Can Two Non-congruent Shapes Have Equal Areas?
Or,
Can triangles look different but have equal areas?

In this *Geometer's Sketchpad* activity, you will sketch a triangle, measure its area, then change it so that its area equals the amount given to you. After that, you will copy it, and see if you can make a second non-congruent triangle (one with a totally different shape), but exactly the same area.

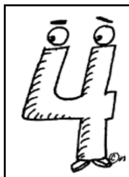
This activity assumes you already know how to use *Geometer's Sketchpad* to do the following:

- Sketch triangles using the "segment" tool,
- Measure lengths of segments,
- Label (and re-name) points,
- Construct a triangle interior, and
- Marquee select a group of objects.

a. Sketch a triangle that if cut from paper would be no larger than the palm of your hand.
b. Label the three vertices as A, B, and C (re-name if needed).
c. Measure the lengths of all three sides of triangle ABC (in symbols: ∆ABC); slide them beside the sides they measure.
d. If you don't already have a scalene ∆, move a vertex or two until you have a scalene ∆.
e. Construct an interior for ∆ABC; use whatever color you want.
f. De-select everything before going to step 2.

a. Select the interior of your triangle (when you click on it, it will show crossed-hatched lines)
b. In the menu bar, click Measure > Area
c. Move the measurement of the area to be above the triangle: remember to de-select it.
d. Click on any vertex of ∆ABC: move it around until ∆ABC has an area of exactly 10.00 cm^2.

a. Marquee select ∆ABC and all of its measurements, including the area.
b. Copy all of it (Edit > Copy or CTRL+C)
c. Paste (Edit > Paste or CTRL+V) - a duplicate will appear, highlighted, overlapping
d. Carefully click on the pasted copy and drag it to the right of ∆ABC.
   Hint: click and drag using a highlighted measurement - this is a large, easy-to-grab object. If you miss and lose the highlighting, undo your work (CTRL+Z), paste again.
e. De-select everything.



a. Re-name the vertices of your second triangle so it becomes ∆DEF.
b. Move any of the vertices of ∆DEF so that ∆DEF has a totally new shape, different side measurements, BUT still has an area of exactly 10.00 cm^2.
c. Repeat step 3 to produce a third triangle, ∆GHJ, that is totally different in shape and lengths, but which also has an area of exactly 10.00 cm^2.

a. Change ∆DEF to become an isosceles triangle, with an area of exactly 10.00 cm^2.
b. Change ∆GHJ to become an equilateral triangle, with an area of exactly 10.00 cm^2.
c. Repeat steps above, making ∆KLM, a right triangle with an area of exactly 10.00 cm^2, and ∆NPQ, an obtuse triangle with an area of exactly 10.00 cm^2.