**Answer on Question #43392, Physics, Mechanics — Kinematics — Dynamics —**

What is the speed of a satellite that orbits about a star with a mass of 3.66 X10 to the power of 32 kg along a circular path with a radius of 4.75 x 10 to the power of 14 m?

Solution

Centripetal acceleration is caused by gravitational force:

$$a_{sat} = \frac{F}{m_{sat}} = \frac{GM_{star}m_{sat}/r^2}{m_{sat}}$$

$$\frac{v^2}{r} = \frac{GM_{star}}{r^2}$$

Hence

$$v = \sqrt{\frac{GM_{star}}{r}} = \sqrt{\frac{6.67 \cdot 10^{-11} \cdot 3.66 \cdot 10^{32}}{4.75 \cdot 10^{14}}} \approx 7.17 \cdot 10^3\, m/s$$