Focused Discussion: Angular Size and Distance (Cosmic Distances)

Leader:_____ Reporter:_____

Skeptic:_____Skeptic:_____Skeptic:_____

Purpose: To be able to estimate the distance to an object from its angular size.

Reflection: You see a Jet airliner m the sky. What is its distance?

Procedure: Examine the photos (Figures 1 and 2) of a jet airliner, which was dose enough to the observer so that the airplane was visible. The photos were taken with a telephoto lens on a 35 mm camera. The image is enlarged so that 1degree equals 20 mm on the print. (This is the ***scale*** of the photo.) You may use either (or both!) photos.

1. What is the angular size, in degrees, of the plane's fuselage?

2. What is the ratio of *actual length to distance from you* for the airplane? Hint: An angular diameter of 1 means a size distance ratio or 1/57.

3. What is the actual distance, in kilometers, to the plane? (Hint: The length of a commercial jet air- line is typically 30 to 40 meters.)

4. Does your result seem reasonable? What assumption(s) have you made to reach your result?

Concept Extension

How can you use this technique to find the distance to the sun?