

Mini-math Div 3/4: Monday, October 19, 2020 (14 minutes)

- (1) The motion of a particle is described by the position function

$$s = f(t) = 2t^3 - 13t^2 + 24t, \quad t \geq 0$$

where t is time measured in seconds and s is measured in metres.

- (a) When is the particle at rest?

- (b) When is the particle moving in the positive direction?

- (c) Find the total distance travelled in the first 2 s to 2 decimal places.

- (d) Find the acceleration of the particle as a function of time.

(e) When does the particle have 0 acceleration?

(f) What is the particle's acceleration when it is at rest?

(2) The population of a bacteria colony after t hours is given by

$$n = 2t^3 + 6t^2 + 15t + 2000.$$

Find the rate of change of the population at time t .

(3) Boyle's Law states that $PV = k$ where P is the pressure of a gas, V is the volume of the gas, and k is a constant. Find the rate of change of the pressure with respect to the volume.