

Missing Measurements and Unit Conversion

Name: _____

Date: _____

Concepts

- Finding Missing Measurements in Plane Figures From the Perimeter
- Finding Missing Measurements in Plane Figures from their Area
- Missing Measurements According to Area: Decomposable and Truncated Solids
- Missing Measurements in Plane Figures (theory)
- Missing Measurements of Solids from the Area
- Missing Measures from a Volume: Decomposable and Truncated Solids
- Units for Measuring Area and Their Conversion
- Units for Measuring Mass and Their Conversion
- Units of Time and Their Conversion

Finding Missing Measurements in Plane Figures From the Perimeter

1. Find the missing length in each figure. Show the equation you solve.
 - a) A rectangular banner has a perimeter of 96 cm and is 18 cm wide. How long is it?
 - b) An isosceles triangle has a perimeter of 74 cm. Its two equal sides each measure 26 cm. How long is the base?
 - c) A rectangular hockey-card display has a perimeter of 54 dm, and its length is twice its width. Find both dimensions.

Finding Missing Measurements in Plane Figures from their Area

- 2.** Each figure's area is given. Find the missing measurement.
- a) A parallelogram has an area of 84 cm^2 and a base of 12 cm. Find its height.
 - b) A triangle has an area of 45 cm^2 and a height of 9 cm. Find the base that goes with that height.
 - c) A trapezoid has an area of 72 cm^2 and parallel sides measuring 9 cm and 15 cm. Find its height.

Missing Measurements According to Area: Decomposable and Truncated Solids

- 3.** A storage bin is an open-topped rectangular prism with a base measuring 40 cm by 30 cm. The inside of the base and all four walls are coated, and the coated surface measures 4000 cm^2 . Find the height of the bin.

Missing Measurements in Plane Figures

4. For each situation, name the measurement formula you would start from, say which letter you are solving for, and state the first step you would take — or explain why the information you are given is not enough. Do not carry out the arithmetic.

- a) You know a triangle's area and its base, and you want its height.
- b) You know a rectangle's perimeter and that it is three times as long as it is wide, and you want its width.
- c) You know a trapezoid's area, its height and one of its parallel sides, and you want the other parallel side.
- d) You know only a rectangle's perimeter, and you want its area.

Missing Measurements of Solids from the Area

5. Find the missing measurement of each solid.

- a) A cube has a total surface area of 294 cm^2 . Find its edge.
- b) The label on a cylindrical can covers the curved side only and has an area of $240\pi \text{ cm}^2$. The can's radius is 6 cm. Find its height.
- c) A pyramid with a square base of edge 10 cm has a lateral area (the four triangular faces) of 260 cm^2 . Find the slant height of one triangular face.

Missing Measures from a Volume: Decomposable and Truncated Solids

6. A water trough is made by joining two rectangular prisms end to end. The first measures 120 cm long, 40 cm wide and 25 cm deep. The second is 60 cm long, 40 cm wide and h cm deep. Together they hold $168\,000\text{ cm}^3$. Find h .

Units for Measuring Area and Their Conversion

7. Convert each measurement.

- a) 4.5 m^2 into cm^2
- b) $320\,000\text{ cm}^2$ into m^2
- c) 7 dm^2 into mm^2
- d) 0.6 km^2 into m^2

Units for Measuring Mass and Their Conversion

8. Convert or compute.

- a) 3.2 kg into g
- b) 4500 mg into g
- c) 0.75 t into kg
- d) A camping bag holds six pouches of 850 g each plus a stove of 1.4 kg. Give the total mass in kilograms.

Units of Time and Their Conversion

9. Convert or compute.

- a) 3 h 25 min into minutes
- b) 9000 s into hours and minutes
- c) 1.75 h into minutes, then into seconds
- d) A film lasting 2 h 15 min starts at 18:50. At what time does it end?

Synthesis — drawing on several sheets in this topic

10. A rectangular patio is to have an area of 12 m^2 , and the space available makes it exactly 250 cm wide.

- a) Find the length of the patio in metres.
- b) Give that length in centimetres.
- c) Give the patio's area in cm^2 , and check that it agrees with your two side lengths in centimetres.

Want the harder problems and the worked solutions?

The *Challenge Problems* set and the *Answer Keys* for Missing Measurements and Unit Conversion — with the reasoning written out in full — are available at tutorinmontreal.ca.