

Name _____ Due date _____

Size of the Earth and the Distances to the Moon and Sun – Answer Sheet

Rung 1: The size of the Earth

01. What is the significance of assuming the Sun to be very far away?

02. What value for the circumference of the Earth would Eratosthenes have determined from his measurements? What value for the radius of the Earth corresponds with this circumference? (Show all calculations.)

03. Please state the units you used in measuring, and show all calculations.

Height of the obelisk: _____

Length of the shadow: _____

Distance between Mazatlan and Denver on the map: _____

Distance between Mazatlan and Denver in kilometers: _____

Radius of the Earth in kilometers: _____

Rung 2: The size of and distance to the Moon

04. How is the second statement important to the measurement of the relative size of the Moon to the Earth? What evidence do you think the ancient Greek astronomers had that the Moon orbits the Earth?

05. State one assumption we've made that will probably lead to an error in our determination of the radius of the Earth, and what kind of an error the assumption could lead to.

06. Please state the units you used in measuring, and show all calculations.

Ratio of the size of the Moon to the size of the Earth: _____

Radius of the Moon (your derived value) in kilometers: _____

07. Your opinion as to why this method would have been difficult for the ancient Greek astronomers to perform, and why the timing method would be more favored.

08. Being mindful of whether you are working with diameter or radius of the Moon when calculating its distance based upon the angular size of the full Moon, state what you found for the distance.

Distance to the Moon in kilometers: _____

Rung 3: The distance to the Sun

09. Why is the second assumption in our model so important in determining the distance to the Sun?

10. Show all calculations and other logic if needed for clarity:

Distance to the Sun in kilometers: _____

Radius of the Sun in kilometers: _____

Measurement	Actual Value (look up)	Your Value	11. Percentage Error
Radius of the Earth			
Radius of the Moon			
Distance to Moon			
Distance to Sun			
Radius of Sun			

12. Which step contributed the largest error? Discuss briefly your results.
