

This quiz is worth 10 points and you have 10 minutes to complete it. Show all work and circle your final answers.

Calculators ARE allowed today.

Standard warning applies: You should basically only be using your calculator to do arithmetic and perhaps to look at a graph. All problems must be solved by hand, with clear work so I can see how you arrived at your answer! Also, no “differentiation shortcuts” are allowed!

1. (10 pts) Suppose you drop an orange from your fourth-floor dorm window (42 feet above the ground). The height of the orange, measured in feet above the ground, t seconds after being dropped is given by the position function $s(t) = -16t^2 + 42$. The orange will hit the ground 1.62 seconds after it is dropped.

a. (3 pts) Find the average velocity of the orange during the entire time it is in the air.

b. (3 pts) Use an average rate of change over a small time interval to approximate the velocity of the orange at the moment it hits the ground.

c. (4 pts) Find the *exact* instantaneous velocity of the orange at the instant that it hits the ground.