

Chapter 8 Review: Proportions

Textbook p.449-516

Summary: p.471-472, p.513-514

Practice Questions p.473, p.515-516

Key Concepts: Unit Rate, Scale Factor, Area, Volume

Vocabulary

Ratio: a comparison of two quantities (2:3, 2 to 3, 2/3) is NOT a fraction

Rate: a ratio with different units (ex. 60 km : 2 hours)

Unit Rate: a rate where the second quantity is reduced to 1 (ex. 30 km per hour)

Scale: comparing a "new" image to the "original" (ex. map is 3 cm : 50 km)

Scale Factor: comparison using the same units (ex. 1 : 5 000 000)

Prerequisite Skills

1) Scale factors can be expressed as a ratio, fraction, decimal, or percentage.

Ratio	Fraction	Decimal	Percentage
3:4	$\frac{3}{4}$	0.75	75%
267:100	$\frac{267}{100}$	2.67	267%

2) Reducing Ratios

To reduce a ratio to lowest terms, you can use the calculator...

MATH → **Frac**

3) Solving Ratios

a) $\frac{600 \text{ km}}{4.0 \text{ h}} : \frac{x}{1.0 \text{ h}}$

$x = 150 \text{ km}$

b) $\frac{13.0 \text{ g}}{0.75 \text{ cups}} : \frac{x}{3 \text{ cups}}$

$x = 52 \text{ g}$

c) $\frac{2 \text{ cm}}{10 \text{ km}} : \frac{5 \text{ cm}}{x}$

$\frac{10 \text{ km}}{2 \text{ cm}} = \frac{x}{5 \text{ cm}}$

$x = 25 \text{ km}$

Key Example - Scale Factor



You want to make a new globe, where the diameter is increased by a factor of 1.5

How much would the surface area increase by?

$1.5 \times 1.5 = 2.25$

How much would the volume increase by?

$1.5 \times 1.5 \times 1.5 = 3.375$

Practice #1: Complete the chart

Ratio	Fraction	Decimal	Percentage
6:10	$\frac{6}{10} = \frac{3}{5}$	0.6	60%
5:4	$\frac{5}{4}$	1.25	125%

Practice #2: Reduce each of the following ratios to lowest terms:

a) $12 : 36 = \underline{1 : 3}$

b) $\frac{2}{3} : \frac{3}{4} = \underline{8 : 9}$

Practice #3: Solve the following ratios

a) $\frac{300 \text{ km}}{2.0 \text{ h}} : \frac{x}{1.0 \text{ h}}$

$x = 150 \text{ km/h}$

b) $\frac{300 \text{ cal}}{500 \text{ mL}} : \frac{x}{1.0 \text{ L}}$

$x = \text{600 cal / L}$

Practice #4: You go in to Save-on to buy some Salsa. They have two options. You don't care how spicy or juicy it is, you just want the most salsa for the least amount of money.

Brand A: 500mL for \$4.49

Brand B: 750mL for \$6.99

Find the unit price for each brand and circle the best deal:

$\frac{\$4.49}{500}$

$\frac{\$6.99}{750}$

Brand A: 0.00898

Brand B: 0.00932

Practice #5: Natasha drives 250 km in 3 hours and 30 minutes without stopping. What was her average speed?

$250 \div 3.5 = 71.4 \text{ km/h}$

Practice #6 On a map, an actual length of 50 km is represented by 5 cm.

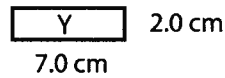
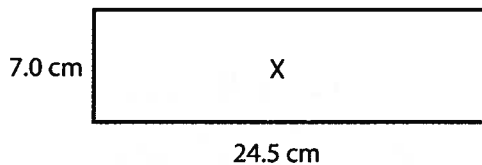
a) What is the scale of this map? $\underline{5 \text{ cm} : 50 \text{ km}} \rightarrow 1 \text{ cm} : 10 \text{ km}$

b) What scale factor was used to create the map? $\underline{1 \div 1000000 = 1 \text{E}^{-6}}$

c) If two places are 10 cm apart on the map, how far apart are they in real life? 100 km

$\frac{50 \text{ km}}{5 \text{ cm}} = \frac{x}{10 \text{ cm}}$

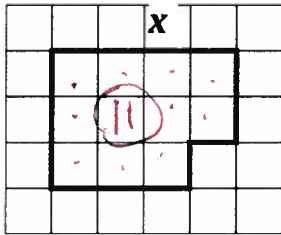
Practice #7: Determine the scale factor that was used to transform diagram X into diagram Y. Express your scale factor as a fraction or as a percent to one decimal place. (1 mark)



Scale Factor = $\frac{2}{7}$ OR 28.6%

Practice #8: Jamia reduces this figure by a scale factor of 50%

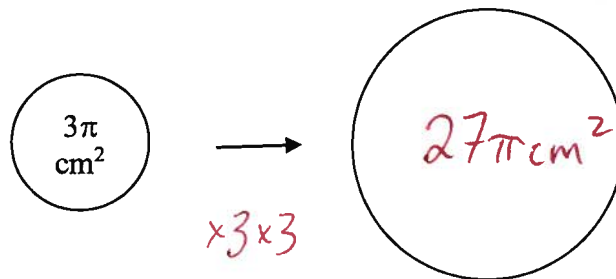
Determine the new length of side x, and the area of the reduced figure, to the nearest tenth of a square unit.



Length of new side x = 2.5

Area of reduction = 2.75

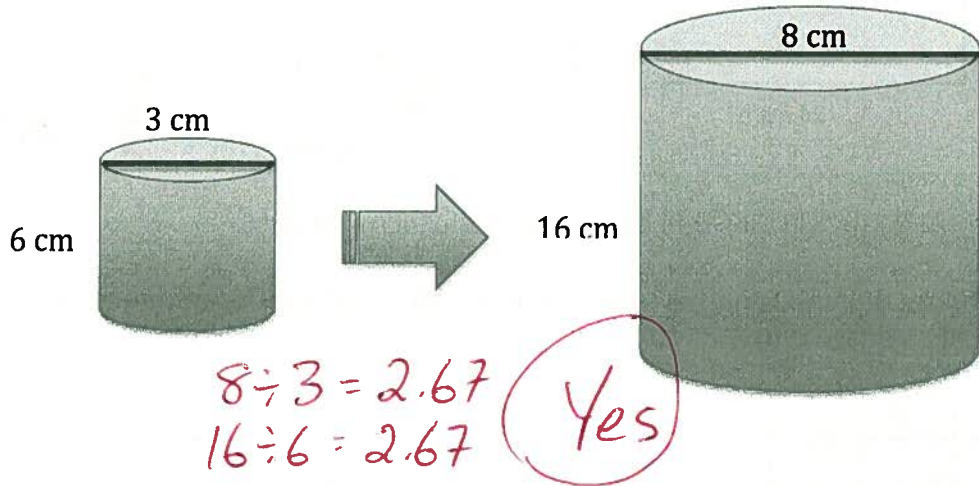
Practice #9: The area of a circle is 3π . It is going to be enlarged by a scale factor of 3. Determine the area of the enlarged circle.



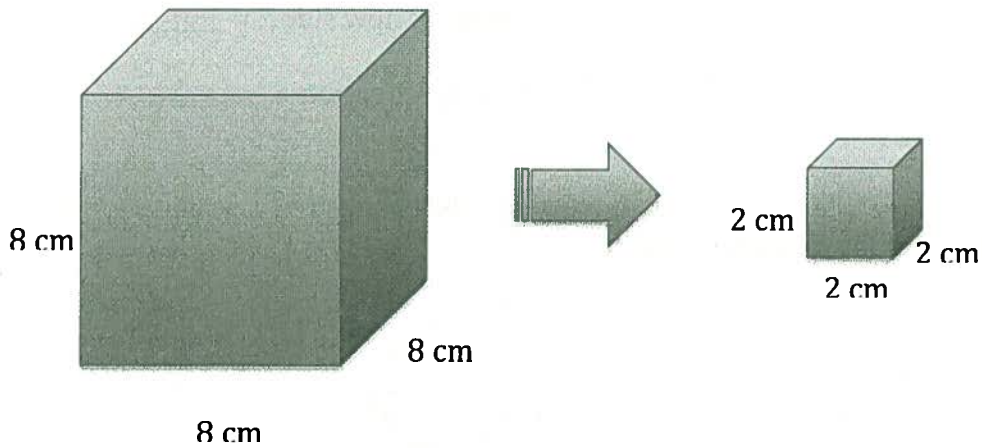
Practice #10: A small fridge has a capacity of 2.8 cubic feet. If the dimensions were all increased by 10%, what would be the new capacity of the fridge (to one decimal place)?

$2.8 \times 1.1 \times 1.1 \times 1.1 = 3.7 \text{ ft}^3$

Practice #11: Was this scale diagram done correctly? In other words, are these two objects “similar”? Show your work.



Practice #12: Look at the scaled object and answer the questions below:



Answer with a scale factor in fraction form

- a) What scale factor was used to scale this 3D object? $\frac{1}{4}$ OR 0.25
- b) By what factor did the surface area change? $\frac{1}{16}$ OR 0.0625
- c) By what factor did the volume change? $\frac{1}{64}$ OR 0.015625