Sections 2.3 and 2.4
Interpretations of the Derivative and The Second Derivative

1. Suppose $C(r)$ is the total cost of paying off a car loan borrowed at an annual interest rate of $r\%$. What are the units of $C'(r)$, what is the practical meaning of it, and what is its sign?

2. The quantity Q (mg) of nicotine in the body t minutes after a cigarette is smoked is given by $Q = f(t)$.

   (a) Interpret the statements $f(20) = 0.36$ and $f'(20) = -0.002$ in terms of nicotine. What are the units of the numbers 20, 0.36, and -0.002 ?

   (b) Use the information given in part (a) to estimate $f(21)$ and $f(30)$. Which estimate is most reliable?

3. The graph of a function $f(x)$ is shown in the figure below. In the table, indicate whether f, f', f'' at each marked point is positive, negative, or zero.

Point	f	f'	f"
A			
B			
C			
D			

1
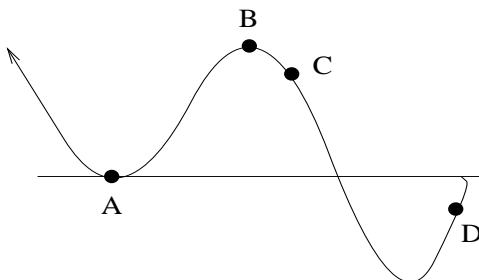
4. A company's revenue from car sales, C (in thousands of dollars), is a function of advertising expenditure, a (in thousands of dollars). So $C = f(a)$.

   (a) What does the company hope is true about the sign of f' ? Explain.

   (b) What does the statement $f'(100) = 2$ mean in practical terms? How about $f'(100) = 0.5$?

   (c) Suppose the company plans to spend about $100,000 on advertising. If $f'(100) = 2$, should the company spend more or less than $100,000 ? What if $f'(100) = 0.5$?

5. Let $f(T)$ be the time, in minutes, that it takes for an oven to heat up to T^o F.

   (a) What are the units of $f'(T)$?
   (b) What is the sign of $f'(T)$?
   (c) Interpret the statement $f(300) = 10$.

   (d) Interpret the statement $f'(300) = 0.1$.