

Name: Key

SLR, PR, AR, and VR Notes

Calculating Perimeter, Area, and Volume Ratios of Similar Figures

Recall:

Side Length Ratio = SLR

Perimeter Ratio = PR

Scale Factor = SF

Area Ratio = AR

Volume Ratio = VR

$$SLR = SF = PR$$

$$SLR = \frac{4}{3}$$

$$AR = SLR^2$$

$$AR = \left(\frac{4}{3}\right)^2$$

This means: $SLR = \sqrt{AR}$

$$AR = \frac{16}{9}$$

$$VR = SLR^3$$

$$VR = \left(\frac{4}{3}\right)^3$$

This means: $SLR = \sqrt[3]{VR}$

$$VR = \frac{64}{27}$$

Why are Side Length Ratio, Scale Factor, and Perimeter Ratio all equal?

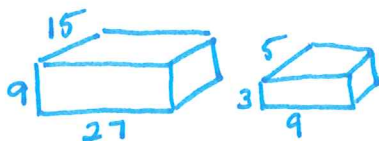
1 Dimension

$$\frac{\quad}{27} \quad \frac{\quad}{9}$$

Why is the Area Ratio equal to the Side Length Ratio squared?



Why is the Volume Ratio equal to the Side Length Ratio cubed?

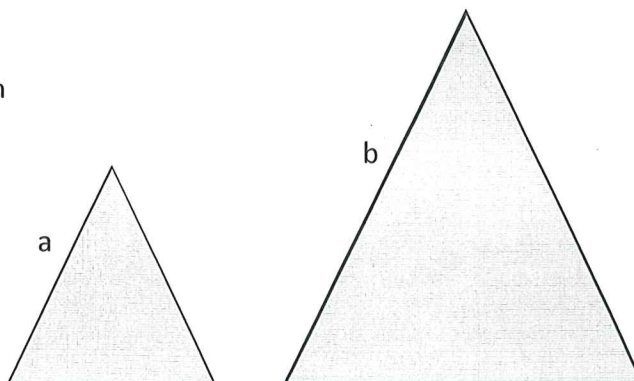


Perimeters & Areas of Similar Figures

If the similarity (side) ratio of 2 similar figures is a/b, then

The ratio of their perimeters is $\frac{a}{b}$.

The ratio of their areas is $\frac{a^2}{b^2}$.



Example 1: Find the ratio of the Perimeter and the Area (Larger to Smaller figure)

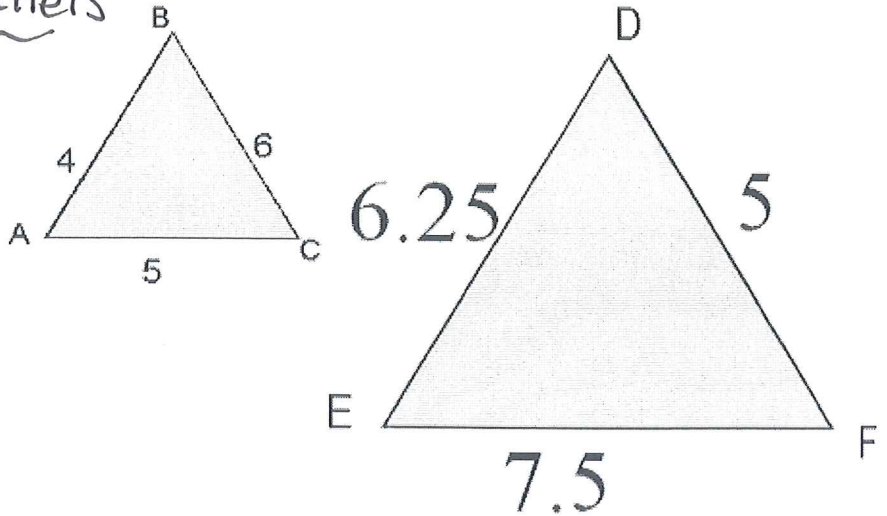
$\triangle ABC \sim \triangle FDE$

ORDER Matters

Side Length Ratio = $\frac{5}{4}$

Perimeter Ratio = $\frac{5}{4}$

Area Ratio = $\frac{25}{9}$



Example 2:

The ratio of the corresponding midsegments of 2 similar trapezoids are 4:5. What is the ratio of their areas?

SLR = $\frac{3}{5}$

WANT AR
AR = $(\frac{3}{5})^2$

$\frac{3}{5}$
AR = $\frac{9}{25}$

Example 3:

The corresponding heights of two similar cylinders are 2:5. What is the ratio of their volumes?



SLR = $\frac{2}{5}$

want VR = SLR³

VR = $(\frac{2}{5})^3$

VR = $\frac{8}{125}$

Example 4:

The ratio of the areas of two similar pentagons is 4:9. What is the ratio of their corresponding sides?

AR = $\frac{4}{9}$

SLR = \sqrt{AR}

SLR = $\sqrt{\frac{4}{9}}$

SLR = $\frac{2}{3}$

Example 5:

The area ratio of a geometric solid is 9:16, find the volume ratio.

AR = $\frac{9}{16}$

Need SLR 1st

SLR = $\sqrt{\frac{9}{16}}$ SLR = $\frac{3}{4}$

VR = $(\frac{3}{4})^3$
VR = $\frac{27}{64}$

Example 6:

The volume ratio of a triangular prism (3D solid) is 512/216. Find the area ratio.

VR = $\frac{512}{216}$

Find SLR 1st

SLR = $\frac{8}{6}$

Simplify: SLR = $\frac{4}{3}$

AR = $(\frac{4}{3})^2$
AR = $\frac{16}{9}$