

### Answer on Question #72519-Physics-Other

A satellite orbits the earth in a circular orbit at a height of 50000 km with what speed does it travel? How long does it take to make one revolution of the earth?

#### Solution

1) Using 3<sup>rd</sup> Kepler's Law we were able to get the semi-major axis distance in terms of the period of motion. Here we assume a simpler circular motion:

$$R^3 = \frac{GM}{4\pi^2} T^2$$

$$(50 \cdot 10^6 + 6.37 \cdot 10^6)^3 = \frac{(6.67 \cdot 10^{-11})(5.972 \cdot 10^{24})}{4\pi^2} T^2$$

$$T = 133238 \text{ s} = 37 \text{ h.}$$

2) The speed is

$$v = \frac{2\pi R}{T} = \frac{2\pi(50 \cdot 10^6 + 6.37 \cdot 10^6)}{133238} = 2658 \frac{\text{m}}{\text{s}}.$$

Answer provided by <https://www.AssignmentExpert.com>