

Math 330A (Barsamian) Computer Project 2: Drawings of Right Triangles with Altitudes

Later in 330A, or maybe in 330B, we will be studying two axiomatic geometries called *Euclidean Geometry* and *Hyperbolic Geometry*. As part of that study, we will investigate the following statement:

Statement S: *In any right triangle, the altitude drawn from the right angle creates two new triangles, each of which is similar to the original triangle.*

At that time, we will prove that Statement *S* is *true* in *Euclidean Geometry*, and we will prove that Statement *S* is *false* in *Hyperbolic Geometry*. Those proofs will have to be based on the axioms for Euclidean Geometry and the axioms for Hyperbolic Geometry. The goal for today is to use Geometer's Sketchpad and NonEuclid to produce drawings of triangles that could illustrate such proofs. Realize that these drawings are not proofs! They are just drawings.

Computer login & filing tasks

1. Login to the computer
 - id: your Oak ID
 - password: last 6 digits of your student ID number
2. On your computer desktop, create a folder called CP2.

Geometer's Sketchpad tasks

1. Open a new drawing in Geometer's SketchPad (GSP)
2. Construct a triangle $\triangle ABC$ with right angle at A in the following manner:
 - Construct a line \overline{AB} .
 - Select point A and line \overline{AB} .
 - Tell GSP to construct a perpendicular. It will create a line through A perpendicular to line \overline{AB} .
 - Construct a point C somewhere on the perpendicular.
 - Construct line \overline{BC} .
3. Construct the altitude from angle A in the following manner.
 - Select point A and select line \overline{BC} .
 - Tell GSP to construct a perpendicular. It will create a line through point A perpendicular to line \overline{BC} .
 - Put the label D on the point at the foot of the altitude.
4. Measure the angles of the three triangles created by your drawing.
 - Measure each of the three angles of triangle $\triangle ABC$. (Display the measurements.)
 - Measure each of the three angles of triangle $\triangle DBA$. (Display the measurements.)
 - Measure each of the three angles of triangle $\triangle DCA$. (Display the measurements.)
5. Save an image of your drawing in its current state.
 - On the GSP [File] menu, click [Save As...]
 - Save in: CP2 folder that you created on the desktop
 - File name: drawing 1
 - Save as type: Windows Metafile (*.wmf)
6. Back in your drawing in GSP, move point C (drastically).
 - Save another image of your drawing in its current state.
 - On the GSP [File] menu, click [Save As...]
 - Save in: CP2 folder that you created on the desktop
 - File name: drawing 2
 - Save as type: Windows Metafile (*.wmf)

Microsoft Word Tasks

1. Open a new document in Microsoft Word (MSWord)
2. Create a title in the document
 - Your Name
 - Spring 2008 Math 330A Computer Project 2
 - Drawings of Right Triangles with Altitudes
3. Save the document
 - Save in : CP1 folder that you created on the desktop
 - Filename: 330A_CP2_YourLastName
 - File type: .doc
4. Insert into your document the two drawings that you saved from GSP.
5. Crop and re-size the drawings so that they look good. Try to get both drawings on one page, but in a way that the labels are still legible.
6. Type captions and brief explanations for each drawing.

NonEuclid Tasks

1. Open a new drawing in NonEuclid
2. Construct a triangle $\triangle ABC$ with right angle at A in the following manner:
 - Construct a line \overline{AB} .
 - Select point A and line \overline{AB} .
 - Tell NonEuclid to construct a perpendicular. It will create a line \overline{AC} through A perpendicular to line \overline{AB} .
 - Construct line \overline{BC} .
3. Construct the altitude from angle A in the following manner.
 - Select point A and select line \overline{BC} .
 - Tell NonEuclid to construct a perpendicular. It will create a line \overline{AD} through point A perpendicular to line \overline{BC} .
4. Measure the angles of the three triangles created by your drawing.
 - Measure each of the three angles of triangle $\triangle ABC$. (Display the measurements.)
 - Measure each of the three angles of triangle $\triangle DBA$. (Display the measurements.)
 - Measure each of the three angles of triangle $\triangle DCA$. (Display the measurements.)
5. Put a picture of your drawing in its current state into your MSWord document
 - Save an picture of your NonEuclid workspace by typing [Alt]+[Print Screen]. This saves a picture of the active window on the computer clipboard.
 - Paste the picture that you just saved into your MSWord document (the same document called 330A_CP2_YourLastName).
 - Resize and crop the picture so that it takes up about $\frac{1}{4}$ page and looks good.
 - Type a a caption and explanation for the picture.
6. Back in your drawing in NonEuclid, move point C (drastically)
7. Put a picture of your drawing in its current state into your MSWord document
 - Save an picture of your NonEuclid workspace by typing [Alt]+[Print Screen]. This saves a picture of the active window on the computer clipboard.
 - Paste the picture that you just saved into your MSWord document (the same document called 330A_CP2_YourLastName).
 - Resize and crop the picture so that it takes up about $\frac{1}{4}$ page and looks good. (Your two NonEuclid drawings and their captions should fit on one page in MSWord.)

Microsoft Word Tasks

1. Save your MSWord document.
2. In Blackboard, try putting your document in the “digital dropbox”. I’m not sure what this will do. We’ll find out.
3. Also e-mail your document to me
 - my e-mail address: barsamia@ohio.edu
 - subject line: Math 330A_CP2_yourlastname
 - message: whatever you want to say
 - attachment: your MSWord document

Computer tasks

1. Close GSP
2. Close NonEuclid
3. Close MSWord
4. Logout