Math 0120
Examination #1
Sample

Name (Print) _____ Student ID # _____

Signature _____ Score _____

TA (Circle one)

Instructions:

1. Clearly print your name and sign your name in the space above.

2. There are 8 problems, each worth the specified number of points, for a total of 100 points. There are also two extra-credit problems worth up to 8 points.

3. Please work each problem in the space provided. Extra space is available on the back of each exam sheet. Clearly identify the problem for which the space is required when using the backs of sheets.

4. Show all calculations and display answers clearly. Unjustified answers will receive no credit.

5. Write neatly and legibly. Cross out any work that you do not wish to be considered for grading.

6. **Calculators may not be used. All derivatives are to be found by learned methods of calculus.**

1. (8 pts.) $f(x) = \sqrt{\dfrac{1}{4 - x^2}}$ and $g(x) = \sqrt{4 - x^2}$.

(a) Find the domain of g.

(b) Find the composition f(g(x)).

2. (12 pts.) (a) Write the definition of the derivative of f(x).

(b) Use the definition to find the derivative of $f(x) = \dfrac{1}{2x}$.

3. (35 pts.) Find the indicated derivatives of the following functions (you need not simplify):

(a) $f(x) = \frac{4}{x} + ex^{-3} - 8x^2 + 200\pi$. Find $f''(x)$.

(b) $f(x) = (2x^2 - x)(5x^{-3} - 10x)$. Find $f'(x)$.

(c) $f(x) = \frac{x^2 + 1}{1 - x^3}$. Find $f'(x)$.

(d) $f(x) = (3x^5 - 18x)^8$. Find $f'(x)$.

(e) $f(x) = \sqrt{(x^3 + 2x) + x}$. Find $f'(x)$

You may earn up to 3 points extra credit by finding $\frac{d^2f}{dx^2}\Big|_{x=8}$ for $f(x) = x^{\frac{5}{3}}$.