

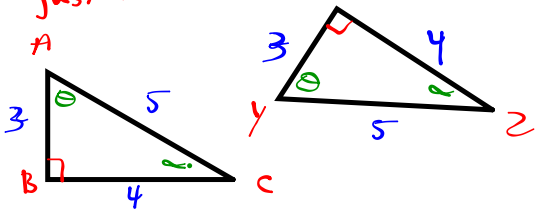
# Unit 10: Characteristics of Congruent

## an Similar Figures 2D

### Congruent

#### Shapes:

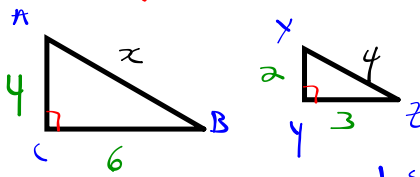
↳ are the same shape just rotated / translated / reflected



- the measures of the corresponding sides are the same
- corresponding angles are the same.
- Perimeters are the same
- Areas are the same
- volumes are the same

### Similar Shapes:

↳ proportionally the same shape, but one's smaller or larger.



→ corresponding angles are the same. congruent

50. a) The ratio of the corresponding sides all equal each other and they equal to the scale factor the ratio of similitude } k

$$\frac{6}{3} = 2 = k \quad \frac{4}{2} = 2 = k \quad \frac{AB}{YZ} = k$$

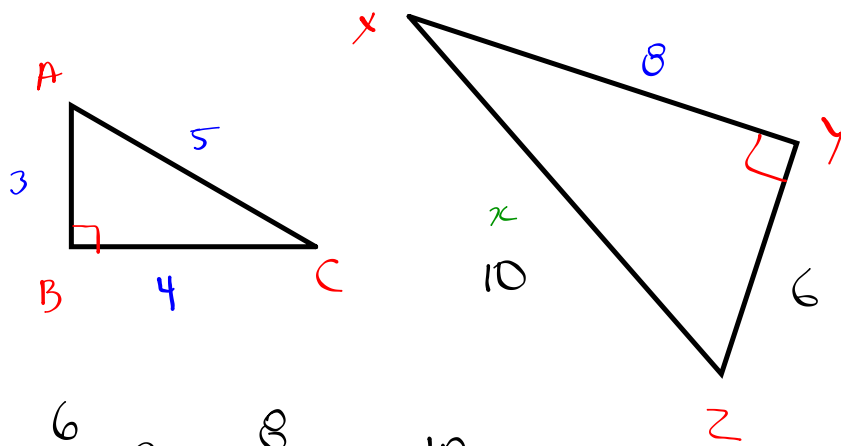
The ratio of perimeters of similar shapes is equal to k

50. c) The ratio of the areas is equal to  $k^2$

$$\frac{A_1}{A_2} = k^2$$

50. d) The ratio of the volumes is equal to  $k^3$

$$\frac{V_1}{V_2} = k^3$$



Similar Triangles  
 ↙ ↘

Find  $x$ !

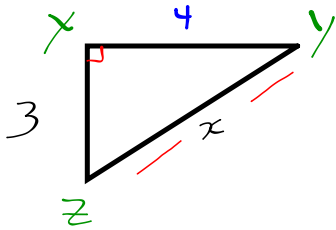
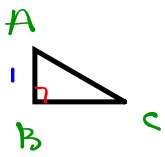
$$\frac{6}{3} = 2 \quad \frac{8}{4} = 2 \quad \frac{10}{5}$$

$$\frac{15 + 8 + 6}{3 + 5 + 4} = \frac{24}{12} = 2$$

$$P = s + s + s$$

$$A = s \cdot s$$

$$= s^2$$



$$c^2 = a^2 + b^2$$

$$x = \sqrt{3^2 + 4^2}$$

$$x = \sqrt{25}$$

$$x = 5$$

The ratio of similitude is  $\frac{1}{3}$ . Find  $x$ .

$$\frac{BC}{YX} = \frac{1}{3}$$

$$\frac{AC}{YZ} = k$$

$$\frac{AB}{XZ} = \frac{1}{3}$$

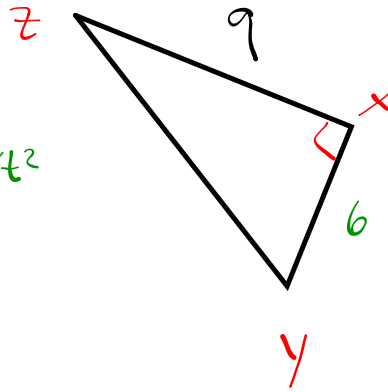
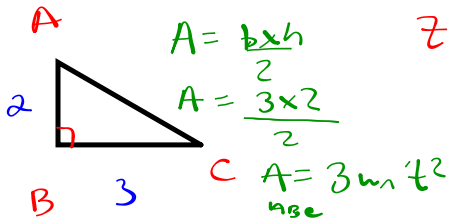
$$\frac{1}{xz} = \frac{1}{3}$$

$$3 = xz$$

↳ since  $k < 1$  they  
put  $\frac{\text{small}}{\text{big}} = k$ .

↳ if  $k > 1 \rightarrow$  put  $\frac{\text{big}}{\text{small}} = k$

$$\triangle ABC \sim \triangle XYZ$$



Find the Area of  $\triangle XYZ$

$$\frac{A_{\triangle ABC}}{A_{\triangle XYZ}} = k^2$$

$$k = \frac{2}{6}$$

• sub in info to find other area.

$$\frac{3}{x} = \left(\frac{2}{6}\right)^2$$

$$x = 27 \text{ unit}^2$$

$$\frac{3}{x} = \frac{4}{36}$$

$$\frac{108}{4} = \frac{x \cdot 4}{4}$$

The two triangles are similar.

The ratio of the areas is 4.

Find the perimeter of  $\triangle XYZ$ .

$$\frac{\text{Side}}{\text{Side}} = k$$

$$\frac{\text{Area}}{\text{Area}} = k^2$$

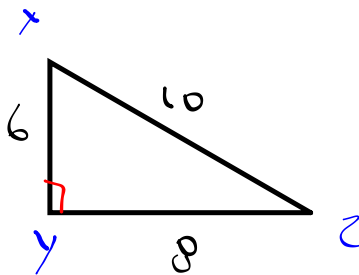
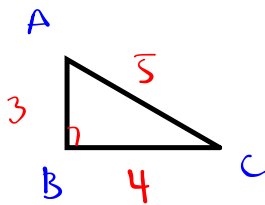
Translate sentences

$$\frac{A_1}{A_2} = 4$$

$$\sqrt{4} = \sqrt{k^2}$$

$$k = 2$$

find  $k$  by isolating.

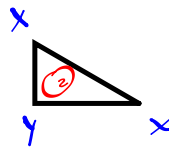
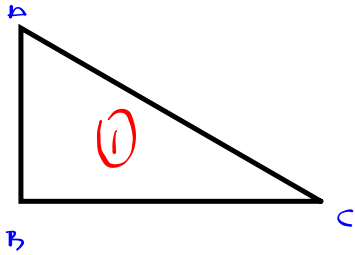


Perimeter is 20 units

The 2  $\Delta$ s are similar

$$\Delta ABC \sim \Delta XYZ$$

"similar"



$$\frac{P_1}{P_2} = k$$

$$\frac{A_1}{A_2} = k^2$$

$\Delta A$

$$\Delta RST \cong \Delta DEF$$

"congruent"

The perimeter of  $\Delta ABC$  is 3 times  
the perimeter of  $\Delta XYZ$

If  $A_{ABC}$  is 180  $\text{unit}^2$  find  $A_{XYZ}$ .

$$\frac{P_1}{P_2} = \frac{3 \times P_2}{P_2}$$

$$\frac{P_1}{P_2} = 3 = k$$

$$\frac{180}{A_2} = k^2$$

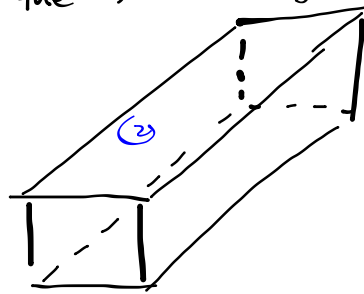
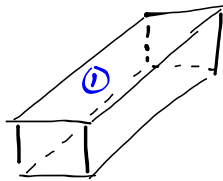
$$\frac{180}{A_2} = 3^2$$

$$\frac{180}{A_2} = 9$$

$$\frac{180}{9} = A_2$$

$$A_2 = 20 \text{ units}$$

The ratio of the areas is equal to  $\frac{2}{1}$   
 If the volume of the small right prism is  $36 \text{ unit}^3$



find the volume of the big one.

$$\frac{A_2}{A_1} = 2$$

$$\sqrt{2} = \sqrt{k \cdot 2}$$

$$k = \sqrt{2}$$

$$\frac{V_2}{V_1} = k^3$$

$$\frac{V_2}{36} = (\sqrt{2})^3$$

$$V_2 = 36 (\sqrt{2})^3$$

$$V_2 = 101.8 \text{ unit}^3$$

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Similar  
right  
prism.

$$\frac{A_1}{A} = k^2$$

$$\frac{V}{V} = k^3$$



Shannon bought two birthday hats for herself and her boyfriend. The smaller hat fits perfectly into big hat.

$$V_{XAB} = 70 \text{ unit}^3$$

A is midpoint of  $\overline{XY}$

Find the  $V_{XYZ}$ .

