
IN-CLASS ACTIVITY : DERIVATIVES I

1. An object moves along a straight line according to the rule $s(t) = \frac{16}{t^2} - \frac{4}{t}$, where $s(t)$ denotes its position at time $0 \leq t \leq 4$.
 - (a) Compute the average velocity between $t = 2$ and $t = 2 + h$ for $h = 0.1$, $h = 0.01$ and $h = 0.001$. Record the results in a table.
 - (b) What is the instantaneous velocity at $t = 2$?
2. A rock is dropped from a height of 64 feet. Its height above the ground t seconds later is given by $h(t) = -16t^2 + 64$.
 - (a) Compute the instantaneous velocity of the rock at time $t = 1$. Do you expect a positive or negative value?
 - (b) At what time t_0 will the rock hit the ground?
 - (c) At what velocity will the rock hit the ground?
3. A coffee shop determined that the daily profit on scones obtained by charging s dollars per scone is $P(s) = -20s^2 + 150s - 10$. The coffee shop currently charges 3.25\$ per scone. Compute $P'(3.25)$ and decide whether or not the coffee shop should consider raising or lowering its prices on scones.
4. Consider the functions $f(x) = \frac{1}{x}$ and $g(x) = \sqrt{x}$. Compute the derivatives $f'(2)$ and $g'(4)$.