5.1 How Do We Measure Distance Traveled?

Name: Date:

P 1. The figure below show the velocity of a car for $0 \leq t \leq 12$ and the rectangles used to estimate the distance traveled.

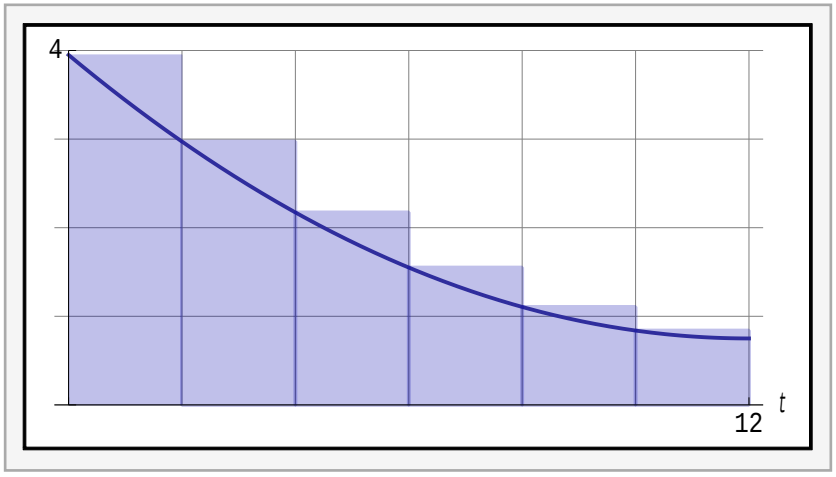
(a) Do the rectangles represent a left or right sum?

(b) Do the rectangles lead to an upper or a lower estimate?

(c) What is the value of n?

(d) what is the value of Δt?

(e) Given an approximate value for the estimate.



P 3. The velocity $v(t)$ in the given table is decreasing, $2 \leq t \leq 12$. Using $n = 5$ subdivisions to approximate the total distance traveled, find

(a) An upper estimate

(b) A lower estimate

t	2	4	6	8	10	12
$v(t)$	44	42	41	40	37	35

P 4. A car comes to a stop five seconds after the driver applies the brakes. While the brakes are on, the velocities in the table are recorded.

(a) Give the lower and upper estimates of the distance the car traveled after the brakes were applied.

(b) On a sketch of velocity against time, show the lower and upper estimates of part (a).

(c) Find the difference between the estimates. Explain how this difference can be visualised on the graph in part (b).

Time since brakes applied (sec)	0	1	2	3	4	5
Velocity (ft/sec)	88	60	40	25	10	0

P 15. Roger runs a marathon. His friend Jeff rides behind him on a bicycle and clocks his speed every 15 minutes. Roger starts out strong, but after an hour and a half he is so exhausted that he has to stop. Jeff's data follow:

Time since start (min)	0	15	30	45	60	75	90
Speed (mph)	12	11	10	10	8	7	0

P 27. A car initially going 50 ft/sec brakes at a constant rate (constant negative acceleration), coming to a stop in 5 seconds.

(a) Graph the velocity from $t = 0$ to $t = 5$.

(b) How fast does the car travel?

(c) How far does the car travel if its initial velocity is doubled, but it brakes at the same constant rate?