APPLICATIONS OF THE DEFINITE INTEGRAL

1. The rate of memorizing information increases over time to a maximum, then decreases. Suppose this information memorization rate is modeled by $m(t) = -0.009t^2 + 0.18t$ words per minute (time t is measured in minutes).

    a) When is the memorization rate at a maximum?

    b) Make an educated guess about whether more words are memorized from time $t_1 = 0$ to time $t_2 = 10$ or from time $t_1 = 5$ to time $t_2 = 15$.

    c) The number of words memorized from time t_1 to time t_2 is $\int_{t_1}^{t_2} m(t)\ dt$. Use this to find exact answers for the number of words memorized over the two intervals in the previous part. Were you right?

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2. Solve the initial value problems. It may help to know that there are 5280 feet per mile.

    a) A car accelerates at a constant rate from 0 mph to 60 mph in 30 sec. How far did it travel?

    b) A car decelerates at a constant rate from 60 mph to 0 mph in 5 sec. How far did it travel?