Math 141 Fall 1997 Exam III Name
No work - No credit SS#

1) (30 points) Complete the following table.

f(x)	f'(x)
$x^2 \tan x$	
$2^{\sin x}$	
$\log_5(1-x)$	
$\sin^{-1} x$	
$e^x \ln x$	
$\sqrt{1-x}$	

2) Find the equation of the line tangent to $f(x) = \sec^4 x$ at $\left(\frac{\pi}{4}, 4 \right)$.

3) Linearize $y = \ln x$ for x values near x = e.

4) Differentiate: (Do not simplify)

a) $y = \sqrt{\sin x + \ln x}$

b) $xe^y = \sin y$

5) For $y = x^2 + 2x - 1$, find $\Delta y - dy$.

6) A population of flies is growing in a large container. The number of flies P (in hundreds) after t weeks is given by $P = 12t^2 - t^4 + 5$. ($t \geq 0$)

a) When does the population stop growing?

b) Over what interval(s) is the population increasing?

c) Over what interval(s) is the population decreasing?