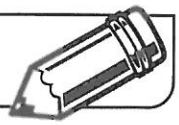
Name _____ Date _____ Time _____

LESSON 8•1

Exploring Least Common Multiples



One way to find a common denominator is to use the least common multiple. The LCM is the smallest number that is a multiple of the given denominators.

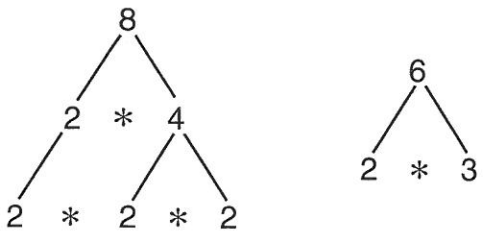
You can find the least common multiple by making lists of multiples.

Find the least common multiple for $\frac{4}{9}$, $\frac{5}{6}$, and $\frac{1}{4}$. List the multiples of each denominator.

- Multiples of 9: _____
- Multiples of 6: _____
- Multiples of 4: _____
- Least common multiple: _____

Another way to find the least common multiple is to use prime factorization.

Find the least common multiple for 8 and 6.



Step 1 Use factor trees to find the prime factorization.

Step 2 Count the appearance of each different prime number. Note only the largest counts.

- 2 appears 3 times in the prime factorization of 8.
- 3 appears once in the prime factorization of 6.

Step 3 Write a multiplication expression using these counts.

- $2 * 2 * 2 * 3 = 24$ so 24 is the least common multiple of 8 and 6.

Use the prime factorization method to find the LCM.

1. 9, 6, and 4 LCM: _____

2. 20 and 90 LCM: _____

3. 15 and 49 LCM: _____

4. 12, 15, and 25 LCM: _____

5. What might be an advantage or disadvantage to using the prime factorization method to find the least common multiple?

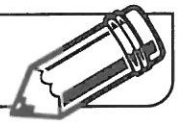
_____

_____

Name _____ Date _____ Time _____

LESSON 8•3

Addition and Subtraction Patterns



Add.

1. a. $\frac{1}{1} + \frac{1}{2} =$ _____ b. $\frac{1}{2} + \frac{1}{3} =$ _____ c. $\frac{1}{3} + \frac{1}{4} =$ _____

   d. $\frac{1}{4} + \frac{1}{5} =$ _____ e. $\frac{1}{5} + \frac{1}{6} =$ _____

2. What pattern do you notice in Problems 1a–1e? _____

   _____

   _____

3. Use the pattern above to solve these problems.

   a. $\frac{1}{6} + \frac{1}{7} =$ _____ b. $\frac{1}{10} + \frac{1}{11} =$ _____ c. $\frac{1}{99} + \frac{1}{100} =$ _____

4. Do you think this pattern also works for problems like $\frac{1}{8} + \frac{1}{3}$? Explain.

   _____

   _____

5. The plus signs in Problem 1 have been replaced with minus signs. Find each answer.

   a. $\frac{1}{1} - \frac{1}{2} =$ _____ b. $\frac{1}{2} - \frac{1}{3} =$ _____ c. $\frac{1}{3} - \frac{1}{4} =$ _____

   d. $\frac{1}{4} - \frac{1}{5} =$ _____ e. $\frac{1}{5} - \frac{1}{6} =$ _____

   f. Describe the pattern. _____

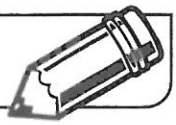
   _____

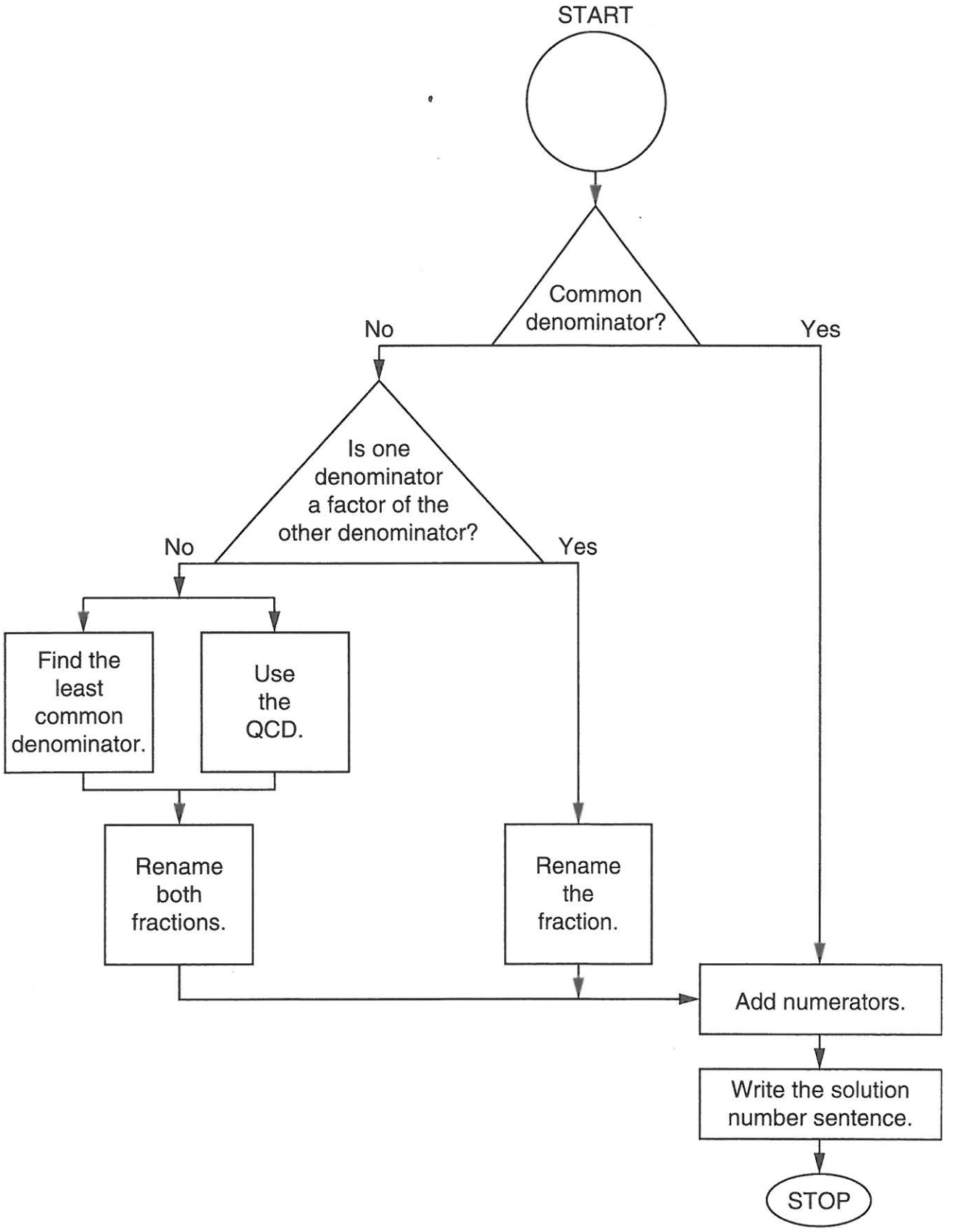
   _____

Name Date Time

LESSON 8·4

Charting Common Denominators

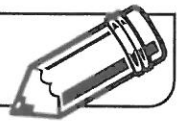




Name Date Time

LESSON 8•4

Exploring Equivalent Fractions



1. Do equivalent fractions convert to the same decimal? _____

2. Complete the fraction column in the table so there are 10 equivalent fractions.

3. Use your calculator to convert each fraction to a decimal. Write the display in the decimal column. (Don't forget to use a repeat bar, if necessary.)

Fractions	Decimals

4. Explain your results. Describe the relationship between the equivalent fractions and their decimal form.

_____

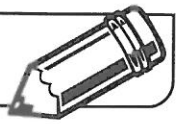
_____

_____

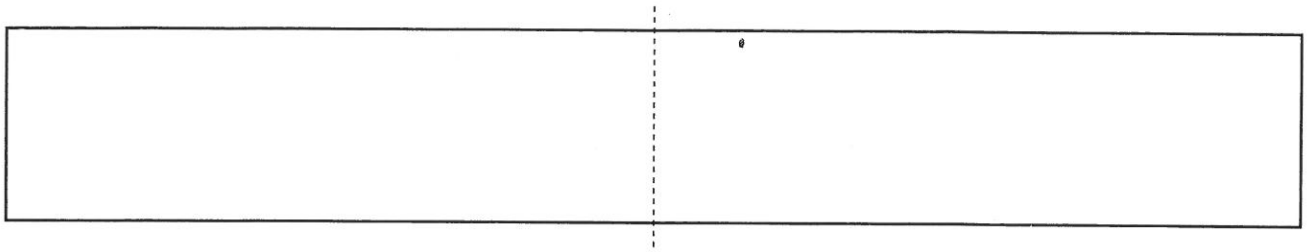
Name Date Time

LESSON 8·5

Equivalent Fractions



Use the fraction stick to find equivalent fractions. A whole stick is worth 1.



1. Divide the fraction stick into 4 equal parts.

   Find the equivalent fraction.

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

2. Divide the fraction stick into 8 equal parts.

   Find the equivalent fractions.

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

3. Divide the fraction stick into 16 equal parts.

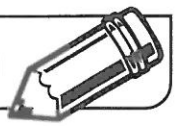
   Find the equivalent fractions.

   $\frac{1}{2} = \frac{\square}{4} = \frac{\square}{8} = \frac{\square}{16}$

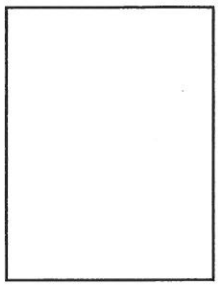
Name Date Time

LESSON 8•6

An Area Model for Fraction Multiplication



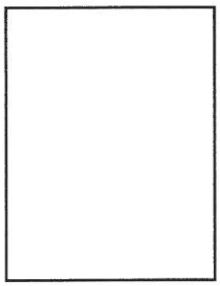
1. Use the rectangle at the right to find $\frac{2}{3} * \frac{3}{4}$.



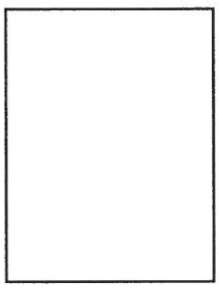
$\frac{2}{3} * \frac{3}{4} =$ _____

Your completed drawing in Problem 1 is called an **area model.**

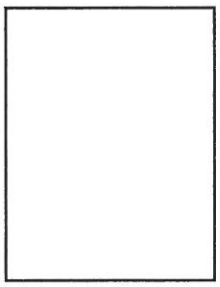
Use area models to complete the following.

2. 

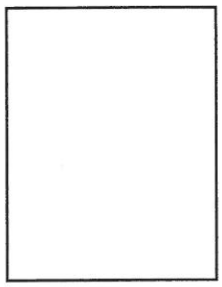
$\frac{2}{3} * \frac{1}{5} =$ _____

3. 

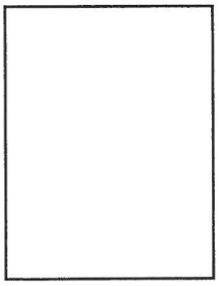
$\frac{3}{4} * \frac{2}{5} =$ _____

4. 

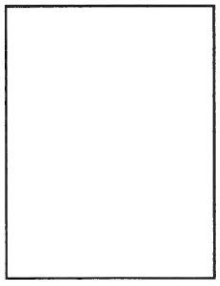
$\frac{1}{4} * \frac{5}{6} =$ _____

5. 

$\frac{3}{8} * \frac{3}{5} =$ _____

6. 

$\frac{1}{2} * \frac{5}{8} =$ _____

7. 

$\frac{5}{6} * \frac{4}{5} =$ _____

8. Explain how you sketched and shaded the rectangle to solve Problem 7.

_____

_____

_____

_____

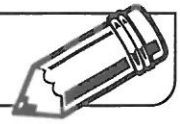
_____

_____

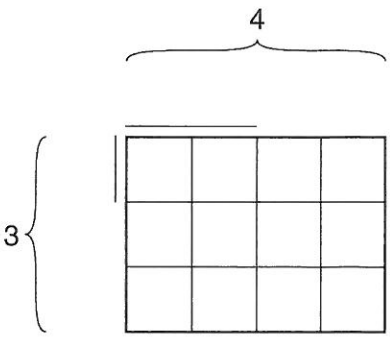
Name Date Time

LESSON 8•6

Fraction Multiplication



Problem 1



a. How many squares are in this grid? _____

b. How many squares represent $\frac{1}{3}$ of $\frac{1}{2}$ of the grid.

_____ Shade these squares.

c. Think of the total number of squares in the grid as the denominator and the shaded squares as the numerator, and write the fraction. $\frac{1}{3}$ of $\frac{1}{2}$ = _____

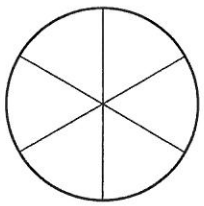
d. Write the number model you would use to find the area of this rectangle.
Reminder: Area = length * width

Area = _____

e. The number model to find the fractional part of the rectangle is the same as the number model to find the area of the rectangle. Write the number model you would use to find the fractional part of the rectangle. _____

Problem 2

Linda bakes a peach pie. She serves $\frac{1}{2}$ of the pie for dessert. She saves $\frac{1}{3}$ of what is left for her mom.



a. Shade the circle to represent the piece of the pie that should be saved.

b. Think of the total number of pie pieces as the denominator and the shaded piece as the numerator, and write the fraction. _____

c. Write a number sentence to show how you could find the fractional part of the pie that was saved without counting pie pieces. _____

To find a fraction *of* a fraction, multiply.

Try This

Write and solve a number model to find the fractional part of the pie left after subtracting dessert and the piece saved for Linda's mom.

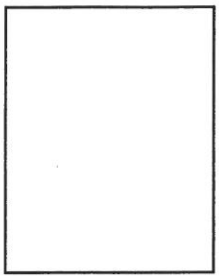
Name Date Time

LESSON 8•6

Using Area Models to Multiply Fractions

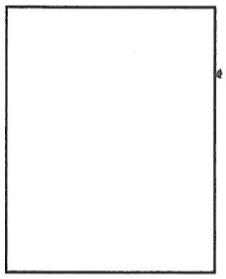
Use area models to complete the following problems.

1.



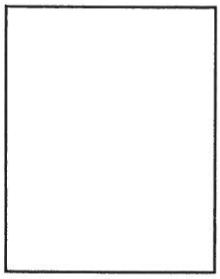
$\frac{3}{4} * \frac{1}{6} =$ _____

2.



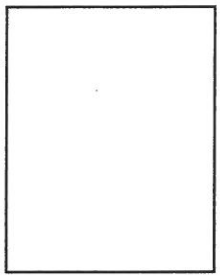
$\frac{2}{3} * \frac{1}{2} =$ _____

3.



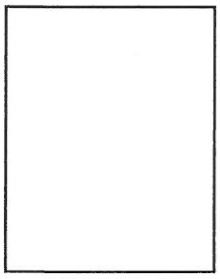
$\frac{3}{4}$ of $\frac{1}{2} =$ _____

4.



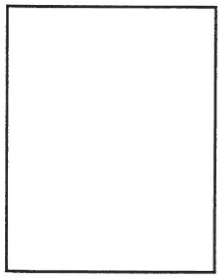
$\frac{3}{8} * \frac{3}{4} =$ _____

5.



$\frac{1}{6}$ of $\frac{3}{4} =$ _____

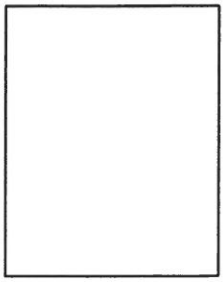
6.



$\frac{3}{5} * \frac{1}{6} =$ _____

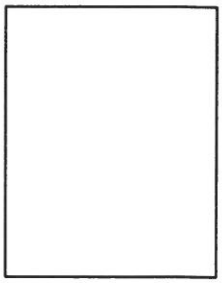
Make up your own fraction multiplication problems.
Use area models to help you solve them.

7.



_____ = _____

8.

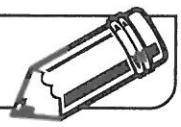


_____ = _____

Name Date Time

LESSON 8•7

Simplifying Fraction Factors



An Algorithm for Fraction Multiplication

$$\frac{a}{b} * \frac{c}{d} = \frac{a * c}{b * d}$$

The denominator of the product is the product of the factor denominators, and the numerator of the product is the product of the factor numerators.

The commutative property lets us write $\frac{a * c}{b * d}$ as $\frac{c * a}{d * b}$. Study the examples.

Example 1: $\frac{7}{8} * \frac{16}{21} = \frac{7 * 16}{8 * 21} = \frac{112}{168}$, $\frac{112}{168} \div \frac{8}{8} = \frac{14}{21}$, or $\frac{2}{3}$

Example 2: $\frac{7}{8} * \frac{16}{21} = \frac{7 * 16}{8 * 21} = \frac{16}{8} * \frac{7}{21} = \frac{2}{1} * \frac{1}{3} = \frac{2 * 1}{1 * 3} = \frac{2}{3}$

1. Describe the similarities and differences between Examples 1 and 2.

Example 3: $\frac{\overset{1}{\cancel{7}}}{\underset{1}{\cancel{8}}} * \frac{\overset{2}{\cancel{16}}}{\underset{3}{\cancel{21}}} = \frac{1 * 2}{1 * 3} = \frac{2}{3}$

2. Describe the similarities and differences between Examples 2 and 3.

Use what you have discovered to solve the following problems. Show your work.

3. $\frac{14}{60} * \frac{12}{21} =$ _____

4. $\frac{36}{88} * \frac{33}{72} =$ _____

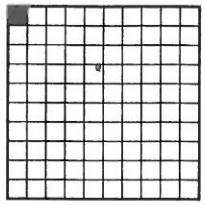
5. $\frac{25}{54} * \frac{36}{45} =$ _____

Name Date 4/4 Time

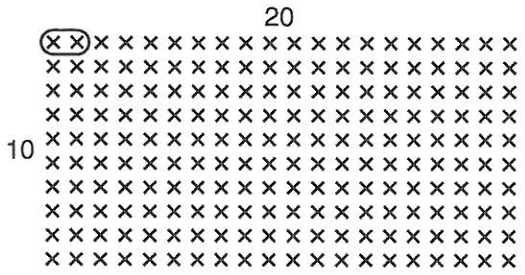
LESSON 8•9

Finding the Percent of a Number

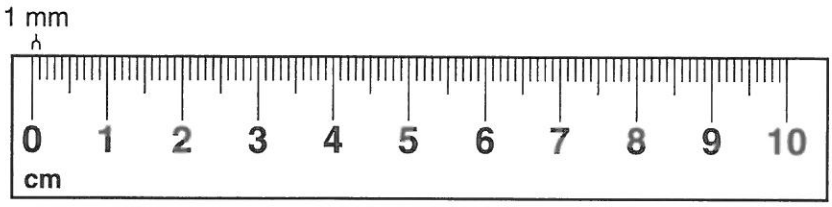
The unit percent is 1% or 0.01. For example, the unit percent of 100 is 1; the unit percent of 200 is 2; the unit percent of 10 is 0.1.



1% of 100



1% of 200



1% of 10 cm

Another way to think of the unit percent of a number is to think: *What number times 100 equals the whole?* For example, 1 * 100 = 100; 2 * 100 = 200; 0.1 * 100 = 10

To find the unit percent of a whole, multiply by 0.01 or $\frac{1}{100}$.

Solve.

1. 1% of 84 = _____ **2.** 1% of 35 = _____ **3.** 1% of 628 = _____

The unit percent can be used to find other percents of a whole. For example, if you want to find 8% of 200:

- Calculate the unit percent: 1% of 200 = 200 * 0.01 = 2
- Check your answer: 2 * 100 = 200.
- Multiply your answer by the percent you are finding: 2 * 8 = 16; 8% of 200 = 16

Solve.

4. 19% of 84 = _____ **5.** 72% of 35 = _____ **6.** 37% of 628 = _____

7. Think about the steps you followed in Problems 4–6. First you multiplied the unit percent by 0.01, and then you multiplied the product by the number of percents. How can you find the percent of a number by multiplying only once? Provide an example.

_____

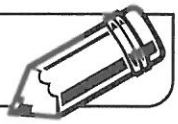
_____

_____

Name Date Time

LESSON 8•9

Calculating Discounts



There are 2 steps to finding a discounted total:

- Calculate the amount that represents the percent of discount.
- Subtract the calculated discount from the original total. This is the discounted total.

Calculate the discounted total for the following problems. Show your work on the back of this sheet.

1. A computer store has an Internet special for their customers. If Carla spends $50.00 or more, she gets 10% off her order. The shipping and handling charge is 4% of the original total. Carla buys $68.00 in software. What is her total charge?

_____

2. The Hartfield School District wants to get the government discount for telephone service. The discount is based on the percent of students qualifying for the National School Lunch Program. 32% of students in this urban district qualify. The district pays about $3,500 per month for telephone service. Use the table below to find how much the district would save.

Percent of Students	Urban Discount	Rural Discount
Less than 1%	20%	25%
1% to 19%	40%	50%
20% to 34%	50%	60%
35% to 49%	60%	70%
50% to 74%	80%	80%
75% to 100%	90%	90%

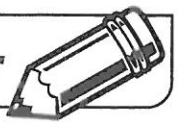
The Hartfield School District is eligible for a _____ discount. The district will save about _____ per month for its telephone service. With the government discount, the district will pay about _____ per month.

3. At the Goose Island Family Restaurant, if the original bill is $75.00 or more, the kids' meals are discounted 3%. If the original bill is $95.70, with $23.00 for kids' meals, what is the discounted amount? _____ What is the discounted total? _____

Name Date Time

LESSON 8•10

Fraction of and Percent of a Number



George practiced finding the fraction of and the percent of a number. He completed the tables below. George thinks there is something wrong with his answers, but he doesn't know how to fix it.

$\frac{1}{4}$ of 12 =	3
$\frac{2}{4}$ of 12 =	6
$\frac{3}{4}$ of 12 =	12
$\frac{4}{4}$ of 12 =	24

20% of 40 =	6
40% of 40 =	12
60% of 40 =	18
80% of 40 =	24
100% of 40 =	30

1. Study George's tables and then explain how he should correct his work.

2. Write the correct answers.

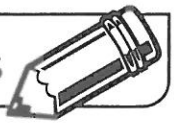
$\frac{1}{4}$ of 12 =	
$\frac{2}{4}$ of 12 =	
$\frac{3}{4}$ of 12 =	
$\frac{4}{4}$ of 12 =	

20% of 40 =	
40% of 40 =	
60% of 40 =	
80% of 40 =	
100% of 40 =	

Name _____ Date _____ Time _____

LESSON 8•10

Fraction and Percent of a Number Methods



1. Alton collected 252 marbles but lost $\frac{4}{7}$ of them on his way to school. When he arrived at school, how many marbles did Alton have left? _____

   Explain how you found your answer.

   _____

   _____

2. Circle the letter of each method below that you could use to solve Problem 1.

   a. You can find $\frac{4}{7}$ of 252 by multiplying $252 * \frac{4}{7}$ and simplifying.

   b. You can find $\frac{4}{7}$ of 252 by dividing 252 by 4 and multiplying the result by 7.

   c. You can find the unit fraction by dividing 252 by 7, and then find $\frac{4}{7}$ of 252 by multiplying the unit fraction value by 4.

3. For any method you did *not* circle, explain why it will not work.

   _____

   _____

4. The regular price for in-line skates is $125 at a local store. The store was having a promotion: Buy one pair of in-line skates and get a second pair for 75% of the regular price. How much would a second pair of in-line skates cost? _____

   Explain how you found your answer.

   _____

   _____

5. Circle the letter of each method below that you could use to solve Problem 4.

   a. You can rename 75% as a fraction and then multiply $125 by the fraction to find 75% of $125.

   b. You can find the cost of the second pair by multiplying $125 by $\frac{1}{4}$ and subtracting the product from $125.

   c. You can find the cost of the second pair by dividing $125 by 4.

6. For any method you did *not* circle, explain why it will not work.

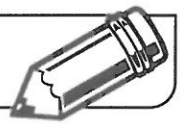
   _____

   _____

Name Date Time

LESSON 8•11

Classroom Survey



Number in Household	Number of Students
1–2	
3–5	
6 or more	

Language at Home	Number of Students
English	
Spanish	
Other	

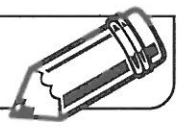
Handedness	Number of Students
right	
left	

Years at Current Address	Number of Students
0 or 1	
2	
3	
4	
5	
6 or more	

Name Date Time

LESSON 8·11

Using a Calculator with Percents



Finding the percent of a number is the same as multiplying the number by the percent. Usually, it's easiest to change the percent to a decimal and use a calculator.

Example: What is 65% of 55?

$65\% = \frac{65}{100} = 0.65$

Write the fraction and decimal for each percent.

1. 18% = _____ = _____

2. 60% = _____ = _____

3. 89% = _____ = _____

4. 7.5% = _____ = _____

Use your calculator and the percents in Problem 1 to find the percent of 55 by multiplying 55 by each decimal.

Example: 55 * 0.65

5. 18% of 55 = _____

6. 60% of 55 = _____

7. 89% of 55 = _____

8. 7.5% of 55 = _____

9. Write the calculator key sequence that you used.

_____

Sometimes you know a percent and how much it's worth, but you don't know what the ONE is. Use a unit percent strategy first to find 1%, and then multiply by 100 to get 100%.

Example: 60 million is 37% of what number?

60 ÷ 37 = 1.6216216

1.6216216 * 100 = 162.16216

Using the fix function: 1.6216216 * 100 = 162 (rounded to the nearest whole number)

37% of 162 million is 59.94 million, or 60 million (rounded to the nearest ten million).

Use your calculator and unit percents to solve the following problems.

10. 42% of _____ = 18

11. 87% of _____ = 65

12. 63% of _____ = 28 million

Name Date Time

LESSON 8•11

Charting Changes in Consumption

Many times the information that interests you has to be located in data displays with much more data than you need. Use the information on *Student Reference Book,* page 363 to complete the table below.

SRB 363

1. _____

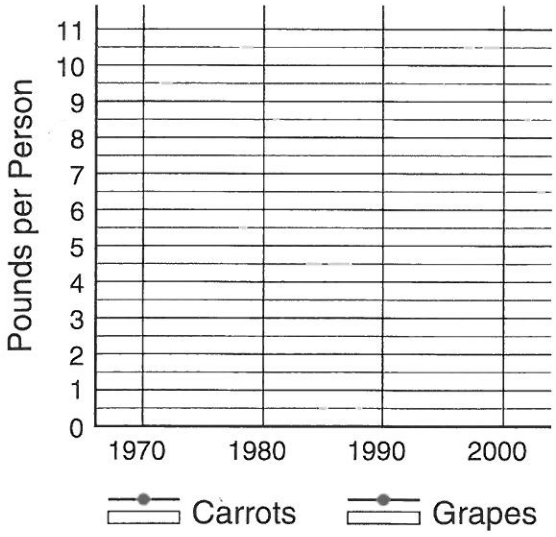
(title)

Foods	1970	1980	1990	2000
Carrots				
Grapes				

Line graphs can make it easier to compare changes in data over time. Use the data from your table in Problem 1 to make a line graph of the pounds of carrots and grapes eaten per person, per year in the United States. Use one color for the carrots data and a different color for the grapes data. Indicate your choices by coloring in the boxes of the graph key.

2. _____

title



3. What is one conclusion you could draw from the data in your line graph?

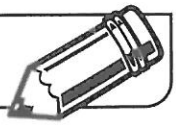
_____

_____

Name Date Time

LESSON 8•12

Exploring the Meaning of the Reciprocal



Lamont and Maribel have to divide fractions. Lamont doesn't want to use common denominators. He thinks using the reciprocal is faster, but he's not sure what a reciprocal is. Maribel looks it up on the Internet and finds this: One number is the **reciprocal** of another number if their product is 1.

Example 1:	Example 2:
$3 * ? = 1$	$\frac{1}{2} * ? = 1$
$3 * \frac{1}{3} = \frac{3}{3} = 1$	$\frac{1}{2} * 2 = \frac{2}{2} = 1$
$\frac{1}{3}$ is the reciprocal of 3	2 is the reciprocal of $\frac{1}{2}$
3 is the reciprocal of $\frac{1}{3}$	$\frac{1}{2}$ is the reciprocal of 2

1. Find the reciprocals.

   a. 6 _____ b. $\frac{1}{7}$ _____ c. 20 _____ d. $\frac{1}{9}$ _____

2. What do you think would be the reciprocal of $\frac{5}{6}$? _____

Reciprocals on a Calculator

On all scientific calculators, you can find a reciprocal of a number by raising the number to the -1 power.

3. Write each number in standard notation as a decimal and a fraction.

   a. 8^{-1} _____, _____ b. 5^{-2} _____, _____ c. 2^{-3} _____, _____

4. Write the key sequence you could use to find the reciprocal of 36.

   _____

5. Write the key sequence you could use to find the reciprocal of $\frac{3}{7}$.

   _____

6. What pattern do you see for the reciprocal of a fraction?

   _____

   _____

   _____