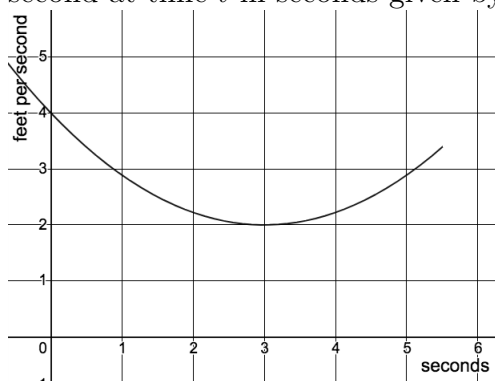


Name: \_\_\_\_\_

## 5.1 Measuring Distance Traveled

1. Suppose that an object moving along a straight line path has its velocity in feet per second at time  $t$  in seconds given by the graph below.

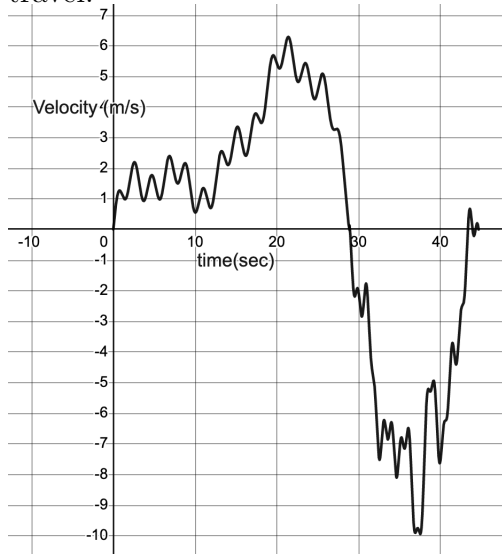


- (a) Estimate the distance traveled from  $t = 2$  to  $t = 5$ .
- (b) Use 4 left rectangles to approximate the distance traveled on the interval  $2 \leq t \leq 5$ . How wide is each rectangle?
- (c) Use 4 right rectangles to approximate the distance traveled on the interval  $2 \leq t \leq 5$ . How wide is each rectangle?
- (d) Suppose the exact value of the velocity is given by the equation

$$v(t) = \frac{2}{9}(t - 3)^2 + 2.$$

Compute the distance traveled on the interval  $2 \leq t \leq 5$  using a 4 right-rectangle approximation. Show your work. Do you think this is an under or over estimate?

2. The graph below gives the vertical velocities of a helicopter drone in meters per second. Positive velocities indicate upward travel, and negative velocities indicate downward travel.



- (a) When is the drone traveling the fastest? Why?
- (b) When is the drone highest in the air? Why?
- (c) Estimate the maximum height of the drone. Explain your reasoning.
3. 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.

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

- (a) Give lower and upper estimates of the distance the car traveled after the brakes were applied.
- (b) Find the difference between the estimates. How can you explain this difference?