Math 0120
Sample
Exam 1

Name (Print) _____ PeopleSoft # _____.

Signature _____ Score _____.

TA (Circle one)

Instructions:

1. Clearly print your name and PeopleSoft number 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 is also an extra-credit problem worth up to 5 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 **No calculators, headphones, tables, books, notes, or computers may be used. All derivatives are to be found by learned methods of calculus.**

1. (10 pts.) $f(x) = \frac{\sqrt{x^2-1}}{x-1}$ and $g(x) = x+1$.

(a) Find the domain of f(x) and express it in interval notation.

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

2. (a) (5 pts) Find $\lim_{x\to 2} \frac{x^3-8}{x-2}$

(b) (5 pts.) Write the definition of the derivative of f(x).

(c) (7 pts.) Use the definition to find the derivative of $f(x) = x^2$.

3. (32 pts.) Find the indicated derivatives of the following functions (<u>you need not simplify, but you must use correct notation</u>):

(a) $f(x) = -\frac{8}{x} + 2x^{-4} - 4x^3 + 100\pi + 2$. Find $\frac{d^2}{dx^2} f(x)$. Use Leibniz notation throughout.

(b) $f(x) = (3x^5 - 18x)(5x^{-3} - 10x)$. Find $f'(x)$.

(c) Find $\frac{d}{dx}\left(\frac{x^2 - 1}{20x + x^3}\right)$.

(d) $f(x) = \left(1 + \frac{1}{\sqrt{x}}\right)^{-3}$. Find $f'(x)$.

You may earn 5 points extra credit by finding $g'(x)$ for $g(x) = \sqrt{x^9 + \pi - \sqrt[4]{x^3 - 2x}}$.