amsppt
Name: _____   **Professor:** A.Alexandrou Himonas■

Mathematics 165
Honors Calculus 1
Fall Semester
Exam 2
November 11, 1991

This Examination contains five problems worth a total of 100 points, each problem worth 20 points, on (7) sheets of paper including the front cover and one extra sheet on the back. Do all your work in this booklet and show your computations. Calculators, books and notes are not allowed.

1	
2	
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4	
5	
Total	

Sign the pledge: "On my honor, I have neither given nor received unauthorized aid on this Test":

_____

GOOD LUCK

1a.) Compute the limit
$$\lim_{x \to 0} (1x \sin x - 1x^2)$$

where R is the radius of the earth and g is the gravitational acceleration at sea level. Find the linear approximation of $W(x)$ at $x = 0$ (sea level).

Answer: _____

1b.) The weight of a body of mass m at altitude x above sea level is given by

$$w(x) = mgR^2(R+x)^2$$

where R is the radius of the earth and g is the gravitational acceleration at sea level.

Answer: _____

2a.) Let $f(x) = 4x^5 - 5x^4 + 2$. Sketch the graph of f by using the information given by $f'(x)$ and $f''(x)$.

2b.)Show that $f(x)$ has exactly one real root which is negative.

Answer: _____

3). Among all right circular cylinders with a given volume, find the one with the least surface area.

4a.) Let the set A be defined by $A = \{11 + x^2 : x \in R\}$

Find $\sup A$ and $\inf A$ and examine if they belong in A.

Answer: _____

5. **Bonus** *Find a function* f: R $\longrightarrow$ R such that it is continuous only at 0.

Answer: _____