

3. A student starts reading a book at time  $t = 0$  minutes and continues reading for the next 10 minutes. The rate at which the student reads is modeled by the differentiable function  $R$ , where  $R(t)$  is measured in words per minute. Selected values of  $R(t)$  are given in the table shown.

| $t$ (minutes)             | 0  | 2   | 8   | 10  |
|---------------------------|----|-----|-----|-----|
| $R(t)$ (words per minute) | 90 | 100 | 150 | 162 |

- A. Approximate  $R'(1)$  using the average rate of change of  $R$  over the interval  $0 \leq t \leq 2$ . Show the work that leads to your answer. Indicate units of measure.
- B. Must there be a value  $c$ , for  $0 < c < 10$ , such that  $R(c) = 155$ ? Justify your answer.
- C. Use a trapezoidal sum with the three subintervals indicated by the data in the table to approximate the value of  $\int_0^{10} R(t) dt$ . Show the work that leads to your answer.
- D. A teacher also starts reading at time  $t = 0$  minutes and continues reading for the next 10 minutes. The rate at which the teacher reads is modeled by the function  $W$  defined by  $W(t) = -\frac{3}{10}t^2 + 8t + 100$ , where  $W(t)$  is measured in words per minute. Based on the model, how many words has the teacher read by the end of the 10 minutes? Show the work that leads to your answer.