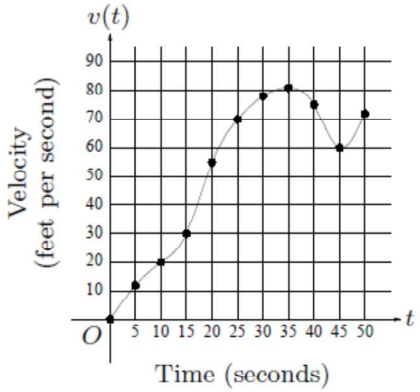

t (seconds)	$v(t)$ (feet per second)
0	0
5	12
10	20
15	30
20	55
25	70
30	78
35	81
40	75
45	60
50	72

3. The graph of the velocity $v(t)$, in ft/sec, of a car traveling on a straight road, for $0 \le t \le 50$, 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.
   (b) Find the average acceleration of the car, in ft/sec^2, over the interval $0 \le t \le 50$.
   (c) Find one approximation for the acceleration of the car, in ft/sec^2, at $t = 40$. Show the computations you used to arrive at your answer.
   (d) Approximate $\int_0^{50} v(t)\,dt$ with a Riemann sum, using the midpoints of five subintervals of equal length. Using correct units, explain the meaning of this integral.

(a) The acceleration is positive on (0,35) and (45,50) because v' is increasing on these intervals.

(b) $AA = \dfrac{v(50)-v(0)}{50-0} = \dfrac{72-0}{50} = \dfrac{72}{50}$ ft/sec^2

(c) Acceleration $\approx \dfrac{v(35)-v(45)}{35-45}$

$\approx \dfrac{81-60}{-10}$

$\approx \dfrac{21}{-10}$ ft/sec^2

(d) $\int_0^{50} v(t)\,dt = 10\cdot 12 + 10\cdot 30 + 10\cdot 70 + 10\cdot 81 + 10\cdot 60$

$= 10(12+30+70+81+60)$

$= 10(253)$

$= 2530$ feet

From time $t=0$ seconds to $t=50$ seconds, the car traveled a total of 2530 feet.