

171 EXAM II NOVEMBER 12, 2003

NAME: _____

T.A.: _____

INSTRUCTIONS: Show all your work. Answers alone will receive little or no credit. Be neat. We do not want to be required to guess at what you're doing. We must be able to see how you got to your answer. **Take your time and be careful with your calculations. A mistake early in your work could be costly.**

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

TOTAL _____

1. (15 p'ts.)

$$g(x) = \begin{cases} x^3 & \text{if } x < -1 \\ x - 1 & \text{if } -1 \leq x \leq 1 \\ x^2 - 1 & \text{if } 1 < x \end{cases}$$

At what points, if any, is $g(x)$ discontinuous? Why?

Ans. _____

2. (15 p'ts.) Consider the function $f(t) = \sqrt{2t+1}$. Using only the definition of derivative, find $f'(3/2)$. (i.e. use only $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h)-f(x)}{h}$).

Ans. _____

3. (20 p'ts.) There are two lines tangent to the graph of $y = x^2 + 3$ and passing through the point $(1, 0)$. One has positive slope and the other has negative slope. Find the equation for the tangent line with negative slope.

Ans. _____

4. (15 p'ts.) We are given that $F(x) = f(3x^3 - 5x^2 + 1)$ and that $f'(-1) = 7$ and $f'(5) = 4$. Find $F'(1)$.

Ans. _____

5. (15 p'ts.) Find the tangent line to $x^2y^2 + 4xy = 6y$ at the point (1,2).

Ans. _____

6. (20 p'ts.) A guy wire is attached to the top of a radio antenna and to a point on horizontal ground 40 meters from the base of the antenna. If the wire makes an angle of $55^{\circ}9'$ with the ground, what is the length of the wire?

Ans. _____

