

Solve the problem.

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

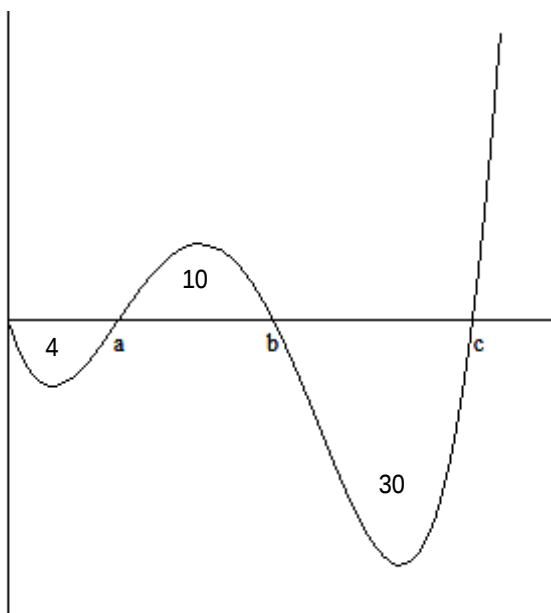
$$\frac{dP}{dt} = 0.0005P(190 - P)$$

where t is time in years.

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

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

Solve the problem.

- 4) The velocity in m/sec of a particle moving along the x-axis is given by the function

$v(t) = \sqrt{t}, 0 \leq t \leq 9$. 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.