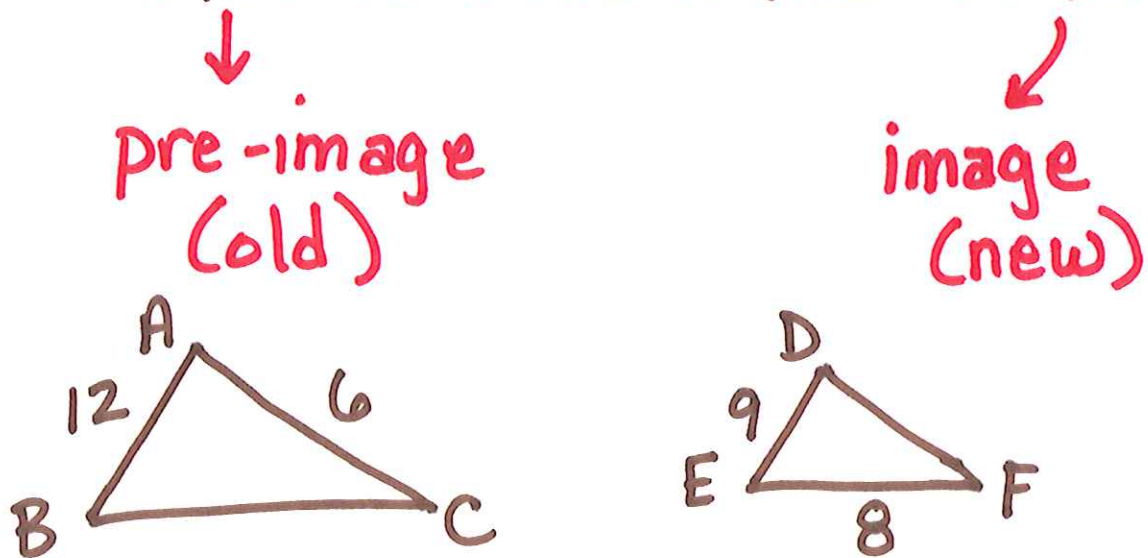


# Effects of Dimension Changes

Scale Factor  
is the ratio

$\frac{\text{new}}{\text{old}}$  or  $\frac{\text{image}}{\text{pre-image}}$

EX Find the scale factor if  $\triangle ABC$  is transformed to  $\triangle DEF$ .



12 and 9 are the only corresponding sides.

$$\frac{9}{12} = \frac{3}{4} \quad \text{3:4}$$

## EFFECTS

Scale Factor = Ratio of Perimeters

$(\text{Scale Factor})^2 = \text{Ratio of Areas}$

$(\text{Scale Factor})^3 = \text{Ratio of Volumes}$

EX Two triangles have a scale factor of 5:8. The larger triangle has a perimeter of 34 inches. What is the perimeter of the smaller triangle?

Step 1: Which effect?

$$SF = \text{ratio of } P$$

Step 2: Write the ratios.

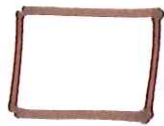
$$\frac{5}{8} = \frac{?}{34}$$

↑  
larger  $\Delta$

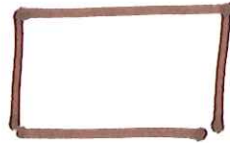
Step 3: Solve and answer.

$$\frac{5(34)}{8} = 21.25 \text{ in}$$

EX The given rectangles are similar.  
The area of the smaller rectangle  
is  $56 \text{ cm}^2$ . What is the area of  
the larger rectangle?



7 cm



9 cm

Step 1: Which effect?

$$(SF)^2 = \text{ratio of A}$$

Step 2: Write the ratios.

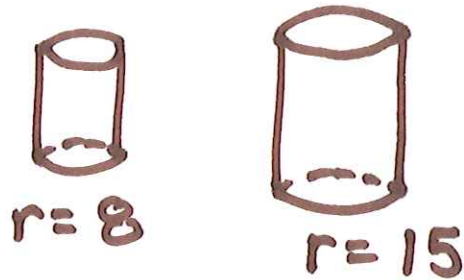
$$\left(\frac{9}{7}\right)^2 = \frac{81}{49} \quad \left\{ \begin{array}{l} 81 \\ 49 = \frac{56}{\text{smaller rectangle}} \end{array} \right.$$

smaller rectangle

Step 3: Solve and answer.

$$\frac{81(56)}{49} = 92.6 \text{ cm}^2$$

EX The two cylinders are similar.  
The volume of the larger cylinder  
is  $128 \text{ cm}^3$ . What is the volume  
of the smaller cylinder?



Step 1: Which effect?

$$(SF)^3 = \text{ratio of } V$$

Step 2: Write the ratios.

$$\left(\frac{15}{8}\right)^3 = \frac{3375}{512} \quad \left\{ \quad \frac{3375}{512} = \frac{128}{?} \right.$$

Step 3: Solve and answer.

$$\frac{512(128)}{3375} = \boxed{19.4 \text{ cm}^3}$$

EX. Two similar prisms have areas of  $84 \text{ in}^2$  and  $56 \text{ in}^2$ . The volume of the smaller prism is  $100 \text{ in}^3$ . What is the volume of the larger prism?

Step 1: Which effect?

$$(SF)^2 = \text{ratio of area}$$

$$(SF)^3 = \text{ratio of volume}$$

Step 2: Ratios

$$\frac{84}{56} = (SF)^2 \Rightarrow \sqrt{\frac{84}{56}} = \sqrt{(SF)^2} \Rightarrow \cancel{84}$$

$$SF = 1.22$$

$$\left(\frac{1.22}{1}\right)^3 = \frac{?}{100} \Rightarrow \frac{1.8}{1} = \frac{?}{100}$$

$$? = 180$$

$$\boxed{180 \text{ in}^3}$$