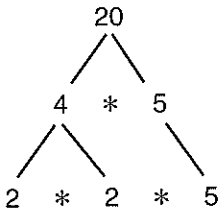
Name Date Time

STUDY LINK 12•1

Factor Trees

1. Make factor trees and find the prime factorization for the following numbers.

Example: 20



$20 = 2 * 2 * 5$

a. 66

b. 72

$66 =$ _____ $72 =$ _____

2. Write each fraction in simplest form. Use factor trees to help you. Show your work.

a. $\frac{20}{66} =$ _____ **b.** $\frac{66}{72} =$ _____ **c.** $\frac{20}{72} =$ _____

3. Find the prime factorization for 250. _____

4. a. Circle the number that has the most prime factors.

63 32 49 100

b. Which has the fewest prime factors? _____

5. Simplify the fraction to the right. $\frac{150}{225} =$ _____

Practice

6. $\frac{1}{4} * 36 =$ _____ **7.** $0.25 * 360 =$ _____

8. $\frac{1}{3} * 90 =$ _____ **9.** $33\frac{1}{3}\%$ of $90 =$ _____

Name Date Time

STUDY LINK 12•2

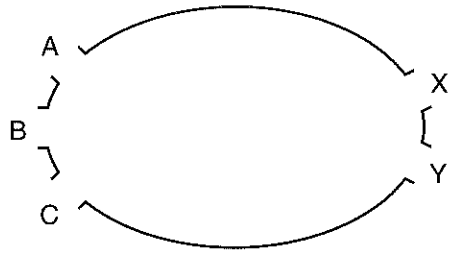
Probability Investigations

SRB 134

Multiplication Counting Principle

Suppose you can make a first choice in m ways and a second choice in n ways. Then there are $m * n$ ways to make the first choice followed by the second choice. Three or more choices can be counted in the same way, by multiplying.

1. A person can enter the stadium shown at the right through any gate and can exit through any gate. In how many different ways can a person enter and exit the stadium?



_____ (ways to enter) * _____ (ways to exit) = _____ (total ways to enter and exit)

2. Draw a **tree diagram** to show all possible ways to enter and exit the stadium.

Entry gate: ___ ___ ___ ___ ___

Exit gate: _

3. Do you think that all the ways to enter and exit are equally likely? _____

Explain your answer. _____

_____

4. How many ways are there to enter and exit the same stadium if a person may not leave by the same gate through which he or she entered? _____

5. Sally takes a quiz with three true or false questions. She does not know the answer to any of the questions, so she guesses on all three.

a. On the back of this page, draw a tree diagram to show Sally's possible results.

b. What is the probability that she will get all three questions correct? ____

Name Date Time

STUDY LINK 12•3

Ratios

SRB 106

Ratios can be stated or written in a variety of ways. Sometimes a ratio is easier to understand or will make more sense if it is rewritten in another form.

Example: In a group of 25 students, 16 students walk to school and 9 take a bus. The ratio of students who take a bus compared to all students in the group can be expressed in the following ways:

- With words: Nine out of twenty-five students take a bus.
- With a fraction: $\frac{9}{25}$ of the students take a bus.
- With a percent: 36% of the students take a bus.
- With a colon between the two numbers being compared: The ratio of students who take a bus to all students in the group is 9:25 (nine out of twenty-five).

Revise the above statements to express the ratio of students who walk to school to all students.

1. With words: _____ students walk to school.

2. With a fraction: _____ of the students walk to school.

3. With a percent: _____ of the students walk to school.

4. With a colon: The ratio of students who walk to school to all students is _____.

In each problem, fill in the ovals next to each correct ratio.

5. Fifty cars drove past in 10 minutes. Twenty-three cars were blue.

- O 23:50 of the cars were blue.
- O 23% of the cars were blue.
- O 0.46 of the cars were blue.

6. In a group of 9 people, 6 were swimmers.

- O $\frac{2}{3}$ of the people were swimmers.
- O 6:9 of the people were swimmers.
- O $66\frac{2}{3}$% of the people were swimmers.

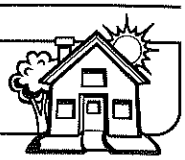
7. In a sports shop, 35 of the 40 caps sold the day before the World Series were baseball caps.

- O 7 out of 8 caps sold were baseball caps.
- O 35% of the caps sold were baseball caps.
- O 35:40 of the caps sold were baseball caps.

Name Date Time

STUDY LINK 12•4

Ratio Problems



1. Draw 20 tiles so that 2 out of 10 tiles are white and the rest are shaded.

a. How many tiles are white? _____ tiles

b. How many tiles are shaded? _____ tiles

2. Draw 9 shaded tiles.

Add white tiles until 2 out of 5 tiles are white.

How many tiles are there in all? _____ tiles

3. Imagine 48 tiles. If 4 out of 12 tiles are white, how many tiles are white? _____ tiles

4. There are 24 players on the soccer team. Two out of every 3 players have not scored a goal yet this year. How many players have scored a goal this year? _____ players

5. For every 8 spelling tests Justine took, she earned 3 perfect scores. If Justine earned 12 perfect scores this year, how many spelling tests did she take? _____ tests

Practice

6. $92\overline{)9{,}054} \rightarrow$ _____

7. $98 * 92 =$ _____

8. $90.16 + 0.38 =$ _____

9. $90.54 * 10^2 =$ _____

Name Date Time

STUDY LINK 12•5

Ratio Problems

SRB 106–109, 243–245

Find the missing number.

1. $\frac{1}{5} = \frac{x}{40}$ $x =$ _____

2. $\frac{2}{3} = \frac{16}{y}$ $y =$ _____

3. $\frac{5}{6} = \frac{m}{54}$ $m =$ _____

4. $\frac{1}{4} = \frac{15}{n}$ $n =$ _____

5. $\frac{5}{8} = \frac{f}{32}$ $f =$ _____

6. $\frac{13}{50} = \frac{g}{100}$ $g =$ _____

Write a number model for each problem. Then solve the problem.

7. Of the 115 students in the sixth grade, 2 out of 5 belong to the Drama Club. How many students are members of the Drama Club?

Number model: _____ Answer: _____ (unit)

8. Three out of 4 students at Highland School ordered a hot lunch today. There are 156 students at the school. How many students ordered a hot lunch?

Number model: _____ Answer: _____ (unit)

9. Gina and the other members of her troop sell cookies for $3 a box. For each box they sell, the troop earns $1.50. One week, Gina's troop sold $90 worth of cookies. How much did the troop earn?

Number model: _____ Answer: _____

10. 30% of the tickets sold by a movie theater for the Friday night show were children's tickets at $4 each. The rest of the tickets were sold at the full price of $8.50. The movie theater collected $360 just for the children's tickets. How many tickets did they sell in all?

Number model: _____ Answer: _____ (unit)

Practice

11. $6^3 =$ _____ **12.** $3^6 =$ _____ **13.** $6^3 * 10^2 =$ _____

Name Date Time

STUDY LINK 12·6

Rates

Complete each table using the given information. Then answer the question below each table.

1. It would take 27,000 spiders, each spinning a single web, to produce a pound of spider webs.

a.

Number of Spiders	27,000	54,000			
Pounds of Spider Webs	1	2	3	4	5

b. At this rate, how many spiders, each spinning a single web, would be needed to produce 10 pounds of spider webs? _____ spiders

2. It used to be thought that the deer botfly flies so fast that it is almost invisible to the human eye. It has since been tested, and scientists found that it actually flies about 25 miles per hour.

a.

Miles	25				
Hours	1	2	3	4	5

b. At this rate, about how far could a deer botfly travel in 1 minute? _____ mile(s)

Solve the following rate problems. Make a table if it will help you.

3. About 50 gallons of maple sap are needed to make 1 gallon of maple syrup. How many gallons of maple sap are needed to make 20 gallons of maple syrup?

About _____ gallons

4. For 186 days a year, the sun is not visible at the North Pole. During a 5-year period, about how many days is the sun not visible?

About _____ days

5. In a beehive, about $1\frac{1}{2}$ ounces of beeswax are used to build a honeycomb that holds 4 pounds of honey. How much beeswax is needed to build a honeycomb that could hold 20 pounds of honey?

About _____ ounces

Source: *2201 Fascinating Facts*

Name Date Time

STUDY LINK 12•7

Operations with Fractions

1. In the Malagasay Indian tribes, it is against the law for a son to be taller than his father. If a son is taller, he must give his father money or an ox. Suppose a father is 5 feet $10\frac{1}{2}$ inches tall and his son is 5 feet $6\frac{3}{4}$ inches tall. How many more inches can the son grow before he is as tall as his father?

_____ (unit)

2. In the state of Indiana, it is illegal to travel on a bus within 4 hours of eating garlic. If you lived in Indiana and had eaten a bowl of pasta with garlic bread $2\frac{1}{3}$ hours ago, how many more hours would you need to wait before you could legally travel on a bus?

_____ (unit)

3. In Idaho, it is against the law to give a person a box of candy that weighs more than 50 pounds. It is Valentine's Day, and you give your mother a box of candy that weighs $48\frac{1}{4}$ pounds. How much more could the box weigh without breaking the law?

_____ (unit)

4. The body of an average jellyfish is about $\frac{9}{10}$ water. What fraction of the jellyfish is not water?

_____

5. The world record for a jump by a frog is 19 feet $3\frac{1}{8}$ inches. How much farther would a frog need to jump to set a new world record of 7 yards?

_____ (unit)

6. The maximum length for a typical king cobra is about $5\frac{4}{5}$ meters. If 6 of these snakes were lined up end to end, how far would they stretch?

_____ (unit)

7. An average trumpeter swan weighs about $16\frac{4}{5}$ kilograms. What is the approximate weight of 3 average trumpeter swans?

_____ (unit)

Sources: *The Top 10 of Everything; Beyond Belief!*

Practice

8. $(4 * 4) + \frac{4}{4} =$ _____

9. $4! + 4 + 4 + \sqrt{4} =$ _____

10. 75% of 12 = _____

11. 50% of 360 = _____

Name Date Time

STUDY LINK 12•8

Rate and Ratio Problems

SRB 104 105

1. The average American eats about 250 eggs per year. At this rate, about how many eggs will the average American eat in . . .

a. five years? _____ (unit)

b. $\frac{1}{12}$ of a year? _____ (unit)

2. The average fifth grader can eat $\frac{3}{8}$ of a pizza for lunch. At this rate, how many lunches will it take for an average fifth grader to eat the equivalent of 3 whole pizzas? _____ (unit)

3. In 1975, a man in Washington state ate 424 clams in 8 minutes. At this rate, how many would he eat . . .

a. in $\frac{1}{4}$ of this time? _____ (unit)

b. in $2\frac{1}{2}$ times as much time? _____ (unit)

4. A deck has 52 playing cards. In two decks,

a. what is the ratio of 2s to 10s? _____

b. what is the ratio of Hearts to the total number of playing cards? _____

c. what is the ratio of Jacks to Kings and Queens? _____

Practice

5. $3\frac{4}{7} * \frac{8}{8} =$ _____

6. $3n + 2n = 25$

$n =$ _____

7. $25 = 2n$

$n =$ _____

8. $12.5 * n = 100$

$n =$ _____