

Module 7 Working with Ratio, Proportion, and PercentsSection 7.1 RatiosPractice Problems 7.1

For Problem 1-6, write the fraction given in simplest terms.

1. $\frac{25}{50}$

2. $\frac{36}{72}$

3. $\frac{11}{18}$

4. $\frac{33}{99}$

5. $\frac{4}{12}$

6. $\frac{14}{22}$

For Problem 7-10, convert the fraction given to a decimal and percent by dividing the numerator by the denominator and then multiplying by 100. (Round to the hundredths place if necessary.)

7. $\frac{2}{5}$

8. $\frac{21}{100}$

9. $\frac{5}{8}$

10. $\frac{13}{15}$

For Problem 11-16, use the given chart to solve the problem.

Vacation Site	Number of Persons Who Prefer the Vacation Site
Out of the Country	23
Recreational Sights Within the State	54
Camping and Hiking	43
The Beach	36

11. Write the ratio for those who prefer camping and hiking to those who do not.

12. Write the ratio for those who prefer traveling out of the country to those who want to visit recreational sights within the state.

13. What is the ratio of those who prefer visiting the beach to those who prefer camping and hiking?



Vacation! This family prefers hiking!

14. What percent of people surveyed prefer going to recreational sights in the state where they live?

15. Which of the four picks (vacation sites) has the least percentage of popularity?

16. A probability ratio is a comparison of preferred outcomes to total outcomes. Which of Problem 11-14 is similar to a probability ratio?

For Problem 17-20, solve the word problem given.

17. Why are equal ratios the same as equivalent fractions?
18. When we rename a fraction such as $\frac{4}{5} \times \frac{2}{2} = \frac{8}{10}$, what property are we using?
19. Why do we leave ratios as improper fractions and not change them to mixed numbers?
20. Think a minute! What would be the ratio of two quarters to \$1.00?

Section 7.2 Scaling Up
Practice Problems 7.2

For Problem 1-4, change each ratio given to a decimal and tell whether the ratio is equivalent or not.

1. $\frac{5}{6}$ and $\frac{8}{9}$

2. $\frac{4}{5}$ and $\frac{48}{60}$

3. $\frac{1}{3}$ and $\frac{3}{10}$

4. $\frac{3}{5}$ and $\frac{24}{50}$

For Problem 5-8, find a ratio equivalent to the ratio given.

5. $\frac{14}{15}$

6. $\frac{1}{7}$

7. $\frac{2}{5}$

8. $\frac{11}{13}$

For Problem 9-11, use the given information to solve the problem.

On a map of Maine, the distance between Acadia National Park and Harriett Beecher Stowe’s home is 10.5 inches.

9. If 2 inches on the map’s scale represents 20 miles in real-life, how many miles is it from Acadia National Park to Harriett Beecher Stowe’s home? Complete the table that represents the ratio of the scale of the map to real-life.

Inches							
Miles							

10. On the same map, the distance between Pemaquid Lighthouse and York Lighthouse is 90 miles. How many inches is that on the map? Complete the table that represents the ratio of the scale of the map to real-life.

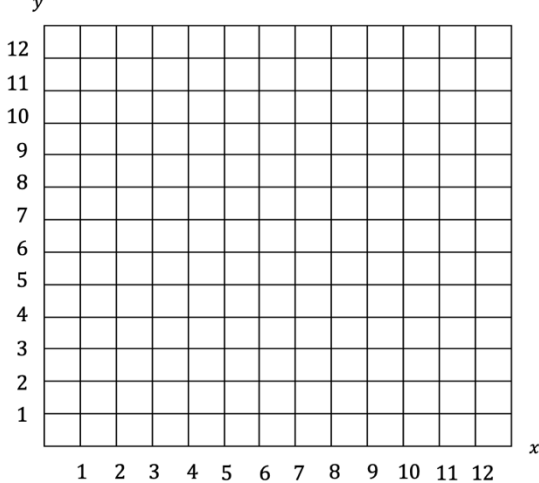
Inches									
Miles									

11. Explain the relationship between the scale on the map and how you use it to determine actual distances.

For Problem 12-16, use the information given to solve the problem.

12. Suppose you are sitting at a table with nine people and on it are four pizzas. At the next table are thirteen people and eight pizzas. If the pizzas are divided equally among the people at the table, will you get the same amount of pizza if you sat at the other table?

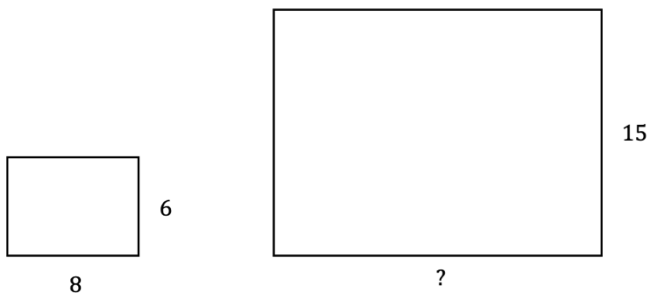
13. Plot and label the three vertices of a triangle $T_1(1, 1)$, $R_1(4, 1)$, $I_1(2.5, 3)$ on the graph below. Triple the x coordinates and the y coordinates using the form $(3x, 3y)$. How does the base of the original triangle change? How does the height of the original triangle change?



14. The formula for area of a triangle is $A = \frac{1}{2}b \cdot h$. Compare the area of the original triangle in Problem 13 to its projected image with the coordinates tripled. How much bigger or smaller did it get?

15. What is the ratio of the base to height of each of the triangles? Are these equivalent ratios?

16. What is the missing length given the rectangles below have the same ratio? What is the scale factor moving from the original small rectangle to the projected large rectangle?



For Problem 17-24, use or make a table to solve the problem.

17. A company office had three printers for eighteen computers. However, the company has grown so much that they now have 144 computers. How many printers do they need to accommodate the 144 computers?
18. A church youth group normally buys fifteen pounds of potatoes to feed 50 homeless people for a holiday dinner. This year, they were told they will be feeding 150 homeless people. How many pounds of potatoes will they need to buy to accommodate the 150 homeless people this year?
19. A local donut store sells 4 donuts for \$3.00. At that rate, how much would a customer pay for 6, 8, and 12 donuts? Are a dozen donuts for \$8.50 a better deal?
20. Find the length of a photograph that is 9 inches wide given the original photograph is 4.5 inches wide by 6 inches long.
21. A map uses a scale in which 2 inches represent 7 miles. If the distance between two cities on the map is 26 inches, how many miles apart are the cities?
22. When you scale up, are you multiplying by a number bigger than the original number or smaller than the original number?
23. Use the multiplication table to write 5 equivalent fractions of $\frac{2}{3}$.
24. Use the multiplication table to write 5 equivalent fractions of $\frac{4}{5}$.

Section 7.3 Scaling DownPractice Problems 7.3

For Problem 1-12, use the information given to solve the problem.

1. A recipe for muffins calls for $3\frac{1}{2}$ cups of flour and $1\frac{1}{2}$ cups of milk for 6 people. How much of each ingredient would you need to make the recipe for 3 people?

2. If you pay \$8.50 for 10 roses, approximately how much would 12 roses cost?

For Problem 3-6, use the given information to solve the problem.

A generic can of grape juice concentrate calls for 2 parts water for every 5 parts concentrate. So, if you put 2 cups of water in a glass, you must put 5 cups of concentrate in the glass and vice versa. If you put 2 liters of water in a glass, you must put 5 liters of concentrate in the glass.

3. Suppose a grape juice concentrate competitor recipe calls for 4 parts water for every 6 parts concentrate. Which mixture will have a stronger grape juice flavor?

4. If the ratios $\frac{5}{2}$ and $\frac{6}{4}$ are for the water to concentrate ratio from Problem 3, which mixture will have a stronger grape juice flavor?

5. Which is true of the generic grape juice? How do you know?

a) $\frac{2}{5}$ is water

b) $\frac{2}{7}$ is water

6. Which is true of the competitor's grape juice? How do you know?

a) $\frac{2}{3}$ is water

b) $\frac{2}{5}$ is water

For Problem 7-9, use the given information to solve the problem.

At Vacation Bible School, each participant has a $\frac{1}{2}$ cup of juice at snack time (1 cup = 8 ounces). A half-gallon of juice is 64 ounces.

7. How many gallons of juice need to be made for 92 Vacation Bible School participants?

8. If the juice comes in half-gallon containers, how many half-gallons of juice need to be purchased for one week (five days) of Vacation Bible School given snack time is once daily?

9. If the leaders of Vacation Bible School purchase a concentrate to make the juice, and it is 5 cups concentrate to 3 cups water to make one-half gallon of juice, how many gallons of concentrate must be purchased for one week (five days) of Vacation Bible School?

For Problem 10-12, use the information given to solve the problem.

10. One batch of chocolate chip cookies requires $2\frac{1}{4}$ cups of flour. If you double the batch, how much flour do you need?

11. Sam made a model of a 30-foot statue of a famous president that was 5 cm. tall. Find the scale:

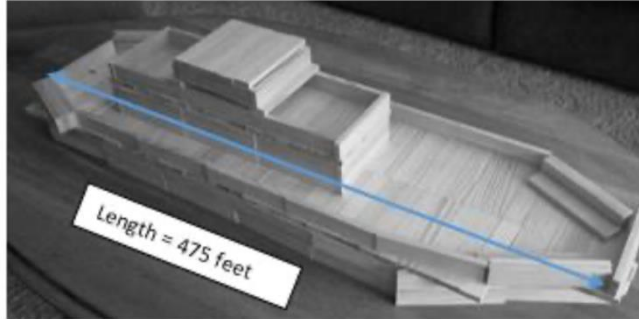
1 cm. = _____ ft.

12. The distance between two towns is 1,000 miles and is represented by 5 inches on a map. Find the scale:

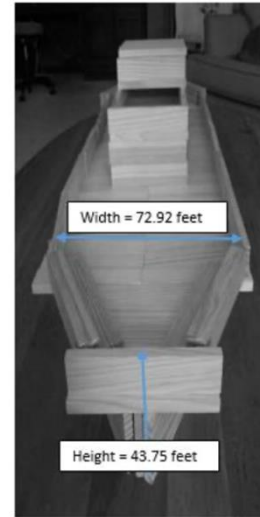
1 inch = _____ miles

For Problem 13-15, use the diagram below to solve the problem.

The diagram uses the scale: 1 short cubit = 17.5 feet. Find the approximate dimensions of the model using scaling techniques.



Noah's Ark built by Titus and Clara



13. What is the approximate length of the ark in short cubits?

14. What is the approximate width of the ark in short cubits?

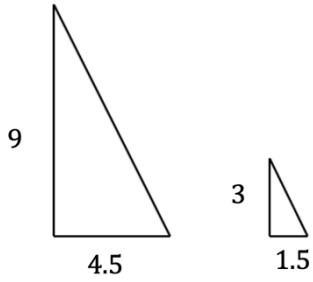
15. What is the approximate height of the ark in short cubits?

Section 7.4 Similar Figures

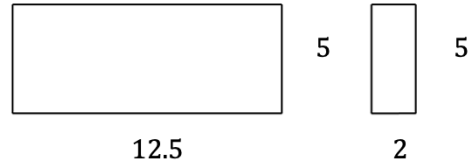
Practice Problems 7.4

For Problem 1-4, determine whether the pair of figures given is similar or not. The corresponding angles are congruent.

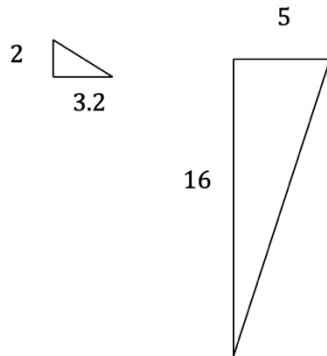
1.



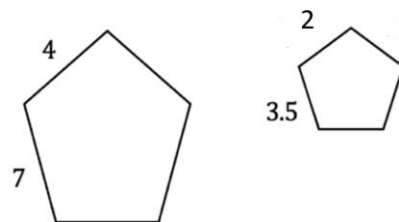
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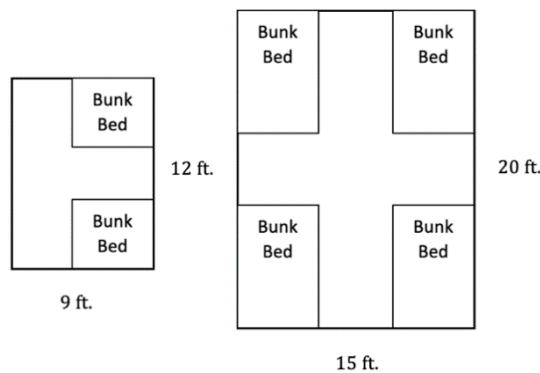
3.



4.



For Problem 5-14, use the given information and diagrams to solve the problem.
At a college, there are dormitories that have 8 or 4 people per unit.



5. If the rooms are all similar, what is the scale factor from the small room to the large room?

12. Using the room for eight people and with a scale factor of 2.5, what would be the dimensions of the new larger room?

13. If the college carpets the new larger room described in Problem 12, and carpet is \$20 per square yard, what is the cost of the carpet? (You must divide total area by a square yard, which is 3 feet by 3 feet or 9 square feet.) What might be the purpose of this room?

14. A dormitory is being renovated to one-and-a-half its original size to make a living space next to the sleeping area. If the original dimensions of the room are 12 feet by 10 feet, what are the dimensions of the newly renovated room?

For Problem 15, use the Lesson Notes to solve the problem.

15. The long leg of the black triangle you made in this section of the Lesson Notes was 1-inch. The long leg of the white triangle you made was 2-inches. What is the scale factor if you want to dilate the small black triangle to project to the large white triangle? What is the scale factor if you want to shrink the large white triangle to project to the small black triangle?

Section 7.5 Similarity ProblemsPractice Problems 7.5

For Problem 1-8, use the information given to solve the problem.

1. Which proportion is correct?

$$\frac{\text{width}}{\text{length}} = \frac{\text{width}}{\text{length}} \qquad \frac{\text{width}}{\text{length}} = \frac{\text{length}}{\text{width}}$$

2. Which proportion is incorrect?

$$\frac{\text{cm.}}{\text{m.}} = \frac{\text{m.}}{\text{cm.}} \qquad \frac{\text{cm.}}{\text{m.}} = \frac{\text{cm.}}{\text{m.}}$$

3. Fill in the blank to make the correct proportion.

$$\frac{\text{lbs.}}{\$} = \frac{\text{lbs.}}{\underline{\hspace{2cm}}}$$

4. Fill in the blank to make the correct proportion.

$$\frac{\text{circumference}}{\text{area}} = \frac{\underline{\hspace{4cm}}}{\text{area}}$$

5. Solve for
- d
- so that each of the fractions are equivalent.

a) $\frac{2}{d} = \frac{4}{10}$

b) $\frac{1}{2} = \frac{5}{d}$

c) $\frac{d}{20} = \frac{3}{4}$

d) $\frac{20}{30} = \frac{d}{3}$

6. Solve for
- d
- so that each of the fractions are equivalent.

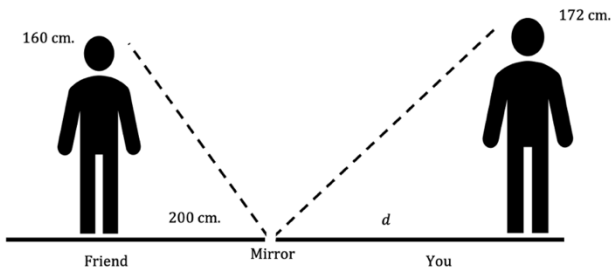
a) $\frac{3}{7} = \frac{d}{49}$

b) $\frac{2}{d} = \frac{14}{21}$

c) $\frac{d}{15} = \frac{4}{60}$

d) $\frac{22}{44} = \frac{11}{d}$

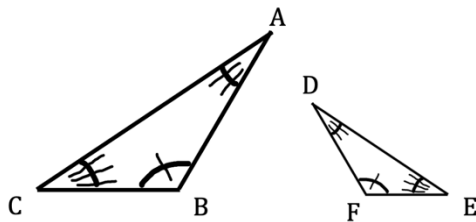
7. Your friend is standing 200 cm. from a mirror. The measurement is 160 cm. from the ground to her eye. It is 172 cm. from the ground to your eye. How far back from the mirror must you stand to see the reflection of your friend's eyes in the mirror?



8. Try this problem at home: Measure the height of another person and yourself. Have them stand 200 cm. from a mirror. Calculate where you need to stand to see their eyes in the mirror. Then move to that distance and see if it works.

For Problem 9-12, use the given similar triangles to solve the problem.

9.



a) Which angle in the smaller triangle corresponds with $\angle A$ in the larger triangle?

b) Which angle in the smaller triangle corresponds with $\angle B$ in the larger triangle?

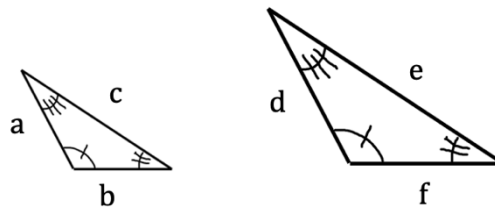
c) Which angle in the smaller triangle has the same measure as $\angle C$ in the larger triangle?

10. In $\triangle ABC$, if the scale factor is $\frac{1}{3}$ from the original $\triangle ABC$ to the projected $\triangle DEF$ and the length of \overline{BC} is 6 cm., what is the length of \overline{EF} ?

11. If the scale factor from $\triangle ABC$ to $\triangle DEF$ is $\frac{1}{3}$, and the length of \overline{EF} is 2.5 cm., what is the length of \overline{BC} ?

12. If the scale factor from $\triangle ABC$ to $\triangle DEF$ is $\frac{1}{3}$, what is the scale factor from $\triangle DEF$ to $\triangle ABC$?

For Problem 13 and 14, use the given similar triangles to solve the problem.



13. Which proportions are incorrect for the similar triangles?

a) $\frac{b}{d} = \frac{c}{e}$

b) $\frac{a}{f} = \frac{b}{d}$

c) $\frac{a}{f} = \frac{c}{e}$

d) $\frac{b}{f} = \frac{a}{d}$

e) $\frac{b}{f} = \frac{c}{e}$

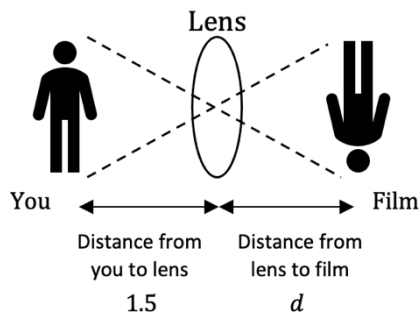
f) $\frac{a}{d} = \frac{c}{e}$

14. Change the incorrect proportions in Problem 13 to make them correct.

For Problem 15, use the given information to solve the problem.

Your image is projected by the lens of the camera onto the film. Your height on the camera is proportional to your height on the film (using similar triangles). Suppose you are 1.8 m. tall and 1.3 m. tall on the film.

15. If you are standing 1.5 m. in front of the camera lens, then...



a) ... how far is the film from the lens?

b) ... how far are you from the film?

Section 7.6 Unit RatePractice Problems 7.6

For Problem 1-7, find the unit rate for the item given.

1. 9 markers for \$1.59
2. 12 roses for \$10.99
3. 3 canned goods for \$2.98
4. 6 sodas for \$5.99
5. 2 chocolate bunnies for \$7.49
6. 6 markers for \$0.79
7. 12 erasers for \$0.49

For Problem 8-13, tell which is a better buy for the items given.

8. A 6-pack of golf balls for \$7.99 or an 8-pack for \$9.98?
9. A dozen eggs for \$2.99 or 18 eggs for \$4.59?
10. A set of 3 tennis balls for \$3.39 or 6 tennis balls for \$5.98?
11. A 3-pack of gum for \$1.08 or a 6-pack of gum for \$2.16?
12. A box of 3 fine chocolates for \$1.50 or a box of 5 fine chocolates for \$2.82?
13. A set of 2 pens for \$7.49 or 6 pens for \$11.98?

For Problem 14 and 15, use the information given to solve the problem.

14. Mariah buys 3 candy bars for \$4.33 and River buys 5 candy bars for \$5.25. Given they both buy 15 candy bars, who will spend more money?
15. Nicholas bought 5 candy bars and paid \$0.89 for each of them. Keyleigh bought 5 candy bars for \$4.56 total. Who got the better buy?

Section 7.7 Unit ConversionsPractice Problems 7.7

For Problem 1-3, determine the unit rate for the phrase given.

1. \$55.00 for 5 hours of work
2. A 16 oz. bottle of juice cost \$2.79

3. A bag of 8 oranges costs \$4.99

For Problem 4-6, use the given information and the “cancel-keep” method to solve the problem.

When we multiply to convert units, it is called a conversion factor.

4. Which conversion factor converts feet to inches?
 - a) $\frac{1 \text{ ft.}}{12 \text{ in.}}$
 - b) $\frac{12 \text{ in.}}{1 \text{ ft.}}$

5. Which conversion factor converts ounces to pounds?
 - a) $\frac{16 \text{ oz.}}{1 \text{ lb.}}$
 - b) $\frac{1 \text{ lb.}}{16 \text{ oz.}}$

6. Which conversion factor converts yards to feet?
 - a) $\frac{3 \text{ ft.}}{1 \text{ yd.}}$
 - b) $\frac{1 \text{ yd.}}{3 \text{ ft.}}$

For Problem 7-15, use the information given to solve the problem.

7. Convert 6 quarts of juice to gallons given 4 quarts = 1 gallon.

8. Convert 12 miles to feet given there are 5,280 feet in 1 mile.

9. Convert 16.3 grams to milligrams.

10. Convert 10.2 millimeters to centimeters.

11. How many centimeters are in a meter?

12. How many meters are in a centimeter?

13. How many grams are in a kilogram?

14. How many kilograms are in a gram?

15. A slug travels across a sidewalk at 0.002 miles per hour. If the sidewalk is 3 feet across, how many minutes will it take the slug to cross from one side of the sidewalk to the other?

16. Jamison throws a frisbee to Eleanor at 2.4 meters per second. Evan throws a frisbee the same distance to Eleanor at 6.2 feet per second. Who throws the frisbee fastest, Jamison or Evan? Use two “cancel-keep” conversions to solve the problem.

Section 7.8 ProportionsPractice Problems 7.8

For Problem 1-6, set up the correct proportion for the situation given.

1. Evan bought 2 scoops of ice cream for \$3.29. How much would 3 scoops of this ice cream cost? Let c represent cost.
2. Alexis sold Katelyn 10 pencils for \$1.55. How many pencils can Katelyn buy from Alexis for \$2.39? Let p represent pencils.
3. Jacquelyn bought Aaliyah 3 pretzels for \$3.39. How many pretzels could Jacquelyn buy for herself with the two dollars she has left? Let p represent pretzels.
4. Dillon bought Haley 6 cupcakes for her birthday for \$5.98. Haley went back to the bakery and bought 4 cupcakes for her friends. How much did she spend? Let a represent the amount Haley spent.
5. Hunter bought Julia 5 roses for \$10.99. Stephen went to the same flower shop and bought 3 roses for Ashton. How much did he spend? Let a represent the amount Stephen spent.
6. Find another way to write each of the proportions in Problem 1-6 correctly.

For Problem 7-15, use the information given to solve the problem.

7. If there are 1.09 yards in 1 meter, how many feet are in 1 meter?
8. How many meters are there in 1 yard?

9. If Riley runs 100 meters in 12.6 seconds, how long will it take him to run 100 yards?
10. If you can answer two questions in one minute, how many minutes will it take you to answer twenty questions?
11. If Sean can assemble 4 fans in 6 hours, how many fans can he assemble in an 8-hour work day?
12. Seth, Ashlyn, Parker and Mackenzie paid \$109.00 for an hour ride in a limousine. Given they each paid the same amount, how much did each pay?
13. Suppose you can buy 3 t-shirts for \$7.25 from a vendor. How many t-shirts can you buy from the vendor if you have \$10.00?
14. A church orders bookmarks for Father's Day at \$12 for 12-dozen. At that rate, use a proportion to answer question a)-c).
- How much are 20-dozen bookmarks?
 - How many bookmarks can be purchased with \$45.00 in the budget?
 - How much would it cost to supply a congregation of 237 fathers with bookmarks?
15. For a) in Problem 14, Jamie set up the following proportion:

$$\frac{\$12}{12\text{dozen}} = \frac{20\text{dozen}}{m}$$

$$12 m = 240\text{dozen}$$

$$\frac{\$12m}{\$12} = \frac{240\text{dozen}}{\$12}$$

$$m = 20\text{dozen/dollar}$$

Jamie set up ratios that are not equivalent. Why did the answer come out correctly?

Section 7.9 Percent
Practice Problems 7.9

For Problem 1-7, convert the decimal or fraction given to a percent.

1. 0.63

2. $\frac{2}{9}$

3. 0.06

4. $\frac{3}{8}$

5. 0.034

6. 1.25

7. $\frac{11}{3}$

For Problem 8 -10, convert the percent given to a fraction and a decimal.

8. 59%

9. 155%

10. 4%

For Problem 11-15, solve the word problem given.

11. If a new soft drink is being offered at 6 cans for \$3.99, how much is one can of this new soft drink?

12. Which is a better buy: the new soft drink from Problem 11 or the old soft drink that sells at 12 cans for \$9.87?
13. To calculate the percent of error in manufacturing DVDs, the greatest possible error (measured to the nearest 0.1 cm.) is divided by the measurement of the DVD. If a DVD has a diameter of 11.9 cm. and the greatest possible error is 0.03 cm., what is the percent of error in measurement?
14. A coffee table manufacturer is going to increase the length of a table from 33 in. to 39 in. What is the percent of increase? (Percent of increase = $\frac{\text{length of increase}}{\text{original length}}$)
15. The cost of a blouse was \$11.95, but it is now on sale for \$8.95. Is this an increase or decrease? What is the percent of change on the sale?

Section 7.10 Finding the Amount in a Percent ProblemPractice Problems 7.10

For Problem 1-3, convert the percent given to a decimal to solve for the amount.

1. 22% of 167 = A

2. 152% of 12 = A

3. 3% of 164 = A

For Problem 4-6, convert the percent given to a fraction to solve for the amount.

4. 22% of 167 = A

5. 152% of 12 = A

6. 3% of 164 = A

For Problem 7-15, use the information given to solve the problem.

7. Which proportion is correct for 14.3% of 27 = A?

a) $\frac{14.3}{A} = \frac{27}{100}$

b) $\frac{14.3}{27} = \frac{A}{100}$

c) $\frac{14.3}{100} = \frac{A}{27}$

8. Write each fraction as a decimal.

a) $\frac{1}{5}$

b) $\frac{2}{9}$

c) $\frac{4}{5}$

9. Write each decimal as a fraction.

a) 0.32

b) 0.67

c) 1.22

10. Write each decimal as a percent.

a) 0.62

b) 1.03

c) 0.7465

11. Write each percent as a decimal.

a) 22%

b) 130%

c) 8%

12. The cost of college tuition and room and board increased from \$25,400 to \$26,100. What is the percent of increase in the college tuition and room and board?

13. If the tuition and room and board from Problem 12 decreased from \$26,100 to \$25,400, what is the percent of decrease in the college tuition and room and board?

14. T-shirts are being sold for \$8.76, but if you buy three or more, you get 33% off. How much will four T-shirts for your family cost?

15. The amount made from T-shirts sales from Problem 14 was \$586.49; however, of that money, 25% was donated to the Juvenile Diabetes Foundation for research. How much money was given to the foundation?

Section 7.11 Finding the Total Number in a Percent ProblemPractice Problems 7.11

For Problem 1-7, use the information given to set up a multiplication problem.

1. 15% of $w = 27$

2. 4% of $w = 100$

3. 103% of $w = 77$

4. 24% of $w = 52$

5. 11% of $w = 4$

6. 4.4% of $w = 1.2$

7. Which proportion is not correct for 20% of $w = 44$?

a) $\frac{20}{100} = \frac{44}{w}$

b) $\frac{100}{20} = \frac{w}{44}$

c) $\frac{20}{44} = \frac{100}{w}$

d) $\frac{20}{44} = \frac{w}{100}$

For Problem 8-10, use the information given to set up a proportion.

8. 2% of $n = 14$

9. 13% of $n = 5$

10. 1.5% of $n = 120$

For Problem 11-15, use the information given to solve the problem.

11. A church is giving 30% of the donations from a fundraiser to the Salvation Army. The rest of the money is being sent to Haiti to fund hurricane relief. If \$350.00 is being given to the Salvation Army, how much money is being sent to Haiti?

12. The president of a company designates 22% of the company profits for his salary. If his salary last year was \$65,000.00, how much profit did the company make last year?

13. In Problem 12, 32% of the company profits were given to charitable organizations. How much money went to charity?

14. Camille made \$65,000.00 last year at the same company from Problem 12 and 13. She saved 15% of her salary. How much money did Camille save last year?

15. Cayden spent 13% of his weekly earnings on new clothes. If he spends \$130.00 on new clothes each week, how much does he earn in a week?

Section 7.12 Finding the Percent in a Percent ProblemPractice Problems 7.12

For Problem 1-3, use the information given to set up a proportion.

1. $n\% \text{ of } 14 = 7$

2. $n\% \text{ of } 92 = 23$

3. $n\% \text{ of } 12 = 64$

For Problem 4-6, use the information given to set up a division problem.

4. $n\% \text{ of } 2 = 11$

5. $n\% \text{ of } 15 = 23$

6. $n\% \text{ of } 150 = 112$

For Problem 7 and 8, use the information given to solve the problem.

7. Write three other proportions that are equivalent to $\frac{n}{100} = \frac{17}{25}$.

8. Which problem in Problem 1-6 will yield a percent greater than 100%?

For Problem 9-15, use the given table, which shows the hours a contractor spent remodeling a room, to solve the problem.

Activity	Hours
Drywall	6
Closet	7.5
Painting	8.5
Ceilings	3
Flooring	10

9. What percent of the time was spent laying tiles for the flooring?

10. What percent of the time was spent putting up drywall?

11. How much more percent of the time was spent on painting the room than building the closet?

12. Use the percent you found in Problem 9 and the total number of hours spent remodeling the room to find the number of hours spent on flooring. Did you get 10 hours?

13. What percent of time was spent on the ceilings?

14. Why would you expect time spent on ceilings to be less than 10%?

15. Why would you expect time spent on flooring to be more than 10%?

Section 7.13 Estimating Taxes and TipsPractice Problems 7.13

For Problem 1-10, solve the word problem given.

1. A hospital worker earns \$54,000.00 per year. However, 5% of the hospital worker's salary is taken out for medical benefits. How much does the hospital worker net at the end of the year after medical benefits are taken out?
2. Rather than have medical benefits taken out of each check like the hospital worker in Problem 1, another hospital worker who earns \$48,000.00 annually pays the 5% benefits quarterly. How much does this hospital worker pay in benefits each quarter? (Quarterly means 4 times a year.)
3. Two friends go out to dinner. The first friend gets a bill of \$19.76 and leaves a 20% tip. The second friend gets a bill of \$24.87 but only leaves a 15% tip. Estimate which friend pays more for their meal (including the tip), the first friend or the second friend?
4. Rigley's Department Store has a store-wide sale of 30% off on total purchases. If someone makes \$247.00 in total purchases, approximately how much will they save?
5. What is the approximated total amount the person making the purchases in Problem 4 will pay if there is a state sales tax of 8% in the state Rigley's Department Store is located in?
6. A used car costs \$7,600.00. How much will it cost once the state sales tax of 7.5% is added?

7. If you get a \$10.00 a week allowance and give 27% of it to charity each week, how much money do you give to charity in one week?

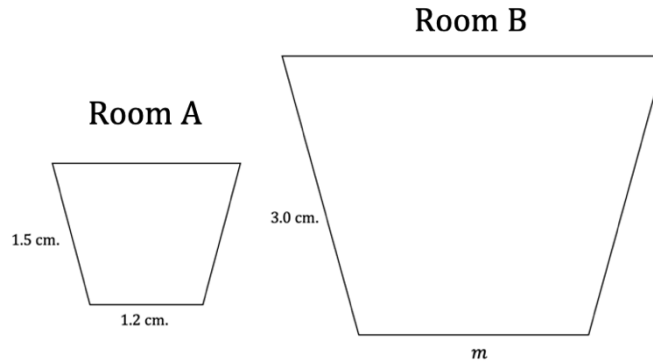
8. If you get a \$10.00 a week allowance and save 25%, how much money do you save in a week?

9. If you get a \$10.00 a week allowance, and give 27% of it to charity and save 25% of it each week, how much money is left for you to spend?

10. From Problem 9, what percent of your total allowance (\$10.00) is left for you to spend?

Section 7.14 Module Review

For Problem 1-6, use the given diagram of two similar rooms to solve the problem.



1. Find the length of m .

2. What is the scale factor from Room A to Room B?

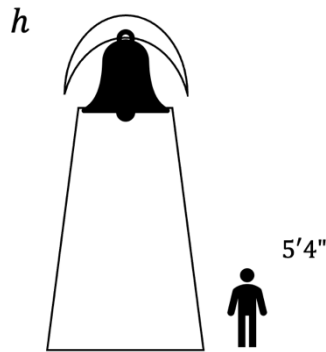
3. What is the scale factor from Room B to Room A?

4. When there are ratios from corresponding sides of a larger shape to a smaller shape or from corresponding sides of a smaller shape to a larger shape, this is called an “external ratio.” One side of a shape to another side of a same shape is called an “internal ratio.” What is the internal ratio for Room A? Using the same ratio of sides, what is the internal ratio for Room B? Are there any other internal ratios?

5. If the scale for the diagram is 1 cm. = 8 ft., how long is side m of the actual Room B?

6. Fill in the blanks: Because the figures are similar, the corresponding sides are proportional and the corresponding _____ are _____.

For Problem 7 and 8, use the given diagram to solve the problem.



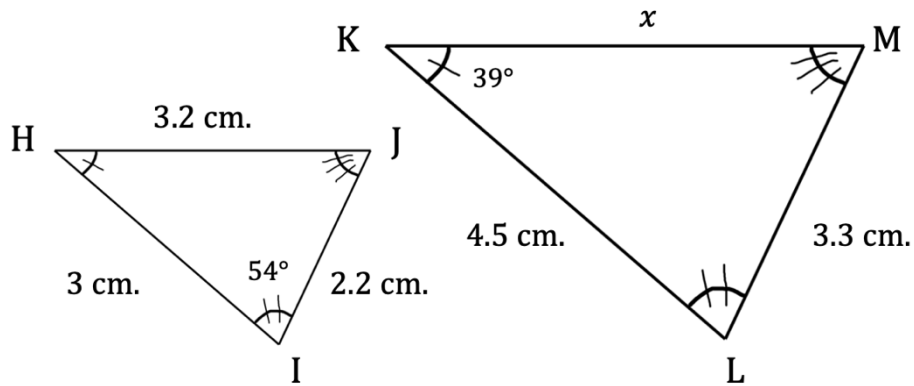
7. Approximately how tall is the bell tower given the person next to it is $5'4''$ (five feet and four inches) tall?
8. How tall would the person be given the tower has a height of $h = 18$ ft.?

For Problem 9-12, use the information given to solve the problem.

9. At a shopping mall, one travel bag is \$65.00. Another travel bag, which is larger, is \$137.00. Does the larger bag cost 2.1% more than the smaller travel bag?
10. If you apply a scale factor to the point (x, y) on a coordinate grid, what is the percent of increase to get to point $(1.2x, 1.2y)$?
- a) 12% b) 20% c) 120% d) 200%
11. If you apply a scale factor to the point (x, y) on a coordinate grid, what is the percent of decrease to get to point $(0.6x, 0.6y)$?
- a) 0.4% b) 4% c) 40% d) 400%

12. How do you know by the scale factor if the percent is an increase or decrease?

For Problem 13 and 14, use the given diagram of two similar triangles to solve the problem.



13. Triangles HIJ and KLM are similar; find the measurements of the missing side (x) and angles ($\angle H$, $\angle J$, $\angle L$, $\angle M$). The sum of the measures of the three angles in a triangle is 180° .

14. If the length of \overline{HI} doubled, would the length of \overline{KL} need to be doubled to keep the same scale factor?

Section 7.15 Module Test

For Problem 1-5, use the triangles below to solve the problem.

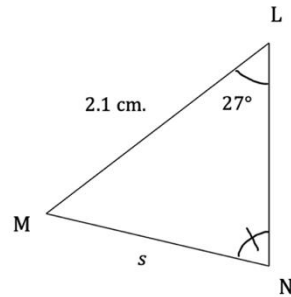


Figure 1

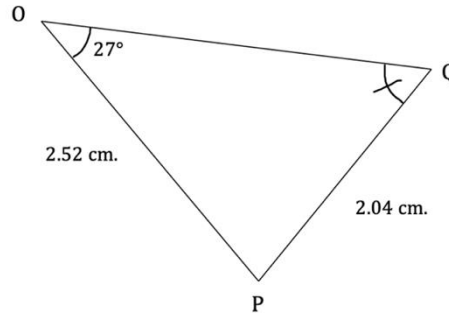


Figure 2

1. Find the length of the missing side s in **Figure 1**.

2. What is the scale factor from **Figure 2** to **Figure 1**?

3. Given $\triangle LMN \sim \triangle OPQ$ (Read: “triangle lmn is similar to triangle opq”) and angle M is 59° , which angle in **Figure 2** is also 59° ?

4. Given side LN is 2.5 cm., how long is side OQ?

5. Fill in the blanks: Because $\triangle LMN \sim \triangle OPQ$, the corresponding _____ are proportional and the corresponding _____ are congruent.

For Problem 6-20, use the information given to solve the problem.

6. Fill in the blanks: In a proportion, the two _____ are equal and so are the cross-_____.

7. In similar figures, the ratio of one side to another side in a figure is the same as the ratio of the corresponding sides of the other figure. Is this an internal ratio or external ratio?
8. Is the scale factor in Problem 2 the internal ratio or external ratio?
9. If a key on a map says 2 in. = 240 miles and the distance between two cities on the map is 4.5 in., what is the actual distance between the two cities in miles?
10. If a bus driver goes approximately 65 MPH (miles per hour), how long would it take a tour group to travel between the two cities in Problem 9?
11. If 6 bananas sell for \$2.46, how much would 8 bananas cost?
12. A student standing outside a school is 5' (60 inches) tall and casts a shadow that is 24 inches long. A flagpole next to the student casts a shadow that is 27.5' (330 inches) long. How many feet must the flag be raised to reach the top of the flagpole?
13. If a runner can run 100 yards in 11.9 seconds, how long will it take him to run 100 meters in seconds? (1 yard = 0.9144 m.) Round to the nearest hundredth.
14. How many kilometers are the same as 1,365 meters?

