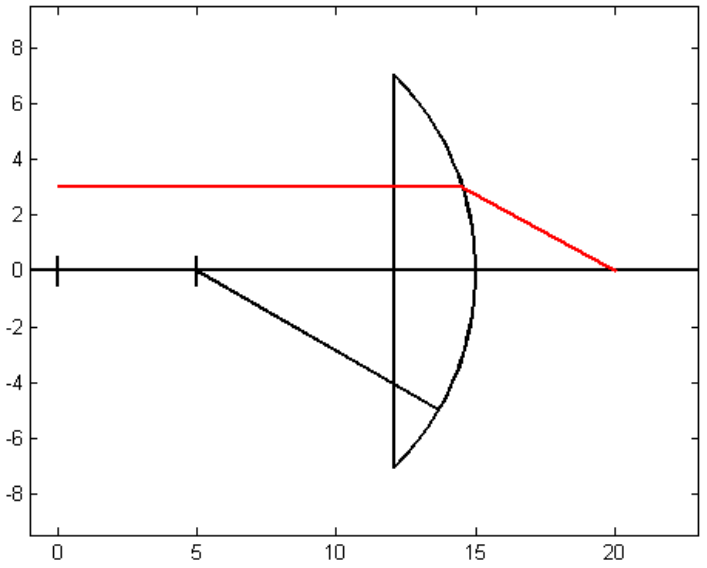
Photo-1 Fall 2009 Homework 1
Due Friday, 11 Sept.

1. Find image file 6-11_2.jpg in folder: ftp.ecn.purdue.edu/bethel and determine the height of the Purdue Bell Tower by relief displacement (then confirm your result by finding actual height from web search). Determine coordinates of the fiducial center (use as principal point) from the mid-side fiducial marks. Measure from the tip of spire to the corresponding location at base. Assume terrain height = 160m and camera station height = 540m (both are h, height above ellipsoid).

2. Determine where ray in the figure intersects the x-axis. Lens is plane-convex, radius of surface 2 is 10. surface center is at (5,0). Ray starts at (0,3) and proceeds parallel to x-axis toward the lens. Hints: intersect line and circle, yielding quadratic, vector dot-product yields angle, theta = atan(dy/dx), etc., use Snell's Law to determine refraction n=1 for air, n=1.5 for glass.



3. Use a digital camera that you own, or let me know if you need to borrow one. Look at the manufacturer's specifications and determine the size (width x height) of the CCD array. Then select an object and take a sequence of images at (approximately) object distances of 1,2,3,4,5,7,10,15 meters. Find the program "jhead.exe" on the previously cited ftp-folder and use that to inspect the EXIF header for the files. Make a table of focal length vs. object distance. **Don't touch the zoom button!**