

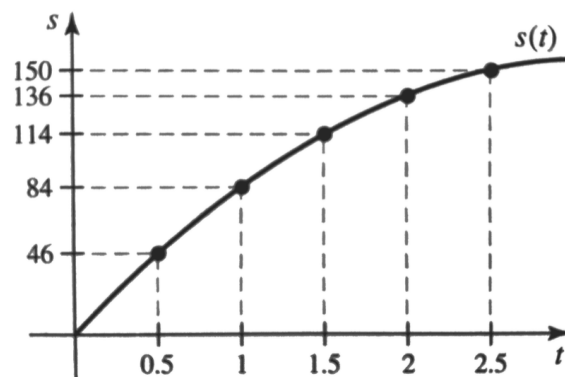
§2.1: THE IDEA OF LIMITS

- 1.] Suppose a grenade is launched vertically upwards from the ground with a speed of 96 ft/s. Neglecting air resistance, a well-known formula from physics states that the position of the grenade after t seconds is given by the function

$$s(t) = -16t^2 + 96t.$$

Find the average velocity of the grenade between 1 and 3 seconds of it being in the air.

- 2.] The graph below gives the position $s(t)$ in feet of a late student sprinting to class at time t , over a 2.5 second interval.



Find the average velocity of the student over the following intervals:

- a.) $[0.5, 2.5]$ b.) $[0.5, 2]$ c.) $[0.5, 1.5]$ d.) $[0.5, 1]$

- 3.] Consider the position function $s(t) = -16t^2 + 128t$, where $s(t)$ is measured in miles and t is measured in hours. Complete the following table with appropriate average velocities.

Time Interval	$[1, 1.5]$	$[1, 1.1]$	$[1, 1.01]$	$[1, 1.001]$
Average Velocity				

Make a conjecture about the value of the instantaneous velocity at $t = 1$.