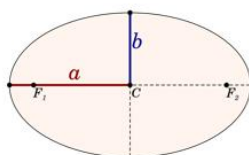## Comet Orbits

Comet Wild-2 was observed to be in the same position exactly 6.54 years apart.
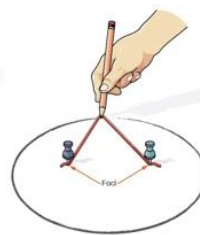
It was also observed to be exactly at this position: (1.9, 2.5)
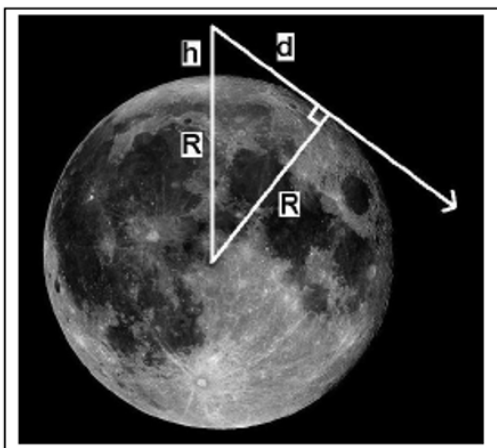
Plot the orbit of the comet.

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$$P^2 = a^3$$

Horizon Distance

Earth radius = 6378 km
Moon radius = 1738 km
Typical person height = 2 m

How far away will you be able to spot a person walking toward you in the distance on the Earth and also on the Moon?

$$a^2 + b^2 = c^2$$

Orbital Mechanics

I have a set of bonus math problems for you! There are seven math videos in the Orbital Mechanics Lab. Please take out your math journal and take notes as I work through several example problems in orbital mechanics.

I will be using algebra to solve several physics equations. I will provide the question, the appropriate physics equations, and ask that you follow along with the steps in algebra.

Since the problems are more complex, please write down everything as I work through the problems together with you. The first part of the video in *Orbital Mechanics* starts with a detailed explanation of the equations we will be using. You can write these down on this page.

ANSWER KEY

Lab #1: Comet Orbits:

1. 3.5 AU
2. 2.5 AU

Lab #2: Horizon Distance

1. (Earth) 5.1 km
2. (Moon) 2.6 km; 13.2 km (antenna of 50 m on Moon)