

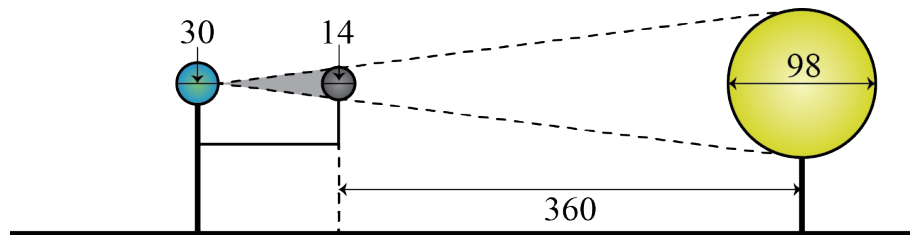


Problem of the Week

Problem D

Making an Eclipse

Quinnen made a model to demonstrate eclipses. She used a spherical LED bulb with diameter 98 mm to represent the Sun, and foam spheres with diameters 30 mm and 14 mm to represent the Earth and the Moon, respectively. The Earth and Sun are attached to a base using metal rods, and the Moon is connected to the Earth's rod by a wire so that it can rotate around the Earth. The centres of the Earth, Moon, and Sun are all the same distance above the base. Quinnen rotates the Moon around the Earth and stops when the Moon is at its closest point to the Sun. In this configuration, her model demonstrates a total solar eclipse. In other words, if you were able to look towards the Sun from the point on the surface of the Earth closest to the Sun, the Moon would completely block the Sun. In this configuration, the distance between centre of the Moon and the centre of the Sun is 360 mm.



Determine the maximum possible distance between the centre of the Earth and the centre of the Moon in Quinnen's model.

NOTE: You may find the following known result about circles useful:

If a line is tangent to a circle, then the perpendicular to that line at the point of tangency passes through the centre of the circle.

