

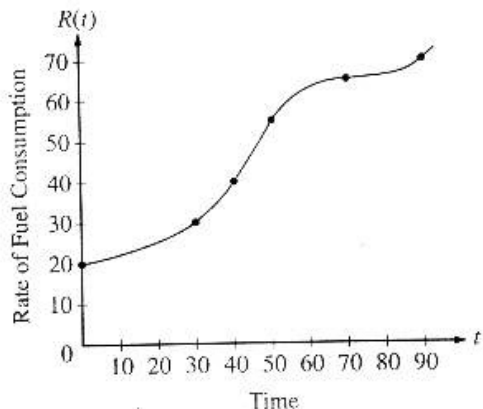
THE LINK—Communicating What We Know About: Airplane Fuel Consumption Rate

Function Info:

The rate of fuel consumption, in gallons per minute, recorded during an airplane flight is given by a twice-differentiable and strictly increasing function R of time t .

Graph—Rate of Fuel Consumption

The graph of R for the time interval $0 \leq t \leq 90$ minutes



Table—Rate of Fuel Consumption

A table of selected values of $R(t)$ for the time interval $0 \leq t \leq 90$ minutes

t (minutes)	$R(t)$ (gal/minute)
0	20
30	30
40	40
50	55
70	65
90	70

R' and R''

A. Use data from the table to find an approximation for $R'(45)$. Show the computations that lead to your answer. Indicate units of measure.

B. The rate of fuel consumption is increasing fastest at time $t = 45$ min. What is the value of $R''(45)$? Explain your reasoning.

Accumulation

C. Approximate $\int_0^{90} R(t) dt$ using a left Riemann sum with five subintervals indicated by the data in the table.

D. For $0 < b < 90$ minutes, explain the meaning of $\int_0^{90} R(t) dt$ in terms of fuel consumption for the plane.

E. Explain the meaning of $\frac{1}{b} \int_0^b R(t) dt$ in terms of fuel consumption for the plane.