Section 6.2: Similar Triangles

Wednesday, January 07, 2015
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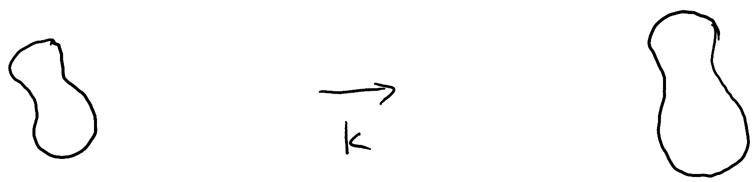
similar figures: (proportional)

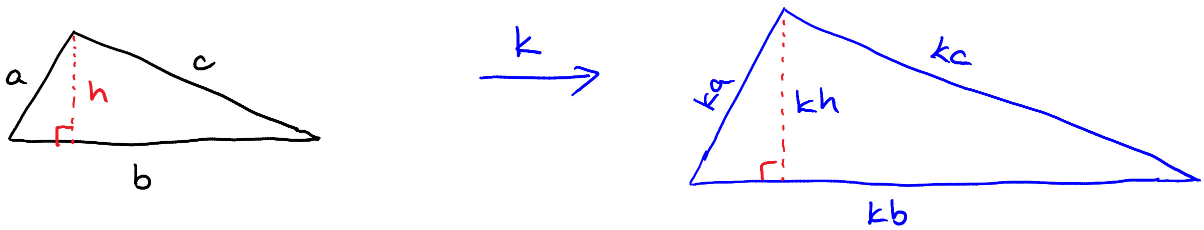


scale factor

same shape, but "blown up" or "reduced" in scale

note: from small → big has $k > 1$
from big → small has $k < 1$

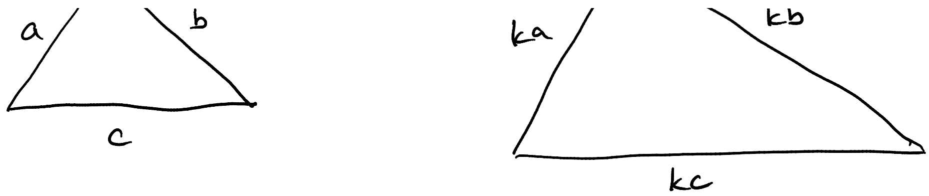
similar triangles:



ratios of corresponding parts of similar triangles (or any similar figures) are equal

three similarity theorems: (for triangles)

SSS – side-side-side



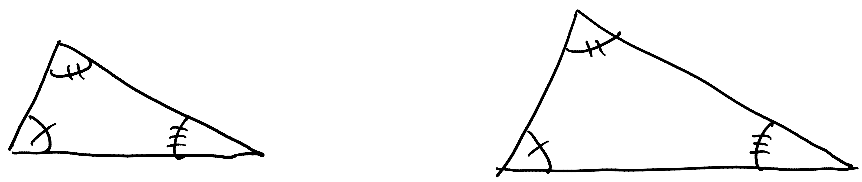
If and only if all three sides scale by the same scale factor, then the triangles are similar.

SAS side-angle-side

note: the angle must be the one included between the two sides

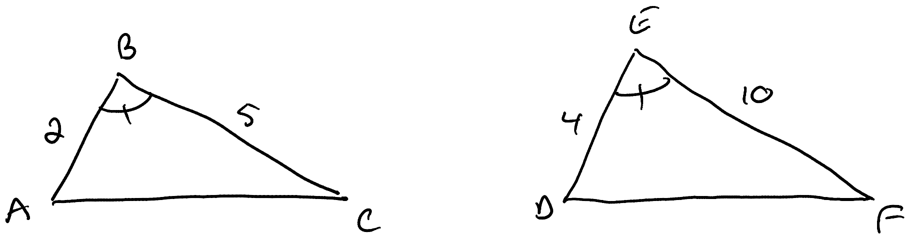
(there is no SSA similarity theorem)

AAA angle-angle-angle



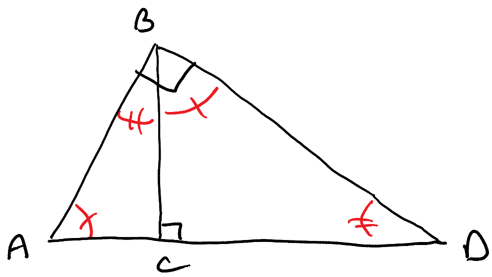
actually, just need to know that two of the angles in each triangle are equal (because the third is given by the 280° property)

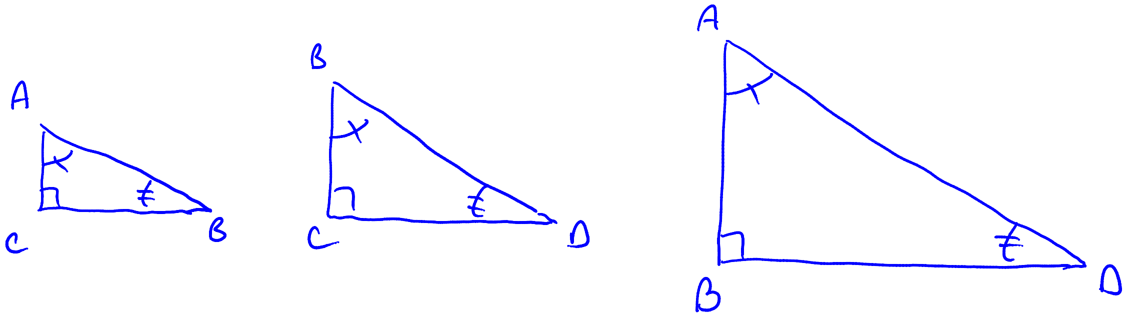
naming convention:



$\triangle ABC \sim \triangle DEF$ by SAS

examples: For the following diagram, name all similar triangles and state why they are similar.





$\triangle ACB \sim \triangle BCD \sim \triangle ABD$ by AAA

areas of similar triangles:

These two triangles are similar, with scale factor k. What's the ratio of their areas?

$\text{Area}_{①} = \frac{1}{2} bh$

$$\text{Area}_{2} = \tfrac{1}{2}(kb)(kh)$$

$$= k^2 \left(\tfrac{1}{2}bh\right)$$

$$= k^2 \, \text{Area}_{1}$$

conclusion:

if lengths scale by a factor of k,

then areas scale by k^2

and volumes scale by k^3