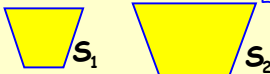


Section 8-6: Perimeters and Areas of similar figures

You already know how to find the **Scale Factor** of two similar figures:

Scale Factor = $\frac{S_1}{S_2}$



You also know that the **Scale Factor = Ratio of Perimeters**

Because of this, we can write

Ratio of Perimeters = $\frac{S_1}{S_2}$

Here's today's question: **How do we find the ratio of areas for**

How do we find the ratio of areas for two similar figures?

Let's start by comparing some perimeter and area values:

Here are two squares:

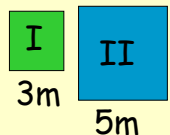


Figure I, P=12m, A=9m²
Figure II, P=20m, A=25m²

Next, let's compare the ratios of these values:

Here are two squares:

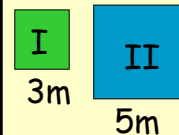


Figure I, P=12m, A=9m²
Figure II, P=20m, A=25m²

Ratio of Perimeters = $\frac{S_1}{S_2} = \frac{3}{5} \left(\frac{12}{20} \right)$

Ratio of Areas = $\frac{A_1}{A_2} = \frac{9}{25}$

How does $\frac{3}{5}$ compare to $\frac{9}{25}$?

Here are two squares:

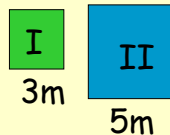


Figure I, P=12m, A=9m²
Figure II, P=20m, A=25m²

How does $\frac{3}{5}$ compare to $\frac{9}{25}$?

$\frac{9}{25}$ is equivalent to $\frac{3^2}{5^2}$

This example leads to the following:

For any two similar figures, their **RATIO OF AREAS** can be found by taking the squares of any two corresponding sides

$$\frac{A_1}{A_2} = \frac{S_1^2}{S_2^2}$$

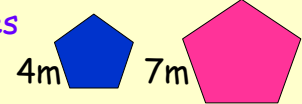
You could also think of it as...

Ratio of Areas =

$$\text{(Ratio of Perimeters)}^2$$

Lets try a couple of examples:

- 1) Find the a)ratio of perimeters and
b)ratio of areas for these two
similar shapes



a)Ratio of Perimeters: $\frac{S_1}{S_2} = \frac{4}{7}$

b)Ratio of Areas $\left(\frac{A_1}{A_2}\right): \frac{S_1^2}{S_2^2} = \frac{4^2}{7^2} = \frac{16}{49}$

Lets try a couple of examples:

- 2)The ratio of perimeters of two
similar shapes is 2:7.

- a)What is their ratio of areas?
b)Find the area of the larger if the
area of the smaller one is 16sq u.

a)Ratio of Areas = $\text{(Ratio of Perimeters)}^2$
 $= \left(\frac{2}{7}\right)^2$, or $\frac{4}{49}$

b) $\frac{A_1}{A_2} = \frac{4}{49} = \frac{16}{A_2}$, $4 \cdot A_2 = 16 \cdot 49$, $A_2 = 196u^2$