Secondary 2 Mathematics · Practice Worksheet · tutorinmontreal.ca

Perimeter and Area of Plane Figures

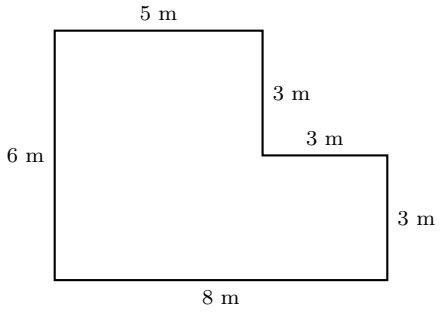
Name: _____ Date: _____

Concepts

- Decomposable Geometric Figures
- Methods to Decompose Figures
- The Arcs and Sectors of a Circle
- The Area and the Perimeter of Triangles
- The Perimeter and The Area of Decomposable Figures
- The Perimeter and the Area of Plane Figures
- The Perimeter and the Area of Plane Figures Using Algebra
- The Perimeter and the Area of Quadrilaterals
- The Perimeter and the Area of Regular Polygons - Secondary 1 and 2

Decomposable Geometric Figures

1. A community garden in Saint-Hyacinthe is shaped like the figure below.

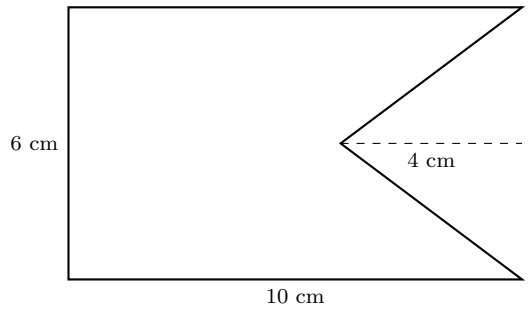


a) Explain what it means to say that this garden is a *decomposable* figure, and name two simple figures whose areas add up to it. Give the dimensions of each.

b) Fabrice says the area is $8 \times 6 = 48$ m^2. Explain what 48 m^2 really measures, then give the correct area.

Methods to Decompose Figures

2. A rectangular pennant measures 10 cm by 6 cm, with a triangular notch cut out of its right-hand end.



a) Would you use the *addition* method or the *subtraction* method here? Say why in one sentence.

b) Find the area of the pennant using the method you chose.

c) Now find the same area by the other method, and check that the two agree.

The Arcs and Sectors of a Circle

3. A lawn sprinkler stands at the corner of a park. It turns back and forth through a central angle of 120° and sprays water up to 9 m away. Use $\pi \approx 3.1416$ and round each answer to one decimal place.

a) What area of grass does the sprinkler water?

b) How long is the arc traced by the far edge of the spray?

c) What is the perimeter of the watered region?

The Area and the Perimeter of Triangles

4. A sailmaker cuts a right-angled sail whose two shorter sides measure 5 m and 12 m and whose longest side measures 13 m.

a) How much edging tape is needed to go all the way around the sail?

b) How much cloth does the sail use?

c) A second sail is cut as a triangle with a base of 12 m and a height of 5 m, but with no right angle anywhere. Does it use the same amount of cloth? Does it need the same amount of edging tape? Explain.

The Perimeter and The Area of Decomposable Figures

5. A neighbourhood skating rink is a rectangle 20 m long and 12 m wide, with a half-disc added at each of the two short ends. Use $\pi \approx 3.1416$.

a) Find the perimeter of the rink, to one decimal place.

b) Find its area, to one decimal place.

c) Resurfacing the ice costs \$6 per square metre. What does one resurfacing cost, to the nearest dollar?

The Perimeter and the Area of Plane Figures

6.

a) For each task, state whether you need a perimeter or an area, and give the unit you would use: (i) buying baseboard for a bedroom; (ii) painting a wall; (iii) fencing a dog run; (iv) laying sod on a lawn.

b) A rectangular dog run measures 7.5 m by 4 m. Find its perimeter and its area, with the correct units on each.

c) Explain in one sentence why the two answers in b) cannot be compared to each other.

The Perimeter and the Area of Plane Figures Using Algebra

7. A rectangular vegetable bed is $(2x + 3)$ metres long and 5 metres wide.

a) Write a simplified expression for its perimeter.

b) Write a simplified expression for its area, in expanded form.

c) Find the perimeter and the area when $x = 4$. Check your area a second way, by first working out the length and the width.

The Perimeter and the Area of Quadrilaterals

8. Find the area of each quadrilateral below.

a) A parallelogram with a base of 14 cm and a height of 9 cm.

b) A trapezoid whose parallel sides measure 11 cm and 19 cm, with a height of 6 cm.

c) A rhombus whose diagonals measure 16 cm and 10 cm. Then find its perimeter, knowing that each of its sides measures 9.4 cm.

The Perimeter and the Area of Regular Polygons - Secondary 1 and 2

9.

a) A regular hexagonal paving stone has sides of 8 cm and an apothem of 6.9 cm. Find its perimeter and its area.

b) A regular octagonal road sign has sides of 25 cm and an apothem of 30.2 cm. Find its perimeter and its area.

c) Explain in one or two sentences why the formula $A = \dfrac{P \times a}{2}$ works for every regular polygon.

Synthesis — drawing on several sheets in this topic

10. A window is made of a rectangle 1.2 m wide and 1.8 m tall, with a half-disc of glass sitting on top of it. The flat side of the half-disc is the top of the rectangle. Use $\pi \approx 3.1416$ and round each answer to the nearest hundredth.

a) Find the area of glass in the window.

b) Wooden trim runs all the way around the outside of the window. What length of trim is needed?

c) The glazier quotes the trim in whole metres. How many metres must be bought?

Want the harder problems and the worked solutions?

The *Challenge Problems* set and the *Answer Keys* for Perimeter and Area of Plane Figures — with the reasoning written out in full — are available at **tutorinmontreal.ca**.