MA 137 Worksheet #20

Sections 5.1 and 5.2
10/22/20

1. Suppose that $f(x)$ is a differentiable function with $3 \leq f'(x) \leq 10$ for all x in the open interval $(-1, 6)$. If $f(-1) = 3$, then the Mean Value Theorem for $f(x)$ on the interval $[-1, 6]$ implies that the largest possible value of $f(6)$ is _____.

2. Denote the biomass at time t by $B(t)$, and assume that $B(t)$ is continuous on the interval $[-1, 3]$ and differentiable on the interval $(-1, 3)$ with $B(-1) = 75$ and $-3 \leq dB/dt \leq 2$ for all $t \in (-1, 3)$. What can you say about $B(3)$?

3. Where is the function $f(x) = 2x^3 - 14x^2 + 48x + 21$ increasing?

4. Suppose $f'(x) = x(x + 2)(x - 3)$. Find the interval or intervals where f is increasing.
   (Read the problem carefully. The given function is $f'(x)$, not $f(x)$.)