

Lecture 14

Thursday, September 26, 2024 1:41 AM

Applications of limit in the problem of finding the equation of a tangent line and the problem of finding instantaneous velocity.

Ex: $f(x) = x^2$. Find the slope of the tangent line at $x_0 = 1$ and find the equation of that tangent line.

Ex: The same questions above but with $f(x) = \sqrt{x}$ at $x_0 = 4$.

Ex: Position function of a falling object is $s(t) = \frac{1}{2}gt^2 + v_0t + s_0$, where $g \approx 9.8 \text{ m/s}^2$ is the gravitational acceleration, v_0 is the initial velocity, and s_0 is the initial position. Suppose that the initial position is $s_0 = 450$ and initial velocity $v_0 = 0$. What is the velocity after 5 s? How about the velocity right before touching the ground?