Creating A New Tool

Often we construct an object that we need to use multiple times. If the construction involves more than a few steps, it becomes cumbersome to repeat the same process over and over. Geometer’s Sketchpad allows the user to record a construction to avoid this redundancy. This purpose of this activity is to learn the Custom Tool feature of Geometer’s Sketchpad. Then we will use a custom tool to investigate a famous theorem.

I) Use the GS Tour Constructing a Square to construct a square.

II) Now let us turn this construction into a Custom Tool.

   a) With just the square in your window go to the Edit menu and choose Select All.

   b) Go to the Custom Tool button on the left side of your window and choose Create New Tool...

   c) A dialogue box will open up. Name your new tool and then click on OK.

   d) At this point your new custom tool is created. To use it, click on the Custom Tool button again. Move your cursor back to the drawing window. You will see a red dot on the tip of your cursor arrow. Click and drag to draw a square in your window. Notice that you can quickly draw numerous squares of varying sizes and orientations using this tool.

A Famous Theorem

We are now going to use this new tool to dynamically investigate one of the most famous theorems of geometry.

I) Using Geometer’s Sketchpad create a right triangle in the middle of your drawing window. There are several ways to do this. One way is to use Rotate under the Transform window to guarantee a right angle. (Do not make the triangle too large. You are about to put some objects around it that need to be inside the drawing window).

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II) Now use your custom tool to draw squares along each of the sides of the triangle. For each square, select all four vertices and choose Quadrilateral Interior under the Construct menu:

III) Select one of the squares so that the interior is highlighted. Under the Measure menu choose Area. Repeat this process for the other two squares.

IV) Using the GS calculator, compute the sum of the areas of the two squares along the shorter two sides of the triangle. Compare this value with the area of the square along the hypotenuse. What theorem is being illustrated?

V) Drag your triangle so that the dimensions change but it still remains a right triangle. What can you say about the sum of the areas of the smaller squares and the area of the larger square? Drag your triangle around again, but this time make sure it is not a right triangle. What can you say about
the sum of the areas of the smaller squares and the area of the larger square in this case?

Take some time to create a few Custom Tools of your own. Can you think of any nice applications where these tools can be used?