

**Math 0220
Examination #1
Sample**

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 7 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. (a) (5 pts.) Write the definition of $f'(x)$, the derivative of the function $f(x)$.

(b) (7 pts.) Use this definition to find $f'(x)$ for $f(x) = \frac{1}{2x}$

2. (21 pts.) Find the indicated derivatives of the following functions. You must use the correct notation, but you need not simplify:

(a) $y = ex^\pi - \cos(2x) + \tan\left(\frac{x}{2}\right)$. Find $\frac{d^2y}{dx^2}$.

(b) $f(x) = \frac{\sqrt{\sin(2x)}}{2x-9}$. Find $\frac{d}{dx}f(x)$.

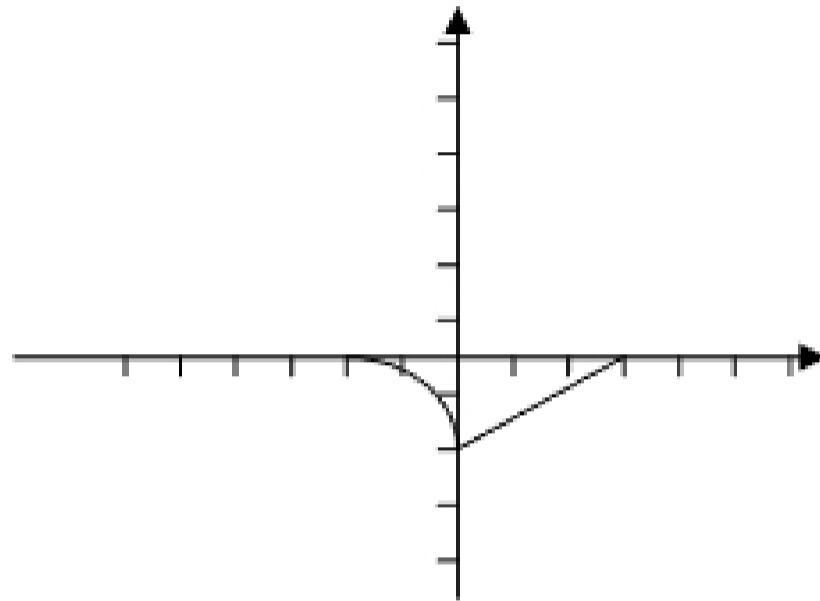
(c) $g(x) = \cot^3(2x)\csc(3x)$. Find $g'(x)$.

3. (24 pts.) Do **any 4** of the following 5:

(a) Find a function **f** and a number **a** such that $\lim_{x \rightarrow 5} \frac{2^x - 32}{x - 5} = f'(a)$.

(b) Find $\lim_{x \rightarrow 4} \frac{x^2 - 2x - 8}{x^3 - 64}$

(c) The graph of $y = f(x)$ is given. Sketch the graph of $y = -2f(x-2)$.



(d) $\lim_{x \rightarrow -\infty} \frac{\sqrt{4x^2 + 1}}{5 - 3x}$

(e) Find $\lim_{x \rightarrow 0} \frac{x + \tan 2x}{\sin x}$

You may earn 7 extra points by stating the Intermediate Value Theorem.