

Additional Study Problems

1. Explain Eratosthenes' measurement of the radius of the earth.
2. A stone falls and comes to rest on the ground. How would this be explained according to Aristotelian ideas of motion? How would this be explained by Newtonian ideas of motion?
3. Copernicus' calculations of the positions of the planets based on his sun-centered model of the solar system were somewhat *less* accurate than the best Ptolmaic model of his time. Also, the model of Copernicus had about the same number of epicycles. Despite this, his ideas had a strong impact on subsequent thinkers, notably Kepler and Galileo. Explain one reason for this.
4. Galileo made several important contributions to the study of motion. Briefly explain the one that in your opinion is the most important. Why is it important?
5. A cannon is aimed at 45° above the horizontal and fires a canonball with an initial speed of 100 m/s. After 1 s, how far has the canonball travelled horizontally? Information that may be useful: $\cos 45^\circ = \sin 45^\circ \simeq 0.7$, $\tan 45^\circ = 1$.
6. A car with mass 1,500 kg is traveling at 10 m/s and is rounding a curve of radius 15 m. What is the minimum frictional force between the tires and the road required to keep the car from skidding?