

THEORIES OF SIMILARITY

Similar figures: 3 properties

1. have same shape
2. corresponding angles are congruent
3. corresponding sides are proportional

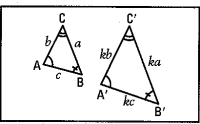
Triangles ABC and A'B'C' on the right are similar.

- $\angle A \cong \angle A'$, $\angle B \cong \angle B'$, $\angle C \cong \angle C'$

- $\frac{m\overline{AB'}}{m\overline{AB}} = \frac{m\overline{A'C'}}{m\overline{AC}} = \frac{m\overline{B'C'}}{m\overline{BC}} = k$

- k is the scale factor.

- We write: $\triangle ABC \sim \triangle A'B'C'$.

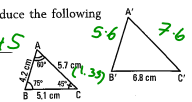


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Triangles ABC and A'B'C' on the right are similar. Deduce the following measures.

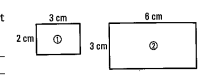
a) $m\angle A' = 60$ b) $m\angle B' = 75$ c) $m\angle C' = 45$

d) $m\overline{A'B'} = 5.6$ e) $m\overline{A'C'} = 7.6$

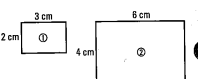


$\frac{6.8}{5.1} = 1.33 = k$ (1.33) (1.33)

Explain why rectangles 1 and 2 on the right are not similar.



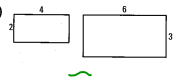
Explain why rectangles 1 and 2 on the right are similar.

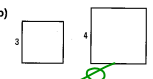


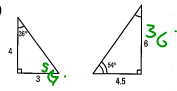
What is the scale factor? \uparrow

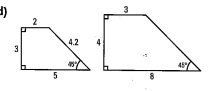
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In each of the following cases, indicate if the given figures are similar.

a)  \parallel

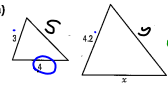
b)  \neq

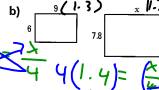
c)  \parallel

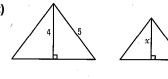
d)  \neq

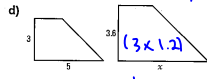
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Determine the value of x in each of the following cases, given that the figures are similar.

a)  $\frac{4.2}{3} = \frac{x}{4} \Rightarrow x = 5.6$

b)  $\frac{6}{3} = \frac{x}{4} \Rightarrow x = 8$

c)  $\frac{3}{4} = \frac{3.75}{5} = \frac{x}{6} \Rightarrow x = 4.5$

d)  $\frac{6}{3} = \frac{x}{5} \Rightarrow x = 10$

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$T_n = \text{Dec } 4 (1^2) = 1$

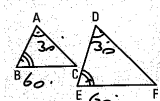
$W_n = \text{Dec } 5 (3^2) = 5$

$T_4 = \text{Dec } 6 (3^2) = 16$

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THEORIES OF SIMILARITY

Theorem of similarity AA (angle-angle): Two triangles with two corresponding congruent angles are similar.



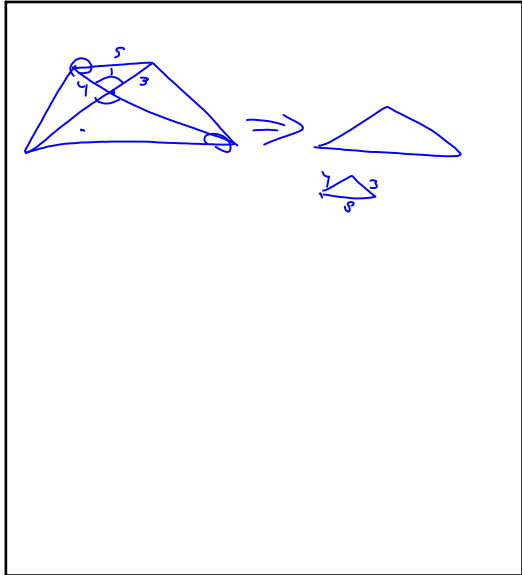
In the trapezoid ABCD on the right, diagonals AC and BD are drawn intersecting at I.

Justify the steps proving that triangles AID and CIB are similar.

Hypothesis: - ABCD is a trapezoid.

Statement	Justification
1. $AD \parallel BC$	trapezoid
2. $\angle ADI \cong \angle IBC$	Alt int
3. $\angle AID \cong \angle CIB$	v.o.
4. $\triangle AID \sim \triangle CIB$	AA

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Theorem of similarity SAS (side angle side): Two triangles with a corresponding congruent angle contained between two proportional sides are similar.

In the figure on the right, the measures are in cm.

a) Justify the steps proving that triangles ABC and ADE are similar.

Statement	Justification
1. $\angle BAC \cong \angle DAC$	Same \angle
2. $\frac{AB}{AD} = \frac{AC}{AE}$	$\frac{3.4}{3.6} = \frac{2.4}{2.8} = 1.5 \rightarrow k$ factor
3. $\triangle ABC \sim \triangle ADE$	

b) Deduce the measure of side BC.

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Theorem of similarity SSS (side side side): Two triangles with corresponding proportional sides are similar.

$$\frac{3.4}{3.6} = 1.5, \frac{3.4}{2.4} = 1.5, \frac{4.2}{2.8} = 1.5$$

Show that the following triangles are similar.

SSS

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SSS SSS

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In each case, indicate which theorem of similarity can be used to prove that the triangles are similar. Justify your answer.

a) AA

b) SAS

c) AA

d) SSS

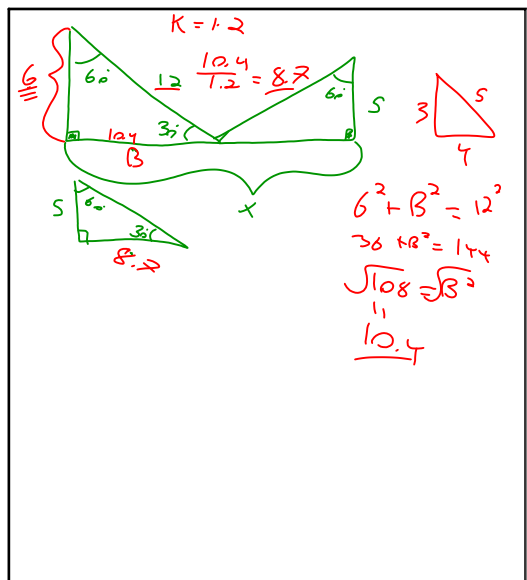
$k = 1.333$

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$\frac{4}{2} = 2, \frac{5}{2.5} = 2, \frac{3}{1.5} = 2$

$k = 2$

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