

Thursday, September 19

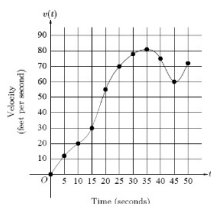
Given the velocity, how can you find:

- * the instantaneous acceleration at a point?
- * the average acceleration?
- * when the acceleration is positive or negative?

September 19

Students will verbally explain how to find the exact area under a curve using definite integrals and relate it to position, velocity and acceleration

(using the words:
right, left, above, below, antiderivative...)

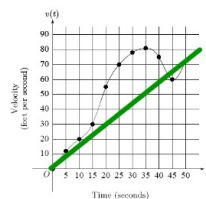


t (seconds)	$v(t)$ (feet per second)
0	0
5	12
10	20
15	30
20	55
25	70
30	78
35	81
40	75
45	60
50	72

3. The graph of the velocity $v(t)$, in ft/sec, of a car traveling on a straight road, for $0 \leq t \leq 50$, is shown above. A table of values for $v(t)$, at 5 second intervals of time t , is shown to the right of the graph.

- (a) During what intervals of time is the acceleration of the car positive? Give a reason for your answer.

$0 < t < 35$ and $45 < t < 50$
The velocity is increasing
/ has a positive slope

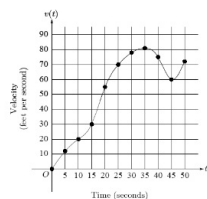


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- (b) Find the average acceleration of the car, in ft/sec², over the interval $0 \leq t \leq 50$.

$$\frac{72-0}{50-0} = \frac{72}{50} = 1.44 \text{ ft/sec}^2$$

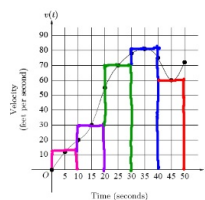


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- (c) Find one approximation for the acceleration of the car, in ft/sec², at $t = 40$. Show the computations you used to arrive at your answer.

$$\begin{aligned} \frac{60-81}{45-35} &= -\frac{21}{10} \\ \text{or} \quad \frac{75-81}{40-35} &= -\frac{6}{5} \\ \text{or} \quad \frac{60-75}{45-40} &= -\frac{15}{5} = -3 \end{aligned}$$



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- (d) using the midpoints of five subintervals of equal length. Using correct units, explain the meaning of this integral.

Interval	x-value	y-value	width	area
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2530 ft
Total distance traveled from
 $t=0$ to $t=50$

