HW Quiz B: Logistic and 7.1

Solve the problem.

1) A wild animal preserve has a rate of growth of

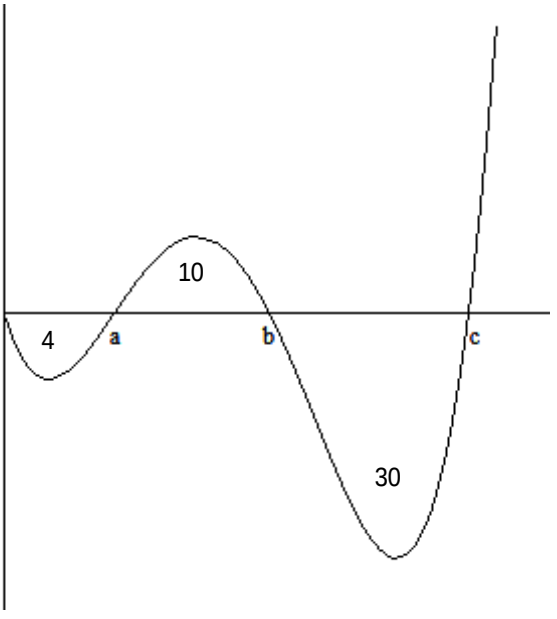
$$\frac{dP}{dt} = 0.0005P(190 - P)$$

where t is time in years.

a) Find $\lim_{t \to \infty} P(t) =$

b) Determine the population when P(t) is growing the fastest.

2) A particle moves along the x-axis (units in cm). Its initial position at t = 0 sec is x(0) = 10. The figure shows the graph of the particle's velocity v(t). The numbers are the areas of the enclosed regions.



a) What is the particle's displacement between t = 0 and t = c?

b) What is the particle's total distance traveled between t = 0 and t = c?

c) Give the positions of the particle at times a, b, and c.

d) At which coordinate(s): a,b, or c, does the particle have a negative acceleration?

The function v(t) is the velocity in m/sec of a particle moving along the x-axis. Find the total distance traveled by the particle. *Show all your work* in finding the total distance traveled

3) $v(t) = 58.8 - 9.8t, 0 \le t \le 24$

Solve the problem.

4) The velocity in m/sec of a particle moving along the x-axis is given by the function $v(t) = \sqrt{t}, 0 \le t \le 9$. Find the particle's position at time t = 4 assuming the particle starting position is s(0) = 5. *Show all your work* in finding the solution.

5) The rate at which your home consumes electricity is measured in kilowatts. If your home consumes electricity at the rate of 1 kilowatt for 1 hour, you will be charged for 1 "kilowatt-hour" of electricity. Suppose that the average consumption rate for a certain home is modeled by the function $C(t) = 4.1 - 2.5\sin(\pi t/12)$, where C(t) is measured in kilowatts and t is the number of hours past midnight. Find the average daily consumption for this home, measured in kilowatt-hours. Set up your integral and use your calculator to find the answer.