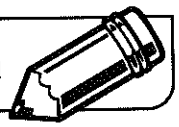
Name Date Time

LESSON 12•1

The Division Method for Prime Factorization



Use the method below to find the prime factorization of the following numbers.

Example: Find the prime factorization for 732.

Step 1 Divide, using the smallest prime factor of the number as the divisor.

Step 2 The quotient becomes the dividend. Use the smallest prime factor as the divisor, and continue dividing until the quotient is a prime number.

2 | 732 Divide: 732 ÷ 2 = 366

2 | 366 Divide: 366 ÷ 2 = 183
2 is not a factor of 183.
The next smallest prime factor is 3.

3 | 183 Divide: 183 ÷ 3 = 61

| **61** 61 is a prime number.

The prime factorization of 732 is
2 * 2 * 3 * 61

Step 3 Write the divisors as a multiplication expression.

$732 = 2 * 2 * 3 * 61$

This is the prime factorization of 732.

Use the division method to find the prime factorizations. Show your work.

1. 1,056

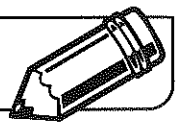
2. 3,190

3. 24,598

Name Date Time

LESSON 12•1

Factor Trees and Adding Fractions



1. Make factor trees and write the prime factorization for each number below.

a. 12 **b.** 42 **c.** 32

12 = _____ 42 = _____ 32 = _____

2. Add the following fractions. Use the factor trees above to help you find the least common multiple of the denominators. Use this least common multiple as a common denominator.

a. $\frac{5}{12} = \frac{\square}{\square}$

$+ \frac{7}{32} = \frac{\square}{\square}$

b. $\frac{41}{42} = \frac{\square}{\square}$

$+ \frac{1}{12} = \frac{\square}{\square}$

3. Use factor trees or some other method to find a common denominator for the fraction pairs below. If you do not use factor trees, explain how you found the least common denominators.

a. $\frac{5}{14}$ and $\frac{2}{21}$ _____

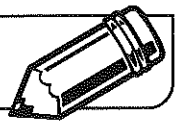
b. $\frac{7}{18}$ and $\frac{16}{36}$ _____

c. $\frac{9}{24}$ and $\frac{21}{64}$ _____

Name Date Time

LESSON 12·2

Chance and Probability



Things that happen are called **events.** For some events, you can be sure that they will or will not happen. For example, you can be sure that water will freeze at the North Pole, and you can be just as sure that tropical plants will not grow there.

When a number between 0 and 1 is used to tell the likelihood of something happening, the number is called a **probability.** The closer a probability is to 1, the more likely it is that the event will happen.

For many events, you cannot be sure that they will or will not happen, but you feel there is a chance. If Susan is a good soccer player, you might say, "Susan has a good chance of scoring in the soccer game." If she is not one of the better players, you might say, "Susan does not have a good chance of scoring in the game."

For the events below:

- Write C if you feel there is a chance that the event may or may not happen, but you cannot be sure.
- Write P if you feel you could assign a probability to the chance that the event may or may not happen.

1. You study for a test and feel you are prepared. What is the likelihood that you will pass the test? _____

2. You ask an adult for permission to go to a movie with friends and the answer is "maybe." What is the likelihood that you will be able to go to the movie? _____

3. What is the likelihood that a die will land on 1 or 2? _____

4. What is the likelihood that next year, every student in your class will have a new baby brother? _____

5. You have 4 pairs of white socks and 2 pairs of blue socks in a drawer. What is the likelihood that the first sock you pull from the drawer will be blue? _____

Describe an event for each type.

6. C: _____

_____

7. P: _____

_____

Name Date Time

LESSON 12•3

Picturing Ratios

The following pictograph shows how the 785 students at Windward Academy responded to a survey about the activities they thought were the most summer fun.

Pictograph of Summer Fun Data

Swimming	
Traveling	
Organized Sports	
Bike Riding	
Reading	
Other	

Each ☀ represents 20 students.

Use the pictograph to answer the questions.

1. How many ☀ would represent 100 students? _____

2. Which activity is the most popular for students at Windward Academy? _____

3. Which activity is about $\frac{1}{2}$ as popular as traveling? _____

4. Which activity is five times more popular than reading? _____

5. Explain how using a pictograph to solve simple ratio problems is different from using only numbers. Use an example to support your explanation.

_____

_____

_____

_____

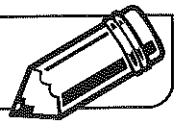
_____

_____

Name Date Time

LESSON 12•3

More Ratios



1. There are 12 children on a bus. In all, 50 people are on the bus. Express the ratio of children to all people on the bus.

   a. With words: _____ people on the bus are children.

   b. With a fraction: _____ of the people on the bus are children.

   c. With a percent: _____ of the people on the bus are children.

   d. With a colon: The ratio of children to all people on the bus is _____.

2. In Mrs. Horton's fifth-grade class, 6 students own a cat. In all, 20 students own pets. Express the ratio of cat owners to all pet owners in the class.

   a. With words: _____ pet owners are cat owners.

   b. With a fraction: _____ of all pet owners are cat owners.

   c. With a percent: _____ of all pet owners are cat owners.

   d With a colon: The ratio of cat owners to all pet owners is _____.

3. In a survey about favorite flavors of ice cream, 8 people said they liked chocolate ice cream best. A total of 24 people were surveyed. Express the ratio of people who chose chocolate ice cream as their favorite to all the people surveyed.

   a. With words: _____ people surveyed prefer chocolate.

   b. With a fraction: _____ of the people surveyed prefer chocolate.

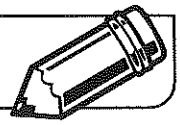
   c. With a percent: _____ of the people surveyed prefer chocolate.

   d. With a colon: The ratio of people who prefer chocolate to all the people surveyed is _____.

Name Date Time

LESSON 12•4

Writing Ratios



Some **ratios** compare part of a collection of things to the total number of things in the collection. The statement *6 out of 24 fifth graders have a pet* compares the number of fifth graders who have pets to the total number of fifth graders. This ratio can be expressed in several ways.

In *words:* For every 24 fifth graders, 6 have a pet. Six in 24 fifth graders have a pet. The ratio of fifth graders who have pets to the total number of fifth graders is 6 to 24.

With a *fraction:* $\frac{6}{24}$ of fifth graders have a pet.

A ratio is in simplest form if, when expressed as a fraction, the fraction is in simplest form. For example, the ratio *9 out of 36 fifth graders wear braces on his or her teeth* can be expressed in simplest form as $\frac{1}{4}$ of fifth graders wear braces.

Express each ratio below with a fraction, using the simplest form.

1. Eighteen out of 24 fifth graders do not have a pet.

_____

2. There are 18 water birds in the pond and 3 are swans.

_____

3. Of the 54 tropical fish in the school aquarium, 27 are tiger fish.

_____

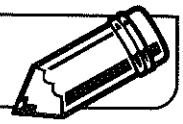
4. For every 6 hot dogs sold at the ballpark, 4 are chili dogs.

_____

Name _____ Date _____ Time _____

LESSON 12•4

Ratios



Solve the following ratio problems. Use the Square Tiles from *Math Journal 2,* Activity Sheet 7 to help you.

1. Place 20 tiles on your desk so that 3 out of 4 tiles are white and the rest are shaded.

   How many tiles are white? _____

   How many tiles are shaded? _____

2. Place 25 tiles on your desk so that 3 out of 5 tiles are white and the rest are shaded.

   How many tiles are white? _____

   How many tiles are shaded? _____

3. Place 4 white tiles on your desk. Add some tiles until 1 out of 5 tiles is white and the rest are shaded. How many tiles are there in all? _____

4. Place 9 white tiles on your desk. Add some tiles until 3 out of 8 tiles are white and the rest are shaded. How many tiles are there in all? _____

5. Imagine 28 tiles. If 4 out of 7 are white, how many are white? _____

6. Imagine 24 tiles. If 5 out of 6 are white, how many are white? _____

7. Place 18 tiles on your desk so that 6 are white and the rest are shaded.

   One out of _____ tiles is white.

8. Place 30 tiles on your desk so that 20 are white and the rest are shaded.

   Out of 3 tiles, _____ are white.

9. Make up a ratio number story for a partner to solve.

   _____

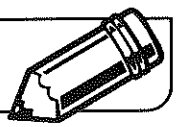
   _____

   Answer: _____

Name Date Time

LESSON 12•5

Solving Ratio Problems with Cross Multiplication



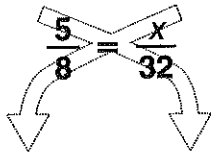
Cross multiplication is a strategy for solving ratio problems that is based on the quick common denominator.

Example:

Josie tosses a penny 32 times.
It lands heads up 5 out of 8 times.
How many times does the penny land heads up?

Number Model: $\frac{5}{8} = \frac{x}{32}$

Cross multiply:



$8 * x = 5 * 32$

Solution: $8 * x = 160$

$x = 20$

Answer: 20 times
(unit)

Use cross multiplication to solve the following problems. Let the variable x represent the missing number in each problem.

1. Jeremy received 3 votes for every 5 votes cast. If he received 18 votes, how many votes were cast?

Number model: _____ Solution: _____

Cross multiply: _____ Answer: _____
(unit)

2. The restaurant at the mall sold 324 lunches. For every 9 lunches served, 3 were fish plates. How many fish plates were served?

Number model: _____ Solution: _____

Cross multiply: _____ Answer: _____
(unit)

3. The Nature Center has a total of 87 amphibians on display. For every 6 amphibians, 2 are types of salamanders. How many salamanders are there?

Number model: _____ Solution: _____

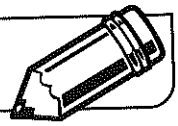
Cross multiply: _____ Answer: _____
(unit)

4. Write a ratio number story for your partner to solve using cross multiplication.

Name Date Time

LESSON 12•5

Solving Ratio Number Stories



Write a number model for each problem. Include key words for the numerators and denominators. Then solve the problem.

1. Of the 90 fifth-grade girls at Lincoln School, 1 out of 6 reported that they jumped rope 3 times last week. How many girls jumped rope 3 times last week?

   Number model: _____

   Answer: _____ (unit)

2. The 175 seniors at Kennedy High School voted for the color of caps and gowns they would wear at the graduation ceremony. Six out of 7 voted for silver. How many students voted for silver?

   Number model: _____

   Answer: _____ (unit)

3. Melissa's brother, Sidney, was explaining his college food budget to her. He told Melissa that he budgeted $160 a month for restaurants, but he spent 3 out of every 4 dollars at the campus pizza parlor. How much did he spend at the pizza parlor?

   Number model: _____

   Answer: _____ (unit)

4. A survey was conducted at Sidney's college to find out how the 640 students budgeted their food money. Five out of 8 students reported that they spent less than $160 a month on food. How many students spent less than $160 on food?

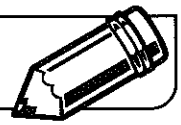
   Number model: _____

   Answer: _____ (unit)

Name _____ Date _____ Time _____

LESSON 12·8

Solving Ratio Problems



Instrument Players in the United States	
Piano/Keyboard	21 million
Guitar	19 million
Organ	6 million
Flute	4 million
Clarinet	4 million
Drums	3 million
Trumpet	3 million
Violin	2 million
Harmonica	1.7 million
Saxophone	1 million

Source: *America by the Numbers*

1. a. What is the ratio of flute players to harmonica players? _____

b. What is the ratio of drum players to piano players? _____

c. Record the ratio of violin and saxophone players to trumpet players. _____

2. Which two pairs of instrument players have a 1-to-1 ratio? _____

_____

3. In a fifth-grade band, the ratio of saxophonists to clarinetists is 2:3. If there are 10 saxophonists, how many clarinetists are there? _____

4. The school orchestra is performing tonight. There are 24 orchestra members. There are 6 violas. The ratio of violins to violas is 2:1. The ratio of cellos to basses is 2:1. There are no other instruments. How many chairs are needed in each section?

a. violins _____ **b.** violas _____

c. cellos _____ **d.** basses _____