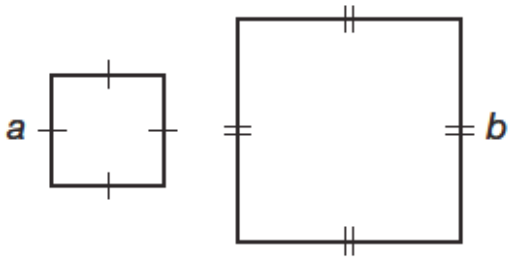
Name: _____

Date: _____

Period: _____

Geometry Lesson 87

Objective: TSW use area ratios of similar figures.



Recall that polygons are similar if they have the same shape, but differ in size. This difference in size describes their scale factor to each other and can be written as a similarity ratio.

For the squares given, the perimeter of the first square is 4*a* and the second is 4*b*. The ratio of their perimeters is 4*a*:4*b*, which can be reduced to *a*:*b*. Their areas are a^2 and b^2, so the ratio of their areas is $a^2 : b^2$. These relationships are true of all similar polygons.

Theorem 87-1 - If two similar figures have a scale factor of *a*:*b*, then the ratio of their perimeters is *a*:*b*, and the ratio of their areas is $a^2 : b^2$.

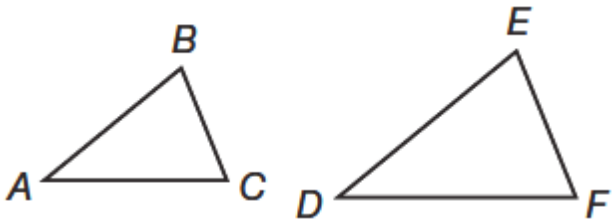
Example 1 Proving Theorem 87-1

Prove the first part of Theorem 87-1.

Given: $\Delta ABC \sim \Delta DEF$

Prove: $\frac{AB+BC+AC}{DE+EF+DF} = \frac{AB}{DE}$

SOLUTION

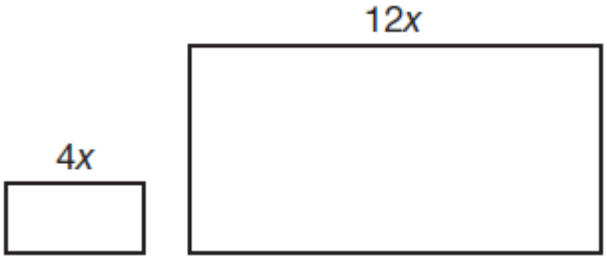


Example 2 Ratio of Perimeters of Similar Figures

In the given similar figures, the perimeter of the smaller shape is 50 inches.

Determine the perimeter of the larger shape.

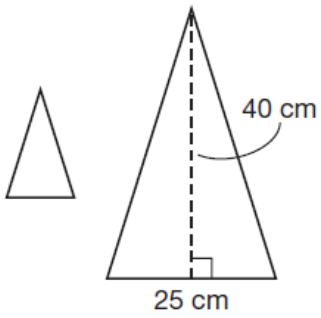
SOLUTION



Example 3 Ratio of Areas of Similar Figures

The two triangles given have a similarity ratio of 2:5. Determine the ratio of their areas and the area of the smaller triangle.

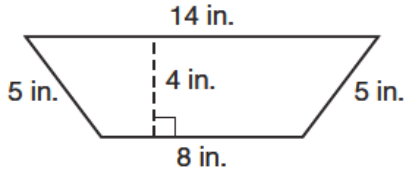
SOLUTION



Example 4 Application: Landscape Design

A landscape design company has created a plan for a large garden in the shape of an isosceles trapezoid, as illustrated in the diagram. The diagram of the garden is in a 2:355 ratio with the size of the actual garden. Find the perimeter and area of the actual garden.

SOLUTION

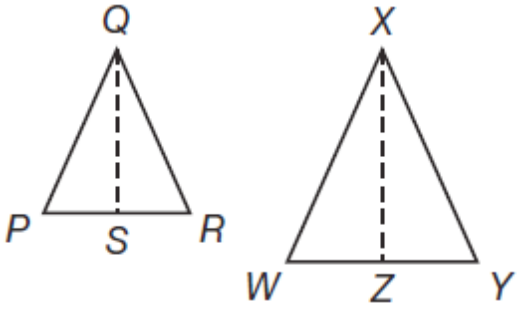


You Try!!!!

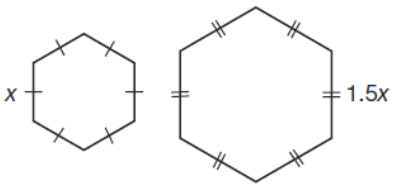
a.Prove the second part of Theorem 87-1.

Given: $\Delta PQR \sim \Delta WXY$

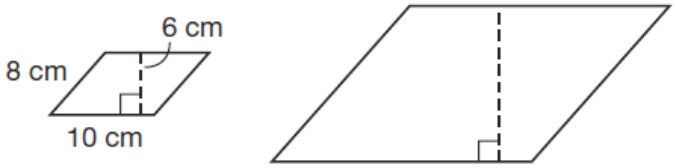
Prove: $\frac{AREA\ \Delta PQR}{AREA\ \Delta WXY} = \frac{PR^2}{WY^2}$



b.In the given similar figures, the perimeter of the large hexagon is 120 feet. Determine the perimeter of the small hexagon.



c.The two parallelograms given have a similarity ratio of 2:5. Determine the ratio of their areas and the area of the larger parallelogram.



d.The kitchen on a floor plan shows a triangle from the sink to the refrigerator to the counter that has an area of 1.5 square feet. If the floor plan has a scale of 1:10, what will be the actual area of this triangle when the house is built?