

## MA 16010 LESSON 26: THE FUNDAMENTAL THEOREM OF CALCULUS (PROBLEM SET)

**Example 3:** The growth rate of the population of a city is

$$P'(t) = -500(3 - t)$$

where  $t$  is time in years. How does the population change  $t = 1$  year to  $t = 3$  years?

**Example 4:** The velocity function, in feet per second is given for a particle moving along a straight line

$$v(t) = -10t + 20$$

where  $t$  is in seconds.

a) Find the displacement from  $t = 0$  to  $t = 2$  seconds.

b) Find the time  $t$  when the displacement is zero after the particle starts moving.

**Example 5:** A faucet is turned on at 9:00 am and water starts to flow into a tank at the rate of

$$r(t) = 6\sqrt{t}$$

where  $t$  is time in hours after 9:00 am and the rate  $r(t)$  is in cubic feet per hour.

a) How much water, in cubic feet, flows into the tank from 10:00 am to 1:00 pm?

b) How many hours after 9:00 am will there be 121 cubic feet of water in the tank?