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JOHNSON
VERSION I

221 EXAM II - APRIL 4, 2005

NAME: _____

T. A.: _____

INSTRUCTIONS: Show all your work. Answers alone will receive little or no credit. Read the instructions carefully and do what is asked. If you do not understand what is being asked, raise your hand and someone will assist you. Calculators and one 8.5" by 11" sheet of paper are permitted.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

TOTAL _____

1. (15 p'ts.) Using only the definition of derivative, find $f'(c)$ when $f(t) = 6t^2 + 3t + 5$;
i.e. $f'(c) = \lim_{h \rightarrow 0} \frac{f(c+h) - f(c)}{h}$

Ans. _____

2. (20 p'ts.) In the following, find $f'(x)$.

a) $f(x) = 3x^5 + 4x^4$

Ans. _____

b) $f(x) = \frac{2-5x}{3x}$.

Ans. _____

c) $f(x) = \tan^3 x$.

Ans. _____

d) $f(x) = \sin^5(4x - 9)$.

Ans. _____

3. (15 p'ts.) Let $f(x)$ be some differentiable function of x and put $F(t) = f(t^2 + 7)$. Suppose $F'(3) = 1$. Find $f'(16)$.

Ans. _____

4. (15 p'ts.) $7(x^2 + y^2)^2 = 625(y^2 - x^2)$. Find dy/dx at (3, 4).

Ans. _____

5. (15 p'ts.) A particle moves around the circle $x^2 + y^2 + 2y = 2$ with an x -velocity $dx/dt = y$. Find dy/dt .

Ans. _____

6. (20 p'ts.) A square sheet of tin 3 inches on a side is to be used to make an open top box by cutting a small square of tin from each corner and bending up the sides. How large of a square should be cut from each corner in order that the resulting box shall have as large a volume as possible?

Ans. _____