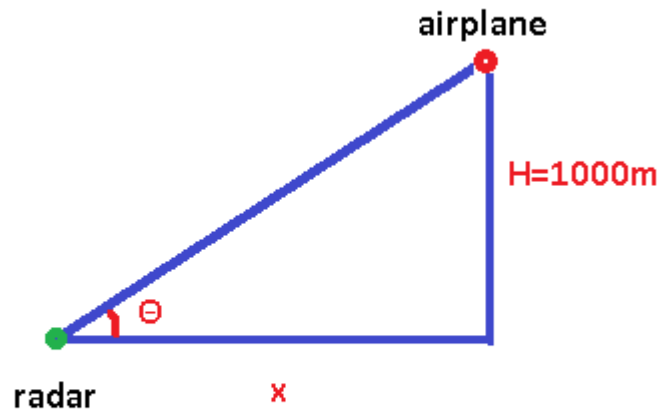# Answer on Question #76992 – Math – Calculus

Question

An airplane flying horizontally at a constant height of 1000 m above a fixed radar station. At a certain instant the angle of elevation θ at the station is π/4 radians and decreasing at a rate of 0.1 rad/sec. What is the speed of the aircraft at this moment.

Solution

$$x = H \cdot \cot \theta$$

$$v = \frac{dx}{dt} = H \cdot \frac{-1}{(\sin \theta)^2} \frac{\partial \theta}{\partial t} = 1000 \cdot \frac{-1}{\left(\frac{1}{\sqrt{2}}\right)^2} \cdot (-0.1) = 200 \, m/sec$$

Answer: $speed = 200 \, m/sec$