You may *not* use your books, notes, graphing calculator, phones or any other internet devices on this exam. Please show all work clearly and legibly.

1. (a) (4 points) State the mean value theorem.

Problem	Points	Score
1	7	
2	6	
3	7	
Total:	20	

(b) (3 points) For $f(x) = x^3 + x + 4$ find all c in the interval $(-2, 0)$ which satisfy the statement of the mean value theorem for $f(x)$ on the interval $[-2, 0]$.

2. (6 points) Let $g(x) = x^5 - 10x$. Find where g is increasing and decreasing and find any local maxima or minima.

3. Use L'hopital's rule to compute the following limits:

   (a) (3 points)
   $$\lim_{x \to 0} \frac{e^x - 1}{x} =$$

   (b) (4 points)
   $$\lim_{x \to 0} \frac{\sin(3x)}{\tan(7x)} =$$