

Objective

The goal of this exercise is to

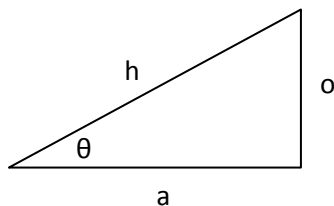
- Practice basic but fundamental trigonometry skills using a real-world image
- Demonstrate how the submission and grading of labs & projects is accomplished

Materials

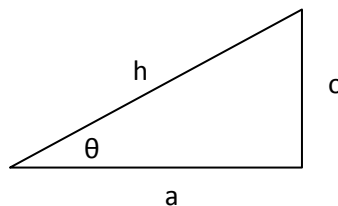
- Some means to take a digital photo of a skyline in your neighborhood, *or* an image in the public domain representing the skyline of a neighborhood in your city
- A presentation program such as PowerPoint (or equivalent available at OpenOffice.org)
- A scientific calculator

Theoretical model

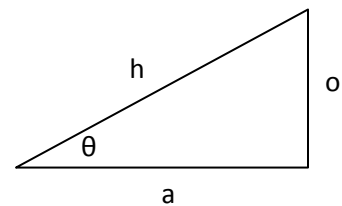
- Basic trigonometry predicts that the ratio of the lengths of two sides of a right triangle can be quickly determined using the $\sin()$, $\cos()$, and $\tan()$ functions.



$$\sin(\theta) = o / h$$



$$\cos(\theta) = a / h$$



$$\tan(\theta) = o / a$$

Procedure

- Acquire a digital photo of a skyline in your neighborhood. If possible, take the photo yourself! If you are unable to do it, search *in the public domain* for a freely available image. (To search in the public domain, just go to Google Images (or equivalent) and include the words public domain in your search.) You are looking for a skyline that can be easily broken into a series of right triangles and squares. Here's an example:



- Make sure none of the people you are working with are using the same image.
- Import the image into your presentation program (e.g., PowerPoint)
- Expand the image to fill a single slide (you may want to go to Page Setup and change the page orientation to Landscape)
- Make a text box on your image that clearly indicates your name, the period of the class, and your teacher's last name
- Label several hollow triangles in your image with their measured side lengths. Then use these lengths to determine the angles in these triangles. You may identify a right angle as usual with a smaller square. (By several, we mean more than three.)
- Here's an example of a completed project.



Post-lab & writeup

- Attach this sheet as a cover sheet. Do not feel you need to duplicate the information in this cover sheet in your write-up.
- Attach the generic laboratory rubric and checklist ([grayscale .pdf](#)) as an appendix. Your instructor will refer to those when grading.
- Print and turn in the project physically (on paper) including the cover sheet and rubric/checklist. Not all of the rubric and checklist will be used.
- Remember to try to find a way to go above and beyond simply what is required.