1. Suppose $f(x)=(x-1)(x-4)(x-9)=x^3-14x^2+49x-36$. Find the intervals on which $f(x)$ is increasing and the intervals on which $f(x)$ is decreasing.

2. Suppose $g'(x)=(x-1)(x-4)(x-9)=x^3-14x^2+49x-36$. Find the intervals on which $g(x)$ is increasing and the intervals on which $g(x)$ is decreasing.

3. Suppose $h(x)=\dfrac{1}{(2x-10)^2}$. Find the largest value of A for which the function $h(x)$ is increasing for all x in the interval $(-\infty, A)$.

4. Suppose $f'(x)=\dfrac{-5}{(x-3)^2}$. Find the value of x in the interval $[-20, 2]$ on which $f(x)$ takes its maximum.

5. Suppose we know that $g(8)=-3$. In addition, you are given that $g(x)$ is continuous everywhere, and is increasing on the interval $(-\infty,10)$ and decreasing on the interval $(10,\infty)$. Which of the following are possible, and which are not possible? *Hint*: draw a graph in each case.
   a. g has a local minimum at $x=8$
   b. g has a local maximum at $x=10$
   c. $g(0)=-5$
   d. $g(0)=5$
   e. $g(0)=-6$ and $g(1)=-4$
   f. $g(0)=-4$ and $g(1)=-6$
   g. $g(0)=-4$ and $g(12)=-4$

6. Sketch the graph of a function which is continuous and differentiable everywhere, is increasing on the intervals $(-\infty,-2)$ and $(5,7)$, and is decreasing on the intervals $(-2,5)$ and $(7,\infty)$.