

8. [5 points] Fifi found Kiki on the desert island after traveling back in time, and she brought another time machine with her to return both of them to their own time. Before they traveled back to the present, they ate dinner on the island, and there was a large insect flying around their table. The speed of the insect in meters per second, was **inversely proportional** to the number of minutes after they began the meal. If the insect was flying at ten meters per second two minutes after they began eating, how fast was it flying five minutes after they began eating? Be sure to show your work. Answers with no work shown will not receive credit.

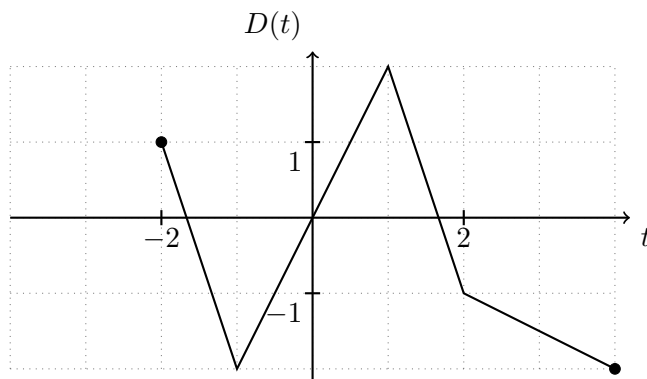
Five minutes after they began eating, the fly was flying 4 m/s

*Solution:* If the speed of the insect is  $v$  and the number of minutes since they began the meal is  $m$ , then the relationship described in the problem is

$$v = \frac{k}{m}.$$

Using  $v = 10$  and  $m = 2$ , we can find  $k = 20$ . Then when  $m = 5$ ,  $v = 4$ .

9. [6 points] The figure below shows **part** of the graph of an odd, piecewise linear, periodic function  $D(t)$  of period 10, defined for all  $t$ . Use the graph to answer the questions below.



- a. [2 points] Find the average rate of change of  $D(t)$  between  $t = -2$  and  $t = 1$ .

The average rate of change between  $t = -2$  and  $t = 1$  is  $(2-1)/(1-(-2)) = \frac{1}{3}$

- b. [4 points] Find:

- $D(18) = D(-2) = 1$
- $D(-3) = -D(3) = 1.5$