

9-1A Lesson Master**Questions on SPUR Objectives**
See pages 611–613 for objectives.**USES** Objective G

In 1–5, solve each using integer division.

- Write the division expression you used to solve the question.
- Give the integer division answer.
- Answer the question.

1. The seventh grade has 165 students. If the entire grade is divided into discussion groups of 8 students each, how many complete groups will there be? How many students will be in the incomplete group?

a. _____ b. _____ c. _____

2. Jenelle received \$50 for her birthday. She wants to buy ceramic figures to add to her collection. If they are on sale for \$5.99 (price includes tax), how many can she buy? How much money will she have left over?

a. _____ b. _____ c. _____

3. The Nelson family just moved and wants to send 135 change-of-address cards. If the cards come in boxes of a dozen each, how many boxes will they need to buy?

a. _____ b. _____ c. _____

4. Mount Everest, the tallest peak in the world, is 29,035 feet high. How tall is this in miles and feet? There are 5,280 feet in a mile.

a. _____ b. _____ c. _____

5. There are 9 players on a baseball team. They have a specific batting order, first through ninth, and rotate in this order throughout the game. If Ellen is sixth in the order and there are 49 at-bats in the game, how many times does she get to bat?

a. _____ b. _____ c. _____

6. How long is 1,000,000 seconds in days, hours, minutes, and seconds?

7. A number is divided by 13, giving a quotient of 52 and remainder of 9. Find the number.

9-1B Lesson Master**VOCABULARY**

1. a. Write the Quotient-Remainder formula. _____

b. Tell what each variable in the formula represents.

c. 29 divided by 6 equals 4 with a remainder of 5 . Identify each number with a variable in the Quotient-Remainder formula you wrote in Part a.

d. Write an equation relating the numbers in Part c. _____

USES Objective G: Use integer division in real-world situations.

In 2–10, use integer division.

2. Aziz is setting out supplies for science class. Each student in the class of 30 will need 3 test tubes. Test tubes are packaged 14 to the box. How many packages does Aziz need to get from the supply room, and how many test tubes will be left in the last box?

3. A carpet runner is 532 centimeters long. How many 65 -centimeter rugs can be cut from it and how many centimeters of waste will there be?

4. Jamie has a 5 -gallon container. He wants to bring 22 quarts of lemonade to his family's picnic. How much lemonade will be left over after he fills his 5 -gallon container?

5. In Cooperstown, 213 boys and girls are going to play on Little League teams.

a. Suppose there will be 15 teams and the number of players per team is made as even as possible. What is the minimum number of players each team will have and how many teams will have an extra player?

b. Suppose teams are made with 12 players on a team with a minimum of one extra player per team. How many teams will there be and how many teams will have an extra player?

6. Mr. Dwyer brings 100 books to share equally among the students in his class.
- a. If there are 23 students in his class, how many books does each student get? _____
- b. How many books are left over? _____
7. Mr. Chen is driving on a trip. The distance he plans to cover is 2,516 miles. Mr. Chen will drive 300 miles per day.
- a. How many days will he be traveling? _____
- b. How far will he drive the last day? _____
8. The school day is 5 hours and 25 minutes long. It has 45-minute periods (38 minutes for class or lunch plus 7 minutes built in to allow passing from class to class), with the leftover time for homeroom.
- a. How many periods are there? _____
- b. How long is homeroom? _____
- c. If each period were 43 minutes long, how long would homeroom be? _____
9. The width of a room is 160 inches. Change this to yards, feet, and inches. _____
10. How many gallons, quarts, and pints are in 74 cups? _____
11. Given each answer, create a word problem for $107 \div 12$.
- a. answer: 8

- b. answer: 8 remainder 11

- c. answer: 9

9-2A Lesson Master**Questions on SPUR Objectives**
See pages 611–613 for objectives.**USES** Objective H

In 1–9,

- a. Show the initial rate.
b. Calculate the answer.

1. Constance made \$30 for babysitting from 5:00 P.M. to 10:45 P.M. To the nearest cent, how much did she earn per hour?

a. _____ b. _____

2. In 1988, Florence Griffith Joyner set the women's world record for the 100 m dash with a time of 10.49 seconds. To the nearest tenth of a meter, how many meters per second is this?

a. _____ b. _____

3. The average number of miles per gallon for a 2006 model car sold in the United States is 28 miles. If the price of gasoline was \$2.39 per gallon, what was the average cost per mile for gasoline? Give the answer to the nearest tenth of a cent.

a. _____ b. _____

In 4 and 5, use the following information: According to the U.S. Census Bureau, the 2005 population of California was about 36,132,000. The area of the state is 155,959 square miles.

4. How many people were there per square mile?

a. _____ b. _____

5. How many square miles were there per person?

a. _____ b. _____

In 6 and 7, use the following information: According to the U.S. Census Bureau, the 2005 population of Wyoming was about 509,300. The area of the state is 97,100 square miles.

6. How many people were there per square mile?

a. _____ b. _____

7. How many square miles were there per person?

a. _____ b. _____

8. Stephanie wants to read a 268-page copy of the book *Pride and Prejudice* over the next two weeks. On average, how many pages must she read per day?

a. _____ b. _____

9. In 2003, Paul Tergat (Kenya) set the world record for the men's marathon (26.2 miles) with a time of 2 hours, 4 minutes, 55 seconds. To the nearest hundredth of a minute, what was his average time per mile?

a. _____ b. _____

In 10–12, use calculations to support your answer.

10. At dinner, a 150-pound adult ate a 12-ounce steak while a 90-pound child ate a 7-ounce steak. Who ate more steak per pound of body weight?

11. One model of hybrid car can travel 380 miles on 10.5 gallons of gas. A second model can travel 420 miles on 11.4 gallons of gas. Which car gets better mileage, the first or the second?

12. A six-pack of vitamin water sells for \$3.59, while a 2-liter bottle costs \$3.99. If the smaller individual bottles hold 250 grams each, which is the better buy?

9-2B Lesson Master**USES** Objective H: Use the Rate Model for Division.

1. Mr. Hart drove 450 kilometers in 7 hours. What is the average rate?
-

2. The Petal Place made 15 bouquets from 17 dozen carnations.
To the nearest flower, how many carnations were in each bouquet?
-

3. Sally earned \$30 for doing yard work from 8:15 A.M. to 1:30 P.M.
To the nearest ten cents, how much did she earn per hour?
-

4. There are 487 students to be assigned to three lunch periods.
To the nearest whole number, what is the average number of
students per lunch period?
-

5. Tom Ferguson was the Pro Rodeo cowboy champion for the 6 years,
1974 through 1979. This was the longest period of time anyone has
held the championship. During that time, his winnings totaled \$481,873.
To the nearest dollar, what were his average winnings per year?
-

6. Jackson wants to save D dollars over a period of W weeks to buy a pair
of skates. How much should he save each week to meet his goal?
-

7. The Booster Club has a committee of M members to fold and address
 F fliers for their fall mailing. How many fliers should each committee
member prepare?
-

8. According to the 1990 census, the state of Ohio had a population of 10,847,115. The land area of Ohio is 41,004 square miles.

a. How many people were there per square mile? _____

b. How many square miles were there per person? _____

9. According to the 1990 census, the state of Alaska had a population of 550,043. The land area of Alaska is 570,833 square miles.

a. How many people were there per square mile? _____

b. How many square miles were there per person? _____

In 10–12, use calculations to support your answer.

10. Mr. Blanco's car can travel 270 miles on 9.5 gallons of gas.
Mrs. Blanco's car can travel 185 miles on 8.2 gallons of gas.
Which car gets better gas mileage?

11. A 300-milliliter bottle of shampoo costs \$1.89. a 480-milliliter bottle costs \$3.09. Which is the better buy?

12. An eight-ounce sirloin steak provides about 36 grams of protein.
A six-ounce serving of salmon provides about 26 grams of protein.
Which food provides more protein per ounce?

9-3A Lesson Master

Questions on SPUR Objectives
See pages 611–613 for objectives.

SKILLS Objective A

In 1–12, write the quotient as a fraction in lowest terms.

1. $\frac{2}{3} \div \frac{1}{3}$ _____

2. $\frac{5}{6} \div \frac{3}{2}$ _____

3. $6\frac{2}{3} \div 1\frac{1}{2}$ _____

4. $1\frac{1}{2} \div 6\frac{2}{3}$ _____

5. $\frac{1}{7} \div \frac{1}{5}$ _____

6. $\frac{w}{x} \div \frac{y}{z}$ _____

7. $\frac{7}{8} \div \frac{1}{5}$ _____

8. $\frac{5}{3} \div \frac{3}{10}$ _____

9. $\frac{7}{10} \div \frac{2}{5}$ _____

10. $\frac{3}{11} \div \frac{4}{12}$ _____

11. $3\frac{1}{3} \div 2\frac{2}{5}$ _____

12. $\frac{a}{b} \div \frac{4}{9}$ _____

In 13–15, write as a rate, and then perform the division.

13. Morgan has used four of the five pages of notes for his history report to write 1,800 words. At this rate, how long will his report be?

rate

answer

14. Stella ran $3\frac{1}{2}$ kilometers in 25 minutes. What is her rate in kilometers per hour?

rate

answer

15. Hugo was able to mow $\frac{2}{3}$ of the lawn in 50 minutes. How long will it take him to mow the entire lawn?

rate

answer

9-3B Lesson Master**VOCABULARY**

1. State the Algebraic Definition of Division.

SKILLS

Objective A: Divide fractions with numbers or variables.

In 2–17, write the quotient as a fraction in lowest terms.

2. $\frac{3}{4} \div \frac{1}{4}$ _____

3. $\frac{7}{8} \div \frac{3}{2}$ _____

4. $\frac{5}{3} \div \frac{2}{3}$ _____

5. $\frac{7}{12} \div \frac{3}{4}$ _____

6. $\frac{2}{9} \div 4$ _____

7. $6 \div \frac{3}{5}$ _____

8. $\frac{\frac{2}{5}}{\frac{1}{10}}$ _____

9. $\frac{\frac{2}{3}}{\frac{8}{9}}$ _____

10. $1\frac{3}{4} \div 4\frac{5}{8}$ _____

11. $4\frac{5}{8} \div 1\frac{3}{4}$ _____

12. $\frac{9}{\frac{1}{2}}$ _____

13. $\frac{\frac{3}{10}}{3}$ _____

14. $\frac{c}{d} \div \frac{e}{f}$ _____

15. $\frac{1}{u} \div \frac{1}{v}$ _____

16. $\frac{1}{r} \div \frac{p}{r}$ _____

17. $\frac{(x \cdot y)}{z} \div \frac{y}{(q \cdot z)}$ _____

In 18–22, write as a rate, and then perform the division.

18. A restaurant uses two-thirds of a container of pancake mix to make 600 pancakes. What is the total number of pancakes that can be made from a full container?

rate _____

answer _____

19. Aiko biked $2\frac{3}{4}$ miles in 18 minutes. At this speed, how far will she ride in one hour?

rate _____

answer _____

20. Ms. Lloyd earned \$39 for $3\frac{1}{4}$ hours of work. How much did she earn per hour?

rate _____

answer _____

21. Halfway through the season, the debate team had won 14 debates. At this rate, how many debates will they win in the entire season?

rate _____

answer _____

22. When driving in the city, Jack's hybrid car travels $166\frac{1}{2}$ miles on 3 gallons of gas. How many miles does the car get to the gallon in the city?

rate _____

answer _____

23. If $4\frac{1}{3}$ times N is 39, find N . _____

24. If $5\frac{3}{4}$ times N is 46, find N . _____

25. Which of these have quotients that are greater than or equal to 1? _____

A $\frac{3}{4}$

C $4\frac{1}{2} \div 4\frac{3}{5}$

E $9\frac{2}{7} \div 7\frac{2}{9}$

B $\frac{1}{3} \div \frac{5}{2}$

D $7\frac{1}{4} \div 5\frac{1}{3}$

9-4A Lesson Master

Questions on SPUR Objectives
See pages 611–613 for objectives.

SKILLS Objective B

1. $-12 \div -2 =$ _____

2. $-96 \div 3 =$ _____

3. $\frac{5.2}{-4} =$ _____

4. $\frac{-1000}{80} =$ _____

5. $-\frac{2}{3} \div -\frac{4}{9} =$ _____

6. $\frac{-3\frac{1}{2}}{-1\frac{3}{4}} =$ _____

PROPERTIES Objective D

7. Write two related facts for: $-4 \div \frac{1}{2} = -8$. _____

8. a. Write two related facts for: $w \cdot -3 = \frac{15}{16}$. _____

b. What value of w makes the sentence in Part a true? _____

9. *Multiple choice:* If $-3c \div 8 = -\frac{2}{3}$, what other fact(s) is true? _____

A $\frac{-2}{-3} = 16$

B $8 \div -\frac{2}{3} = -3c$

C $\frac{-3c}{-2} = 8$

D $-3c \cdot -\frac{2}{3} = 8$

PROPERTIES Objective F

10. Write two fractions, in lowest terms, equal to $-\frac{3}{4}$. _____

11. Write two fractions equal to $\frac{f}{-3}$. _____

12. Tell whether the number is positive or negative.

a. $-\frac{2}{-3}$ _____

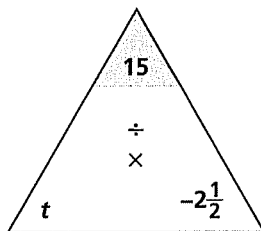
b. $\frac{-2}{-3}$ _____

c. $-\left(\frac{-2}{-3}\right)$ _____

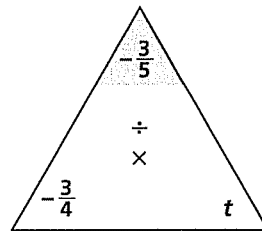
d. $-\left(\frac{m}{n}\right)$ when $m < 0$ and $n > 0$ _____

REPRESENTATIONS Objective KFor the fact triangles in 13 and 14, a. write the related facts, and b. find t .

13.



14.



a. _____

a. _____

b. _____

b. _____

9-4B Lesson Master**SKILLS** Objective B: Divide positive and negative numbers.

1. $\frac{-125}{25}$ _____

2. $\frac{6.4}{-0.8}$ _____

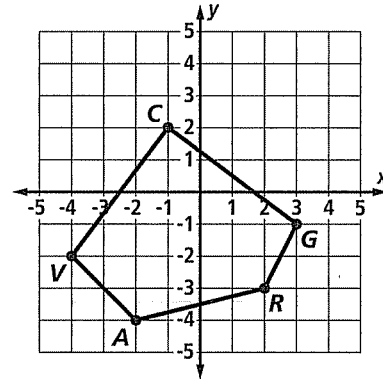
3. $\frac{\frac{-2}{3}}{\frac{-4}{3}}$ _____

4. $\frac{-3}{4} \div \frac{1}{8}$ _____

5. $-2\frac{1}{2} \div -7\frac{1}{2}$ _____

6. $\frac{-14.4}{-6}$ _____

7. The center of gravity of a polygonal region is the point on which the region would balance if cut out and placed horizontally. When placed on a coordinate grid, the mean of the first coordinates of the polygon's vertices is the first coordinate of the center of gravity, and the mean of the second coordinates of the polygon's vertices is the second coordinate of the center of gravity. Find the coordinates of the center of gravity of *CGRAV*.

**PROPERTIES** Objective D: Know related facts of multiplication and division.

8. Write the related facts for:
- $(-2)(5) = -10$

9. Write the related facts for:
- $\frac{\frac{-3}{4}}{\frac{-1}{4}} = 3$

10. Solve
- $\frac{x}{4.2} = -3$
- for
- x
- .

PROPERTIES

Objective F: Know the general properties for dividing positive and negative numbers.

11. Write two fractions in lowest terms equal to $\frac{-4}{7}$. _____
12. If $\frac{a}{b} = c$, and a and c are negative, is b positive or negative? _____
13. Explain how the rules for division of negative numbers compare to the rules for multiplication of negative numbers.

14. *Multiple Choice.* Which does not equal $\frac{a}{-b}$, where $b \neq 0$? _____

A $\frac{-a}{b}$

B $-\frac{a}{-b}$

C $-\frac{a}{b}$

D $-a \cdot \frac{1}{b}$

15. Separate these numbers into two collections of equal numbers. _____

$\frac{4}{5}$

$-\frac{4}{-5}$

$\frac{4}{-5}$

$\frac{-4}{5}$

$-\frac{-4}{-5}$

$\frac{-4}{-5}$

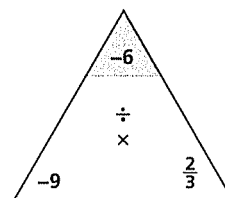
$-\frac{4}{5}$

$-\frac{-4}{5}$

REPRESENTATIONS

Objective K: Represent multiplication and division related facts with a fact triangle.

16. What are the related facts given by the fact triangle?



17. Draw a fact triangle for $\frac{1}{5} \div \frac{-5}{9} = \frac{-9}{25}$.
18. Draw a fact triangle for $\frac{-3}{4} \div \frac{7}{12} = n$. Solve for n .

9-5A Lesson MasterQuestions on SPUR Objectives
See pages 611–613 for objectives.**SKILLS** Objective C

In 1–9, solve and check.

1. $-8 = -16b$

2. $\frac{2}{3}m = -1.2$

3. $-15 = 2.5a - 5$

4. $16 = 72\% \text{ of } q$

5. $-1.2t + 4 = 3.2$

6. $-1.2n < -6$

7. $-3\frac{1}{2} \leq \frac{1}{2}k$

8. $56 \geq -15d + 11$

9. $\frac{3}{4} < -\frac{1}{2}g - 1\frac{3}{4}$

In 10 and 11,

- Write an equation or inequality to solve the problem.
- Find the answer.

10. Elle is working to save money for college. She wants to have a minimum of \$2,500. If she already has \$545 and works at the local bookstore making \$6.25 per hour, how many hours will she need to work?

a. _____ b. _____

11. $\frac{3}{4}$ of the students in the drama club went to see a professional performance of *Hamlet* with 5 chaperones. If 29 people went to *Hamlet*, how many students are in the drama club?

a. _____ b. _____

9-5B Lesson Master

SKILLS Objective C: Solve equations and inequalities using the Division Property of Equality and the Division Property of Inequality.

In 1-12, solve and check.

1. $\frac{4}{15}w = -20$

2. $\frac{45}{-70}n = 9$

3. $\frac{-3}{1.5}y = 12$

4. $\frac{7}{10} = \frac{1}{55}g$

5. $\frac{1}{21}m = \frac{3}{14}$

6. $\frac{121}{70} = \frac{-1}{210}s$

7. $\frac{1}{18}k = \frac{125}{90}$

8. $\frac{48}{69}b = 16$

9. $\frac{1}{54}d < \frac{-0.2}{0.9}$

10. $\frac{49}{5.2}h > 196$

11. $\frac{300}{227} < \frac{-1}{4.54}t$

12. $-8.2 > \frac{12.3}{8.4}u$

In 13–20,

a. Write an equation or inequality to solve the problem.

b. Find the answer.

13. Valery paid \$64.89 for 7 CDs. What was the average price of the CDs?

a. _____

b. _____

15. Matt wants to ship brochures, each weighing 7 grams, in a box that weighs 350 grams. There is a total shipping weight limit of 1700 grams. What is the greatest number of brochures Matt can ship?

a. _____

b. _____

17. Leisurely swimming burns around 350 calories an hour. About how many minutes will it take to burn 150 calories through leisurely swimming?

a. _____

b. _____

19. Manny wants to invite some friends to a basketball game on his birthday. Tickets to the game cost \$11.70 and transportation will cost \$60 for the group. If Manny can spend up to \$190, how many friends can he invite (don't forget a ticket for Manny)?

a. _____

b. _____

14. Box lunches are selling for \$8.50 each. Caleb paid \$51.00 for some box lunches. How many box lunches did Caleb buy?

a. _____

b. _____

16. Jenna paid \$7.89 for lunch materials that consisted of a loaf of bread that cost \$0.67 and deli ham that cost \$6.25 a pound. To two decimal places, how many pounds of ham did Jenna buy?

a. _____

b. _____

18. Walking burns about 208 calories an hour. About how long will it take to burn at least 624 calories through walking?

a. _____

b. _____

20. Brawny-Brats bratwursts are sold in packages of 10, while buns for them are sold in packages of 8. If the picnic committee buys 17 packages of buns, what is the greatest number of packages of bratwurst that will allow for a bun for every bratwurst?

a. _____

b. _____

9-6A Lesson Master**Questions on SPUR Objectives**
See pages 611–613 for objectives.**USES** Objective I

1. \$2.74 tax was added to a \$45.63 dinner bill. Calculate the tax rate. _____
2. On the final exam in mathematics, Joanne scored 112 of 125 points. What was her percent score? _____
3. *Fill in the blank.* 320 students attended the school's Valentine's Day dance this year. Last year 225 students attended.
 - a. This year, _____ times as many students attended as last year.
 - b. Last year, _____ times as many students attended as this year.
 - c. This year's attendance was _____ percent of the number of students in attendance last year.
4. *Fill in the blank.* According to the Consumer Price Index, in July of 1996, a gallon of gasoline cost \$1.57. In July, 2006, it cost \$3.20.
 - a. The ratio of the 2006 price to the 1996 price is _____.
 - b. The 2006 price is _____ percent of the 1996 price.
5. According to infoplease.com (source: Department of Education, National Center for Education Statistics), 26,410 students graduated from college in 1900. In 2000 there were 1,237,875 graduates. To the nearest tenth of a percent, find the ratio of graduates in 1900 to graduates in 2000. _____
6. The largest state, Alaska, has 571,950 square miles of land. The smallest state, Rhode Island, has 1,045 square miles of land. To the nearest tenth of a percent, find the ratio of the land mass of Rhode Island to the land mass of Alaska. _____
7. The atomic weight of the smallest atom, Hydrogen, is 1.00794. The next atom listed on the periodic table, Helium, has an atomic weight of 4.002602.
 - a. To the nearest hundredth of a percent, what is the ratio of the weights of the hydrogen atom to the helium atom? _____
 - b. To the nearest hundredth of a percent, what is the ratio of the weights of the helium atom to the hydrogen atom? _____
8. At the time of his draft in 1987, "Mugsy" Bogues, 5'3", was the shortest person ever to play in the National Basketball Association (NBA). During his rookie year, he was a teammate of Manute Bol, 7'7", who was the tallest person ever to play in the NBA at that time. Manute Bol is about how many times as tall as Mugsy Bogues? _____

9-6B Lesson Master**USES** Objective I: Use the Ratio Comparison Model for Division.

In 1–4, use this table of the heights above sea level of the 121 tallest mountains on Earth, from infoplease.com.

Elevation (meters)	>8,500	8,000–8,499	7,500–7,999	7,000–7,499	6,500–6,999	6,000–6,499
Number of Peaks	4	10	22	30	20	35

Source: National Geographic Society

- Of the 14 tallest peaks, 10 are in the Himalayas and 4 are in the Karakoram.
 - What percent of the 14 tallest peaks are in the Himalayas? _____
 - Compare the numbers of Himalayan and Karakoram peaks, in both orders. _____
- Of the peaks taller than 6,999 meters, all are in Asia, and 43 are in the Himalayas. There are 5 Asian peaks whose heights are between 6,000 meters and 6,999 meters.
 - Find the ratio of Himalayan peaks to all the peaks taller than 6,999 meters. _____
 - Find the ratio and percent of the number of Asian peaks to the number of peaks taller than 5,999 meters. _____
- The Andes mountains have the other 50 peaks whose heights are between 6,000 meters and 6,999 meters. There are 45 Himalayan peaks in the entire table.
 - Give the ratio and percent of the number of Andean peaks whose heights are between 6,000 meters and 6,999 meters compared to the total number of peaks with those heights. _____
 - Compare the numbers of Andean and Himalayan peaks, in both orders. _____
- A tax of \$3.99 was added to the \$56.99 cost of a pair of shoes. Calculate the tax rate. _____
- The fourteenth and fifteenth longest rivers are the Mississippi River, 2,350 miles long, and the Missouri River, 2,341 miles long.
 - About how many times as long as the Missouri is the Mississippi? _____
 - About how many times as long as the Mississippi is the Missouri? _____

6. *Fill in the blank.* The Nile is the longest river in the world, measuring 4,160 miles. The second longest river is the Amazon, measuring 4,000 miles. The Chang Jiang (Yangtze) is third longest river, measuring 3,964 miles.

- a. The Nile is about _____ times as long as the Amazon.
- b. The Amazon is about _____ times as long as the Chang Jiang.
- c. The Nile is about _____ times as long as the Chang Jiang.

7. *Fill in the blank.* In 2002 a family's grocery bills averaged \$380 per month. In 2007 they spent an average of \$535 per month.

- a. The 2002 grocery bills were about _____ percent of their 2007 grocery bills.
- b. The 2007 grocery bills were about _____ percent of their 2002 grocery bills.
- c. Their 2007 grocery bills were about _____ times their 2002 grocery bills.

8. Last year 3,041 babies were born at South Side Hospital, and 1,218 were born at Hastings Hospital.

- a. Write a sentence comparing the number of births at South Side Hospital to the number of births at Hastings Hospital.

- b. Write a sentence comparing the number of births at Hastings Hospital to the number of births at South Side Hospital.

9. In 2000, three percent of the people living in Ohio were born in another country. How was the three percent calculated?

9-7A

Questions on SPUR Objectives
See pages 611–613 for objectives.

PROPERTIES Objective E

In 1–3, by what expression can you multiply both sides of the equation to eliminate fractions?

1. $\frac{5}{8} = \frac{95}{x}$

2. $\frac{3.2}{x} = \frac{48}{75}$

3. $\frac{x}{a} = \frac{b}{c}$

In 4–6, solve for x using the Means-Extremes Property. Show your work.

4. $\frac{5}{8} = \frac{95}{x}$

5. $\frac{3.2}{x} = \frac{48}{75}$

6. $\frac{x}{a} = \frac{b}{c}$

7. Write an equation involving fractions that is *not* a proportion. _____**USES** Objective J

In 8–10, write a proportion and then answer the question.

8. One copy of *War and Peace* is 1,134 pages long. Yuko has been reading $\frac{3}{4}$ of a page per minute. If she continues at this rate, how long will it take her to finish the book?

proportion

answer

9. A $5\frac{1}{3}$ -ounce can of olives sells for \$1.69. At this rate, how much should an 8-ounce can cost?

proportion

answer

10. Last week Sheila earned \$22.50 babysitting for 3 hours. At this rate, how long will she have to work to earn enough to buy a radio that costs \$82.50?

proportion

answer

9-7B**PROPERTIES**

Objective E: Recognize the Means-Extremes Property and know why it works.

1. a. Using the Multiplication Property of Equality, by what expression can you multiply both sides of $\frac{4.2}{n} = \frac{63}{78}$ to eliminate the fractions? Give the expression, multiply both sides of the equation by the expression (eliminating common terms), and solve the equation.

- b. How would you solve $4.2:n = 63:78$ using the Means-Extremes Property? Write an equation and then solve it.

- c. How can the first two parts of this problem be used to show that the Means-Extremes Property is related to the Multiplication Property of Equality?

2. Which sentences are *not* proportions? _____

A $\frac{1}{4} = \frac{13}{39}$

B $\frac{10}{3} = \frac{60}{18}$

C $\frac{2.5}{15} = \frac{50}{300}$

D $\frac{70}{84} = \frac{6}{5}$

E $\frac{1.6}{4.8} = \frac{3.3}{9.9}$

F $\frac{51}{90} = \frac{15}{24}$

G $\frac{m}{20} = \frac{1}{2}$

H $\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$

3. Rewrite the right side of each sentence as a single fraction, which can be used as one side in a proportion.

a. $\frac{2}{3} = \frac{y}{7} - \frac{2}{7}$ _____

b. $\frac{4}{9} = 4 + \left(\frac{3}{5}\right)t$ _____

In 4–9, solve the proportion.

4. $\frac{x}{5} = \frac{34}{85}$

5. $\frac{11}{2} = \frac{R}{18}$

6. $\frac{9}{e} = \frac{72}{20}$

7. $\frac{500}{62} = \frac{125}{a}$

8. $\frac{6}{0.2} = \frac{s}{9}$

9. $\frac{2x}{5} = \frac{8}{3}$

USES Objective J: Recognize and solve problems involving proportions in real-world situations.

In 10–16, write a proportion and then answer the question.

10. If $7\frac{3}{4}$ yards of ribbon costs \$6.20, how much do $12\frac{1}{2}$ yards cost?

proportion

answer

11. A copier makes 530 copies in 5 minutes. At this rate, how long will it take to make 1,200 copies?

proportion

answer

12. Lynelle can do 75 math facts in 3 minutes. At this rate, how long will it take her to do 240 math facts?

proportion

answer

13. If pizza sauce costs \$1.35 for 4 cans, how many cans can be bought for \$12?

proportion

answer

14. It takes Ed 5 minutes to wash 4 windows. At this rate, how long will it take him to wash 35 windows?

proportion

answer

15. A model of a car is built to a scale of 1:20. If the model is 23.5 centimeters long, how many meters long is the car?

proportion

answer

16. Sliced ham sells for \$2.09 a half pound. How much will 1.62 pounds of ham cost? Round your answer up to the nearest cent.

proportion

answer

9-8A**Questions on SPUR Objectives**
See pages 611–613 for objectives.**USES** Objective J

In 1–3, solve each proportion mentally.

1. $\frac{3}{2} = \frac{15}{q}$ _____

2. $\frac{9}{10} = \frac{p}{15}$ _____

3. $\frac{3}{50} = \frac{x}{25}$ _____

In 4–9, write a proportion(s). Then answer the question.

4. A photograph 3 cm wide and 12 cm long is proportionately enlarged to a width of 12 cm. What is the new length of the photo?
-
- _____

5. Manuel completed 6 math problems in 12 minutes. At this rate, how long will it take him to finish the entire 28-problem assignment?
-
- _____

6. A dollhouse and its furniture is usually
- $\frac{1}{12}$
- the size of a real house and furniture. If a real dining-room table is about 72 inches long, 48 inches wide, and 36 inches high, what would be the dimensions of a dollhouse table?
-
- _____

7. One cow requires
- $2\frac{1}{2}$
- acres of land for grazing. How many cows can be supported on a 300-acre pasture?
-
- _____

8. At a deli, sliced turkey sells for \$3.29 a half pound. How much will 1.50 pounds of sliced turkey cost?
-
- _____

9. On a map with a scale of 1 inch = 60 miles, it is about
- $3\frac{1}{4}$
- inches from Boston to New York City. If Harry averages 30 miles per hour, how long will it take him to make the trip?
-
- _____

10. In 2006, the world record for the 100 m dash was 9.77 seconds. If this pace could be maintained, estimate the time for the 1,600 m run (the metric mile) using proportional thinking. Then write and solve a proportion. Give your answer in minutes and seconds.
-
- _____

9-8B

USES Objective J: Recognize and solve problems involving proportions in real-world situations.

In 1–7, state a proportion and use proportional thinking to answer the question. Explain how you got an answer without using pencil and paper or a calculator.

1. A car can travel 500 kilometers on 60 liters of gas. How much gas will be needed to travel 1,250 kilometers?

2. From a faucet, Frank can fill two one-gallon containers with water in one minute. Assuming this rate is constant, how much time will he need to fill five one-gallon containers?

3. A recipe calls for $\frac{2}{3}$ cup of flour for 12 servings. For 30 servings, how much flour should be used?

4. A machine can fill 2,400 cans of juice in an hour. At this rate, how many cans of juice can be filled in 12 hours?

5. A recipe serving eight people requires $2\frac{1}{2}$ pounds of ground beef. How much ground beef will be needed to serve 20 people?

6. If cantaloupes are 2 for \$1.19, how much will 8 cantaloupes cost?

7. Fertilizer is diluted at the rate of $\frac{1}{2}$ ounce per gallon of water. How many gallons of water can be treated with a quart of fertilizer? (There are 32 ounces in 1 quart.)

8. If a recipe for 6 servings uses 2 tablespoons of honey,
a. How many tablespoons of honey are in each serving? _____

b. how much honey is needed for 18 servings? _____

9. *Fill in the blanks.* At 45 miles per hour, . . .

a. it takes _____ hours to travel 90 miles.

b. it takes _____ hours to travel 450 miles.

c. it takes between _____ and _____ hours to travel 150 miles. (Use consecutive whole numbers.)

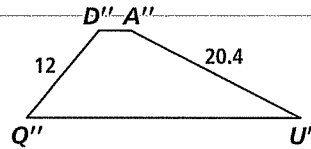
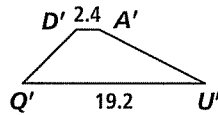
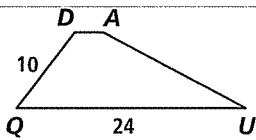
10. Using the information from Question 9, write and solve the proportion needed to find the time needed to travel 150 miles.

9-9A Lesson Master

Questions on SPUR Objectives
See pages 611–613 for objectives.

REPRESENTATIONS Objective L

In 1–9, use these similar figures.



1. $\overline{UA} =$ _____
2. $\overline{Q'D'} =$ _____
3. $\overline{Q''U''} =$ _____
4. $\overline{AD} =$ _____
5. $\overline{U'A'} =$ _____
6. $\overline{A''D''} =$ _____
7. What is the perimeter of $QUAD$? _____
8. What is the perimeter of $Q'U'A'D'$? _____
9. What is the perimeter of $Q''U''A''D''$? _____
10. Study the ratios of the perimeters of pairs of the above figures. Make a conjecture about the perimeter of similar figures.

11. The scale of a map is 1 inch = 5 miles. If a distance on the map is $2\frac{1}{4}$ inches, how far is the actual distance?
12. A pen pal from Paris sends her friend a scale model of the Eiffel Tower that is 8 cm tall. The box has the ratio 1 : 3,750. Estimate the height of the Eiffel Tower in meters.

13. A triangle with sides 3, 4, and 5 is a right triangle.
 - a. Give the dimensions of a similar bigger right triangle. _____
 - b. Give the dimensions of a similar smaller right triangle. _____

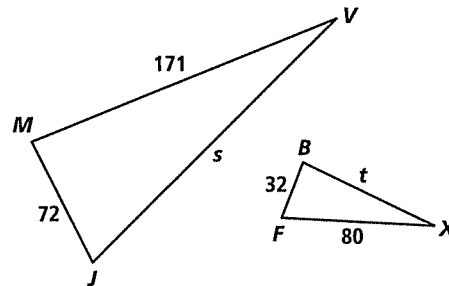
9-9B Lesson Master

REPRESENTATIONS

Objective L: Find missing lengths in similar figures.

1. In the diagram at the right, $\triangle MJV$ is similar to $\triangle BFX$.

a. Name the corresponding sides.



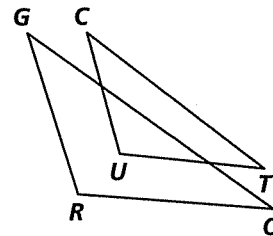
b. Write a proportion to find s . Solve for s .

c. Find the value of t .

2. $\triangle CUT$ is a contraction image of $\triangle GRO$.

a. Name the ratios equal to $\frac{UT}{RO}$.

b. If $\overline{GR} = 24$, $\overline{GO} = 44$, and $\overline{CU} = 18$, what is the value of \overline{CT} ?

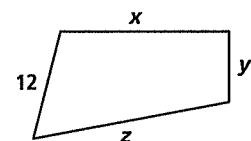
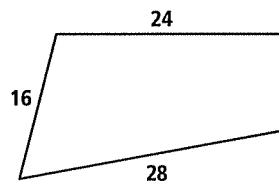


3. The quadrilaterals at the right are similar.

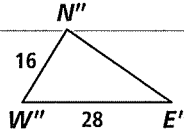
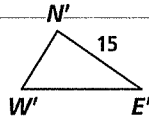
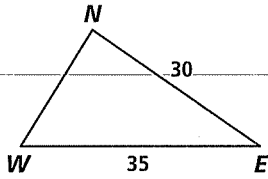
a. What is the value of x ?

b. What is the value of y ?

c. What is the value of z ?



In 4–7, find the missing measures in these similar triangles.



4. \overline{NW}

5. $\overline{E'W'}$

6. $\overline{N''E''}$

7. $\overline{N'W'}$

8. Find the perimeter of each triangle.

a. $\triangle NEW$

b. $\triangle N'E'W'$

c. $\triangle N''E''W''$

REVIEW

Lesson 9-7, Objective J

In 9 and 10,

a. Write a proportion.

b. Use the proportion to answer the question.

9. The scale on a map is 1 cm = 15 km. If a distance on the map is 3.5 centimeters, what is the actual distance?

a. _____ b. _____

10. An architect's model of a new school has the ratio 1:28. If the model is 40 centimeters high, how many meters tall will the school be?

a. _____ b. _____

11. A photo is 3 inches by 4 inches. Give possible dimensions of . . .

a. an enlargement of the photo.

b. a reduced copy of the photo.
