6. [10 points] While eating cookies, Alex notes that the velocity of a student passing by is given, in meters/second, by the data shown below.

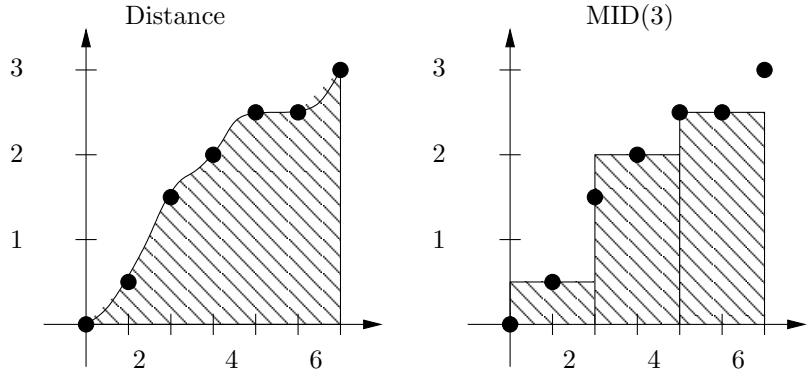
t (seconds)	0	1	2	3	4	5	6
$v(t)$ (m/s)	0	0.5	1.5	2	2.5	2.5	3

(a) [5 of 10 points] Using the midpoint rule, find as accurate an estimate as possible for the total distance the student travels in the six seconds shown in the table (use only the given data in your calculation).

Solution:
The smallest value of Δt we can use with the given data is $\Delta t = 2$ seconds; if we try to use $\Delta t = 1$, we need values of v at $t = \frac{1}{2}$, $\frac{3}{2}$, etc., which aren't available in the given data. Then, using $\Delta t = 2$, we have

$$\text{MID}(3) = 2(0.5 + 2 + 2.5) = 10 \text{ meters.}$$

(b) [5 of 10 points] Draw two figures on the axes below, one each to illustrate the total distance you are estimating and the estimate you found. Be sure it is clear how your figures illustrate the indicated quantities.



Solution:
We show the actual distance traveled and MID(3) in the figures above right. The actual distance traveled is the shaded area under the function $v(t)$ between $t = 0$ and $t = 6$; MID(3) is the shaded area in the indicated rectangles.