Math 16A; Sample First Midterm

Name:

GSI:
Section number:
or time and room:

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2	
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Please show all your work and exhibit your final answers clearly. You may use the backs of these pages for your extra work. You have 50 minutes.

Problem 1 (20 points)

(a) (10 points) Find the slope of the line through the points $(3, 2)$ and $(6, 1)$.

(b) (10 points) $f(x)$ is a function where $f(5) = 1$ and $f'(5) = -8$. Find the equation of the tangent line to $y = f(x)$ at $x = 5$.

Problem 2 (20 points)
(a) (10 points) What is the limit definition of $f'(5)$ where $f(x) = \dfrac{1}{x^2}$

(b) (10 points) Find a function $f(x)$ and a number a so that the following is the limit definition of $f'(a)$
$$limit_{h \to 0} \frac{\sqrt{(3+h)^2 + 7} - 4}{h}$$

Problem 3 (20 points)

Let $f(x) = (1 + 5x)^3 + \sqrt{2 + 7x} + (1/(8 + 3x))$

(a) (10 points) Find the derivative of $f(x)$

(b) (10 points) find the second derivative of $f(x)$.

Problem 4 (20 points)

Find $f'(x)$ where $f(x) = \sqrt{5 + (1 + 3x^2)^3}$

Problem 5 (20 points)

Sketch the graph of $y = 5x^6 - 6x^5$.

(Be sure to **clearly** indicate where your graph is increasing, decreasing, concave-up, and concave-down).

y

x