
gree	$\frac{12}{100}$	.12	twelve hundredths
yellow	$\frac{32}{100}$	.32	thirty-two hundredths
red	$\frac{20}{100}$	.20	twenty hundredths
orange	$\frac{6}{100}$	.60	sixty hundredths

2.* All three answers are correct because they all represent the part of the grid that is shaded. There are 100 small boxes and 84 are shaded, so that is $\frac{84}{100}$. In the decimal notation, it shows that the whole is divided into pieces that are $\frac{1}{10}$ the size of the whole. Nila's group saw the 8 rows that are each $\frac{1}{10}$ of the whole and 4 boxes that are each $\frac{1}{100}$ of the whole. Nila's group is using expanded form.

3. **A.** 10
   B. 100
   C. 1000

*Answers and/or discussion are included in the lesson.

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4. A.* 3 full rows are shaded or 0.3 or three tenths of the grid is shaded.

B.* 30 squares; 0.30 or thirty hundredths of the grid is shaded.

C.* 300 tiny rectangles or 0.300 or three hundred thousandths of the grid is shaded.

D.* five squares are shaded; 0.05 or five hundredths of the grid is shaded.

E.* 7 more tiny rectangles; .007 or seven thousandths of the grid is shaded.

F.* .3 + .05 + .007 = 0.357

5. A.* Between .35 and .36

B.* Point A represents 0.357.

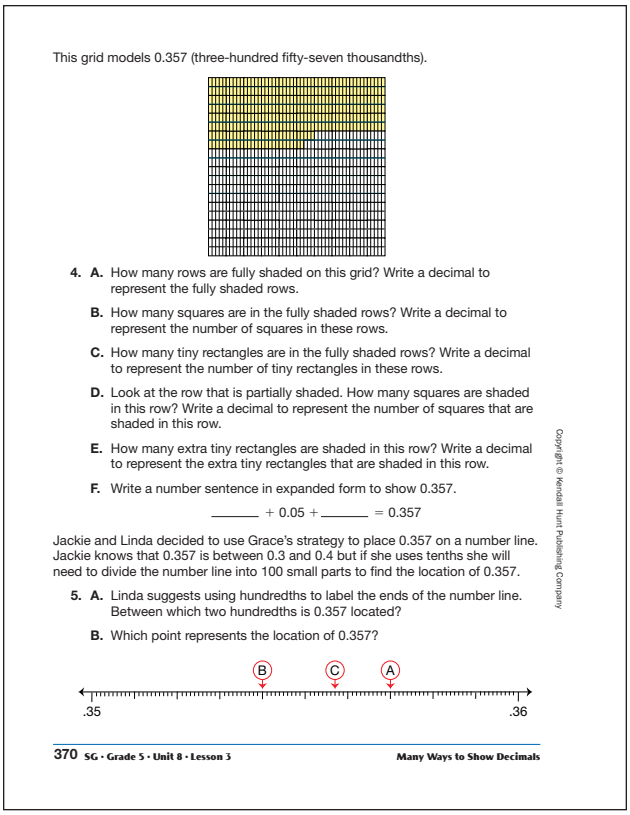
6. A.* 0.083 or eighty-three thousandths

B.* Point B represents 0.083

7. A. Grid A: 0.642; .6 + .04 + .002 = .642
Grid B: 0.649; .6 + .04 + .009 = .649

B. Grid A: six hundred forty-two thousandths
Grid B: six hundred forty-nine thousandths

C.* Both Points A represent 0.642.
Both Points B represent 0.649.



This grid models 0.357 (three-hundred fifty-seven thousandths).

4. **A.** How many rows are fully shaded on this grid? Write a decimal to represent the fully shaded rows.
B. How many squares are in the fully shaded rows? Write a decimal to represent the number of squares in these rows.
C. How many tiny rectangles are in the fully shaded rows? Write a decimal to represent the number of tiny rectangles in these rows.
D. Look at the row that is partially shaded. How many squares are shaded in this row? Write a decimal to represent the number of squares that are shaded in this row.
E. How many extra tiny rectangles are shaded in this row? Write a decimal to represent the extra tiny rectangles that are shaded in this row.
F. Write a number sentence in expanded form to show 0.357.
_____ + 0.05 + _____ = 0.357

Jackie and Linda decided to use Grace's strategy to place 0.357 on a number line. Jackie knows that 0.357 is between 0.3 and 0.4 but if she uses tenths she will need to divide the number line into 100 small parts to find the location of 0.357.

5. **A.** Linda suggests using hundredths to label the ends of the number line. Between which two hundredths is 0.357 located?
B. Which point represents the location of 0.357?

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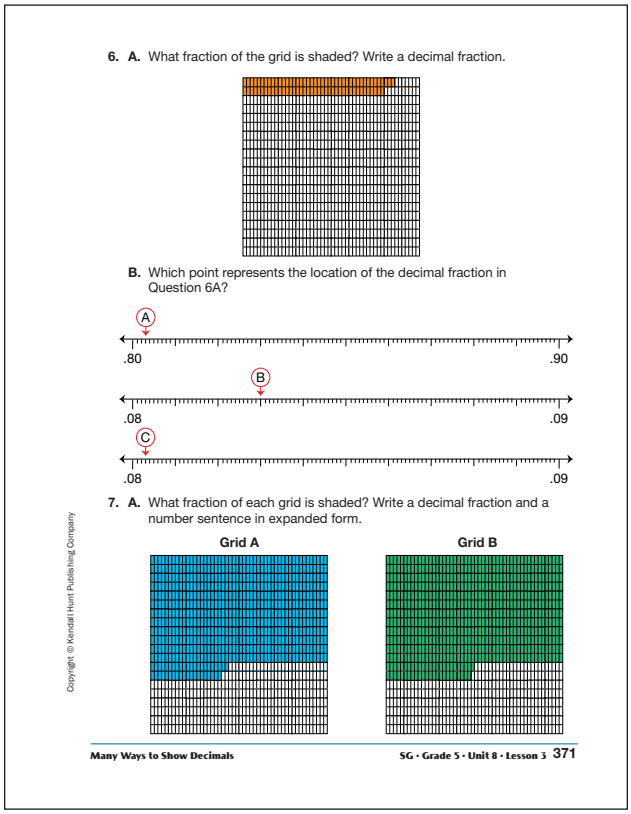

6. **A.** What fraction of the grid is shaded? Write a decimal fraction.

B. Which point represents the location of the decimal fraction in Question 6A?

7. **A.** What fraction of each grid is shaded? Write a decimal fraction and a number sentence in expanded form.

Grid A Grid B

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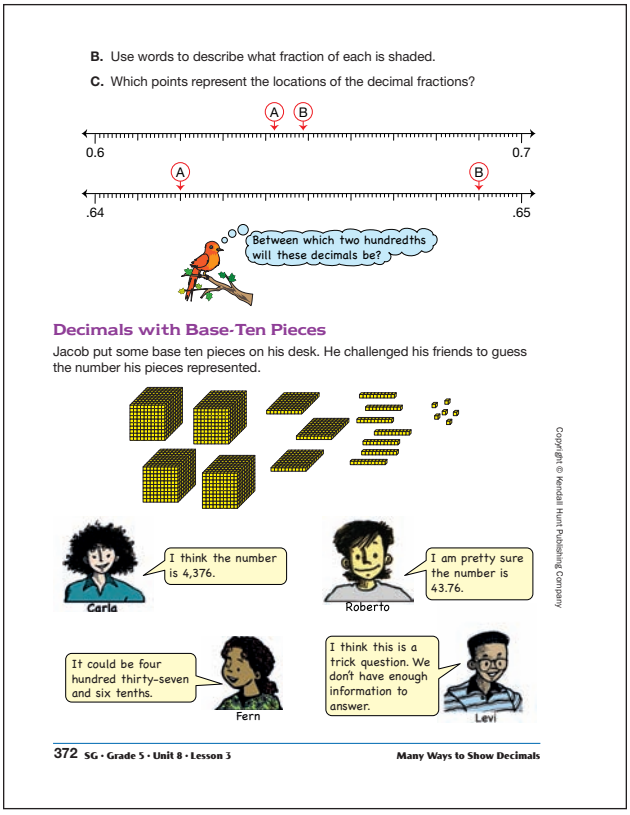

B. Use words to describe what fraction of each is shaded.
C. Which points represent the locations of the decimal fractions?

Decimals with Base-Ten Pieces

Jacob put some base ten pieces on his desk. He challenged his friends to guess the number his pieces represented.

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***Answers and/or discussion are included in the lesson.**

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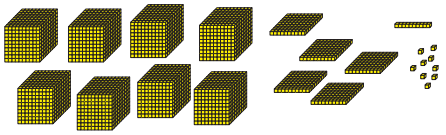
8. Use base ten pieces or base ten shorthand to show each number.

A. 2469 **B.** 45.75 **C.** 4.503

D. 280.4 **E.** 8.34

F. Explain how the value of the digit 4 changes in the numbers in Questions A–E.

Ana put some base ten pieces on her desk.



She read her number as eight and five hundred and nineteen thousandths.

Irma used base ten shorthand and a place value chart to show the value of Ana's pieces.

Ones	Tenths	Hundredths	Thousandths

Luis showed Ana's number using expanded form

8 + .5 + .01 + .009

9. **A.** How is Irma's place value chart similar to Luis's expanded form? How are they different?

B. Write the value of Ana's base ten pieces in standard form.

Explore

10. Write each number using expanded form.

A. 5.905 **B.** 7.009 **C.** 3.664

D. 2.222 **E.** 23.528

F. six and one hundred sixty-four thousandths

G. Write the number in Question 10C using words.

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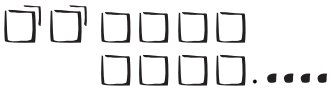
8. **A.**

B.

C.

D. 

E.

F.* If you line the numbers up on the place value chart from largest to smallest, you can see that each time the 4 moves a place to the right it is $\frac{1}{10}$ the value it was in the place to the left. If you move from the smallest number to the largest number, each time you move the 4 a place to the left it gets 10 times larger.

9. **A.** Possible response: Both the place value chart and expanded form break the number apart using the place value of each number. Irma uses models to show the value of each digit and Luis uses symbols. Irma arranged the base-ten shorthand on a chart and Luis put the digits into a number sentence.

B. 8.519

10. **A.** 5.905= 5 + .9 + .005

B. 7.009 = 7 + .009

C. 3.664 = 3 + .6 + .06 + .004

D. 2.222 = 2 + .2 + .02 + .002

E. 23.528 = 23 + .5 + .02 + .008

F. 6 + .1 + .06 + .004

G. three and six hundred sixty four thousandths

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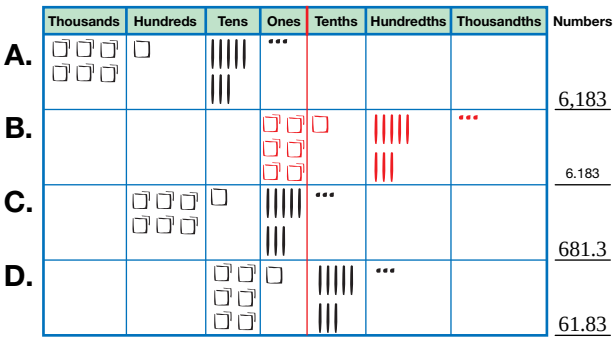
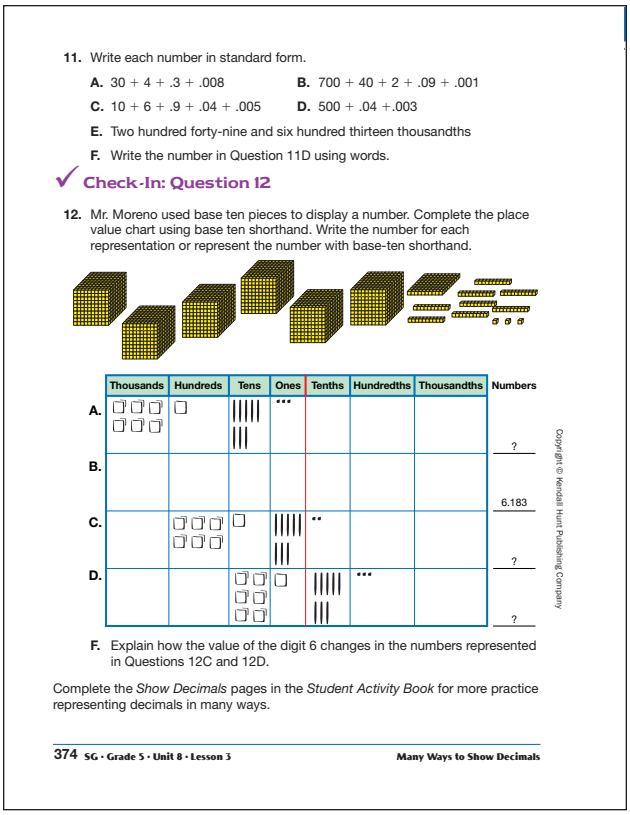
11. A. 34.308
B. 742.091
C. 16.945
D. 500.043
E. 249.613
F. five hundred and forty-three thousandths

12.



E. Possible response: In the number 613.3 the six is worth 6 × 100 or 600. In the number 61.83 the six is worth 6 × 10 or 60. That means that when the six moved one place to the right from the hundreds place to the tens place it is worth $\frac{1}{10}$ as much.



11. Write each number in standard form.

A. 30 + 4 + .3 + .008
B. 700 + 40 + 2 + .09 + .001
C. 10 + 6 + .9 + .04 + .005
D. 500 + .04 +.003
E. Two hundred forty-nine and six hundred thirteen thousandths
F. Write the number in Question 11D using words.

✓ Check-In: Question 12

12. Mr. Moreno used base ten pieces to display a number. Complete the place value chart using base ten shorthand. Write the number for each representation or represent the number with base-ten shorthand.

Thousands | Hundreds | Tens | Ones | Tenths | Hundredths | Thousandths | Numbers

A. ?
B. 6.183
C. ?
D. ?

F. Explain how the value of the digit 6 changes in the numbers represented in Questions 12C and 12D.

Complete the *Show Decimals* pages in the *Student Activity Book* for more practice representing decimals in many ways.

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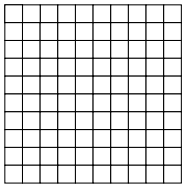
Name _____ Date _____

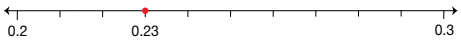
Decimal Grids: Hundredths

1. **A.** Shade twenty-three hundredths of the grid.



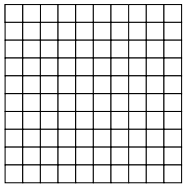
B. Write twenty-three hundredths as a decimal fraction.

Grace shows the decimal 0.23 on a number line. Since she knows that 0.23 is between two tenths and three tenths she uses these decimals to label the ends of her number line.



Grace used a dot to show the location of twenty-three hundredths.

2. **A.** Shade $\frac{47}{100}$ of the grid.



B. Write $\frac{47}{100}$ as a decimal fraction.

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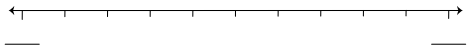
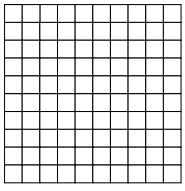
Name _____ Date _____

C. Use Grace's strategy to locate $\frac{47}{100}$ on the number line. First decide between which tenths the decimal is located. Label the end points of the number line with these tenths. Then place a dot on the number line to show the location of the decimal.



D. Name the fraction of the grid that is **not** shaded. Write a decimal fraction.

3. **A.** Shade sixty-eight hundredths of the grid.



B. Write sixty-eight hundredths as a decimal fraction.

C. Use expanded form to represent sixty-eight hundredths.

D. Locate sixty-eight hundredths on the number line.

E. Name the fraction of the grid that is **not** shaded. Write a decimal fraction and a number sentence in expanded form.

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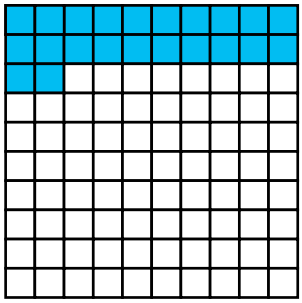
Student Activity Book

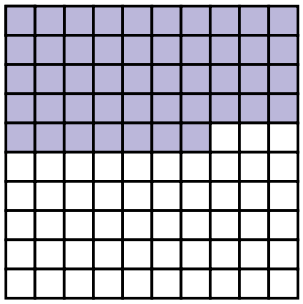
Decimal Grids: Hundredths (SAB pp. 299–300) Questions 1–3

1. **A.**



B. 0.23

2. **A.**

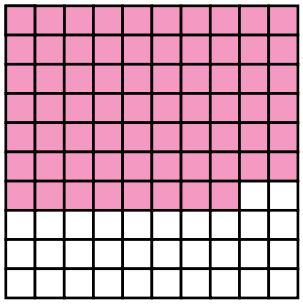


B. 0.47

C.

D. 0.53

3. **A.**



B. 0.68

C. .6 +.08 = .68

D.

E. .3 +.02 = .32

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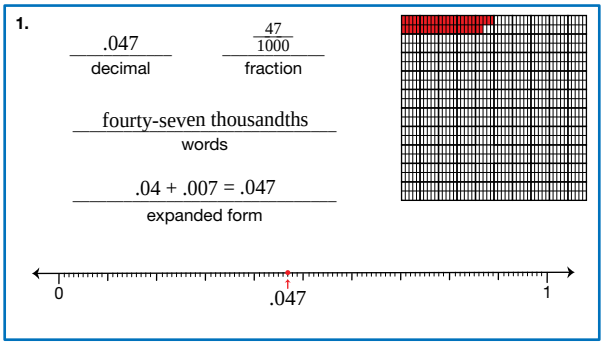
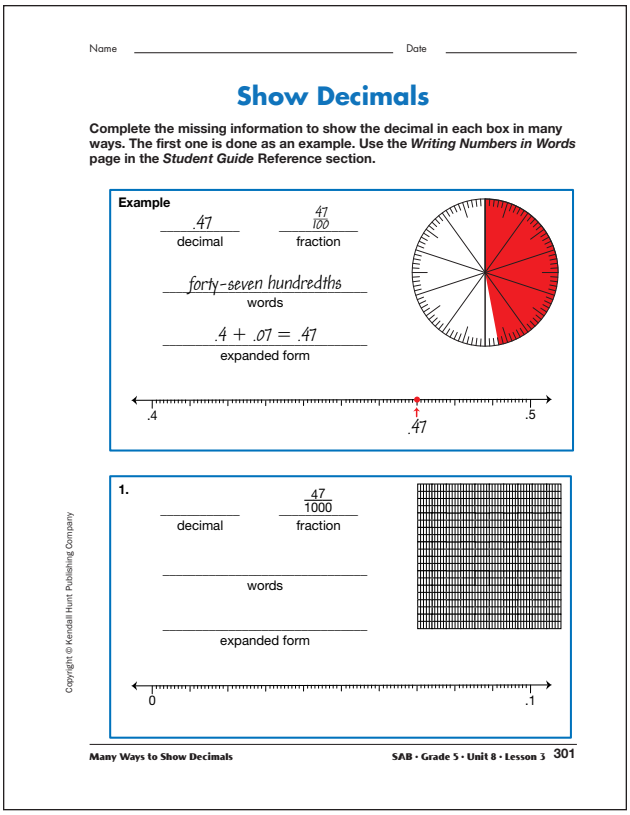
Show Decimals (SAB pp. 301–304)
Questions 1–7





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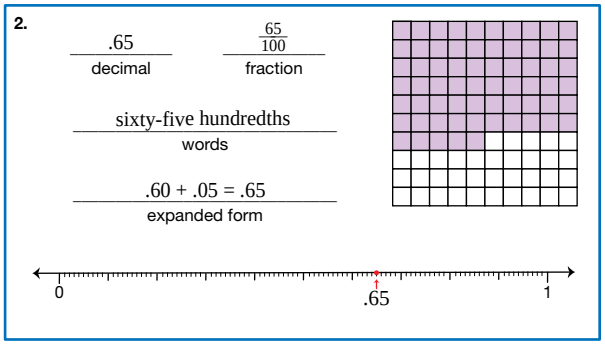

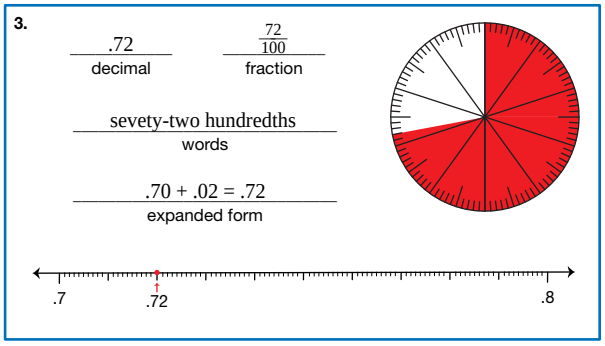

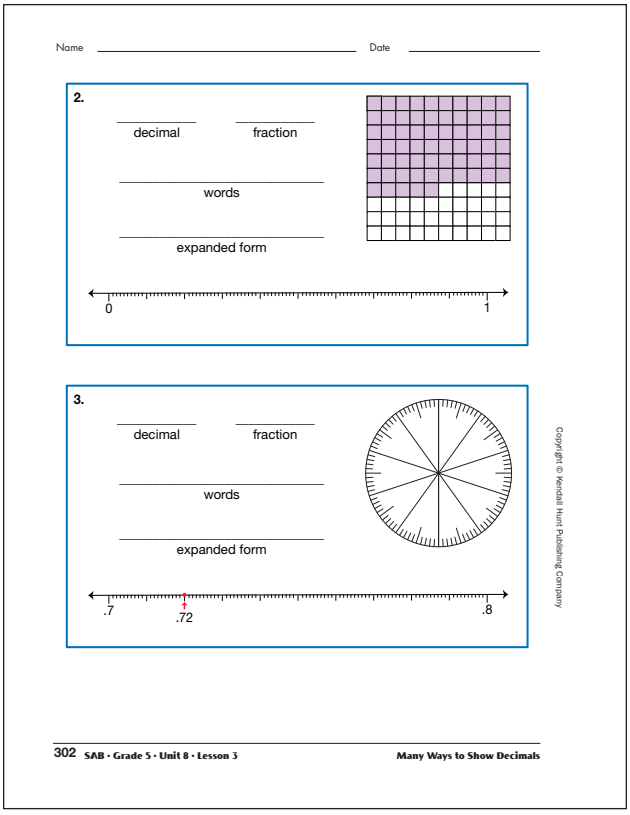

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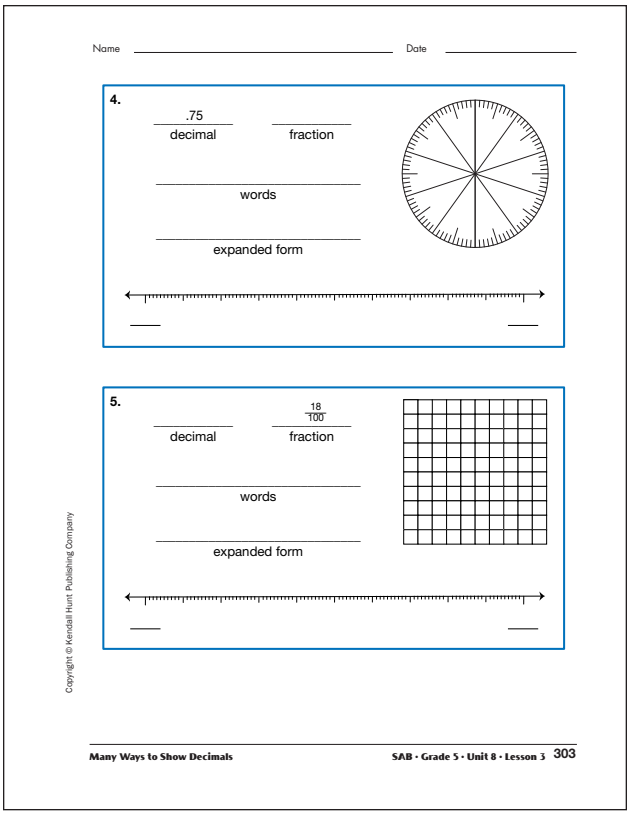
Name _____ Date _____

4.

.75
decimal

_____
fraction

_____
words

_____
expanded form

5.

_____
decimal

$\frac{18}{100}$
fraction

_____
words

_____
expanded form

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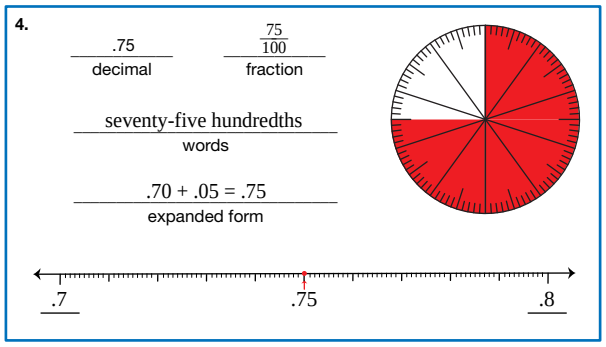

4.

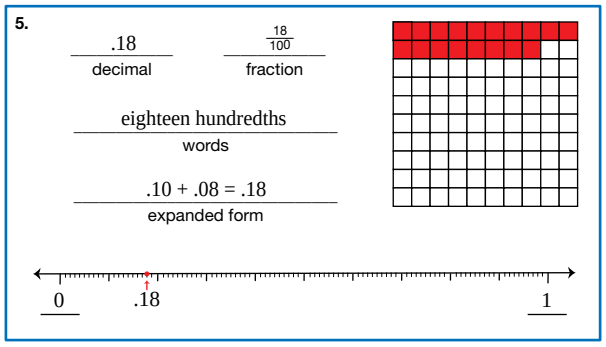
.75
decimal

$\frac{75}{100}$
fraction

seventy-five hundredths
words

.70 + .05 = .75
expanded form

.7 .75 .8


5.

.18
decimal

$\frac{18}{100}$
fraction

eighteen hundredths
words

.10 + .08 = .18
expanded form

0 .18 1

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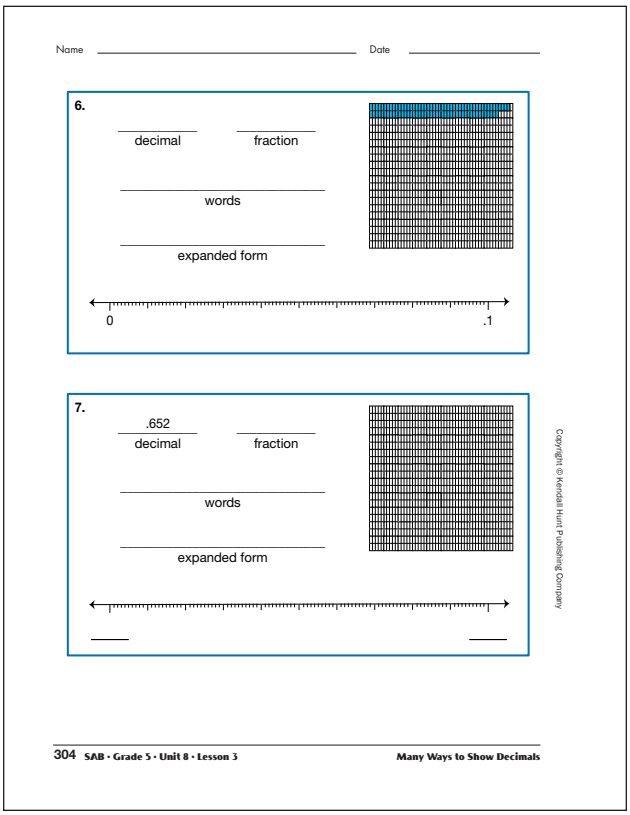
Name _____ Date _____

6.

_____
decimal

_____
fraction

_____
words

_____
expanded form

0 .1

7.

.652
decimal

_____
fraction

_____
words

_____
expanded form

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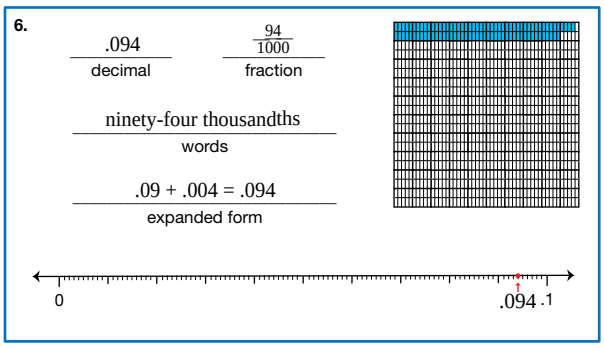

6.

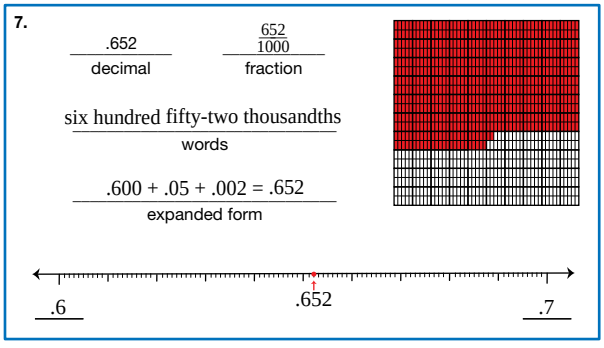
.094
decimal

$\frac{94}{1000}$
fraction

ninety-four thousandths
words

.09 + .004 = .094
expanded form

0 .094 .1


7.

.652
decimal

$\frac{652}{1000}$
fraction

six hundred fifty-two thousandths
words

.600 + .05 + .002 = .652
expanded form

.6 .652 .7

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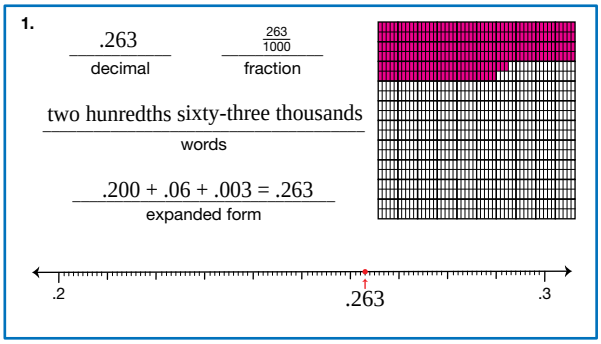
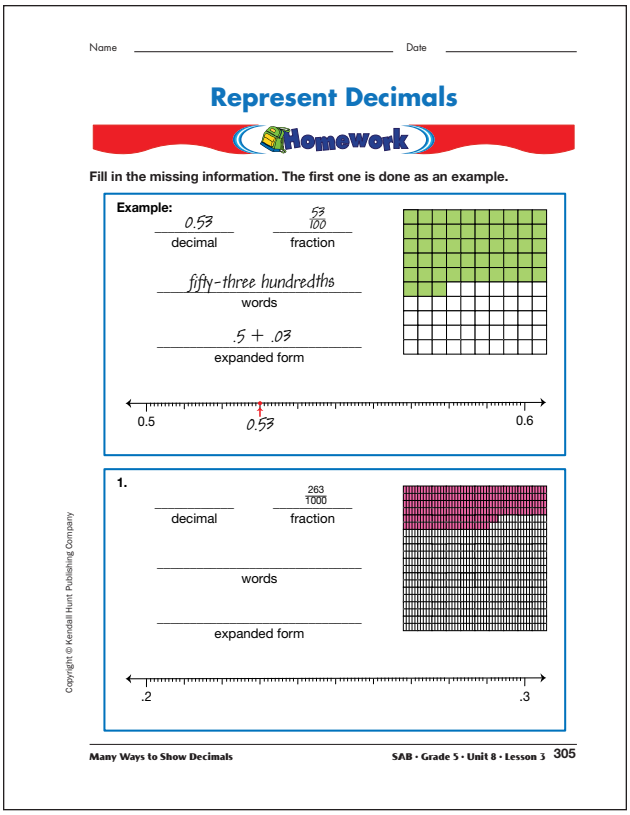
Represent Decimals (SAB pp. 305–308)
Homework
Questions 1–7





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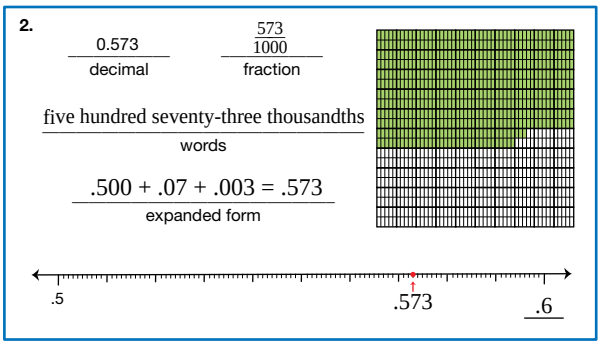

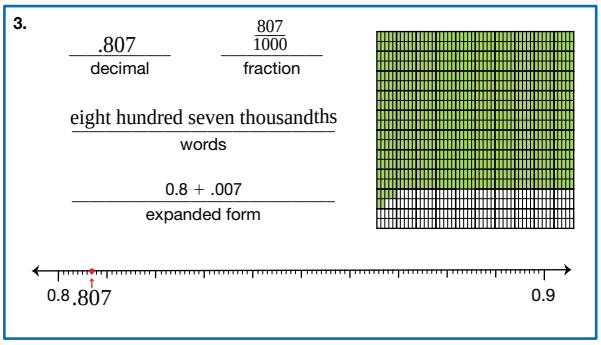

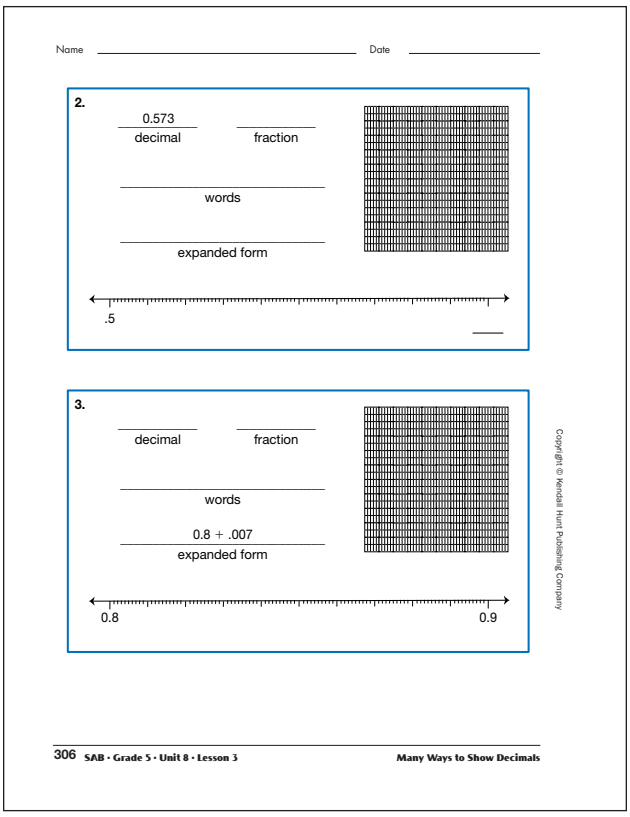

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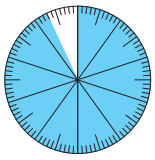
Name _____ Date _____

4.

_____ decimal _____ fraction

_____ words

_____ expanded form



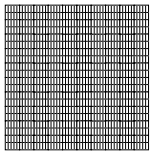
.9 1.0

5.

_____ decimal _____ fraction

seven hundred twenty-four thousandths words

_____ expanded form



0.7 ____

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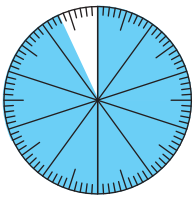
4.

.93 decimal

$\frac{93}{100}$ fraction

ninety-three hundredths words

.9 + .03 = .93 expanded form



.9 .93 1.0

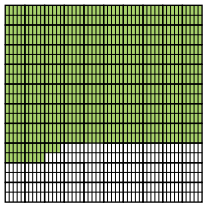
5.

.724 decimal

$\frac{724}{1000}$ fraction

seven hundred twenty-four thousandths words

.700 + .02 + .004 = .724 expanded form



0.7 .724 .8

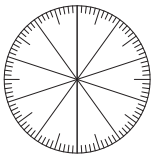
Name _____ Date _____

6.

.06 decimal _____ fraction

_____ words

_____ expanded form



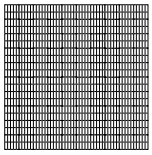
____ ____

7.

.065 decimal _____ fraction

_____ words

_____ expanded form



____ ____

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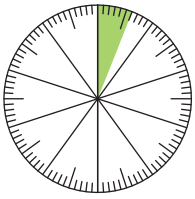
6.

.06 decimal

$\frac{6}{100}$ fraction

six hundredths words

.0 + .06 = .06 expanded form



0 .06 .1

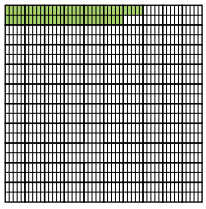
7.

.065 decimal

$\frac{65}{1000}$ fraction

sixty-five thousandths words

.06 + .005 = .065 expanded form



.06 .065 .07

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