AP CALCULUS AB Dr. Paul L. Bailey

Homework 0422c Wednesday, April 22, 2020

Problem 1. Johanna jogs along a straight path. For $0 \le t \le 40$, Johanna's velocity is given by a differentiable function v. Selected values of v(t), where t is measured in minutes and v(t) is measured in meters per minute, are given in the table below.

t (minutes)	0	12	20	24	40
v(t) (meters per minute)	0	200	240	-220	150

(a) Use the data in the table to estimate the value v'(16).

(b) Using correct units, explain the meaning of the definite integral $\int_0^{40} |v(t)| dt$ in the context of the problem. Approximate the value of $\int_0^{40} |v(t)| dt$ using a right Riemann sum with the four subintervals indicated in the table.

Problem 1 ((continued)). Johanna jogs along a straight path. For $0 \le t \le 40$, Johanna's velocity is given by a differentiable function v. Selected values of v(t), where t is measured in minutes and v(t) is measured in meters per minute, are given in the table below.

t (minutes)	0	12	20	24	40
v(t) (meters per minute)	0	200	240	-220	150

(c) Bob is riding his bicycle along the same path. For $0 \le t \le 10$, Bob's velocity is modeled by $B(t) = t^3 - 6t^2 + 300$, where t is measured in minutes and B(t) is measured in meters per minute. Find Bob's acceleration at time t = 5.

(d) Based on the model B from part (c), find Bob's average velocity during the interval $0 \le t \le 10$.