Name________________________________ Date_______________________ Period_____________

Calculus Test: 2.1 to 3.1. No Calculator

Part I: Multiple Choice

_____ 1. If $f(x)=\ln\left|x+4+e^{-3x}\right|$, then $f'(0)=$ (A) $-\frac{2}{5}$ (B) $\frac{1}{5}$ (C) $\frac{1}{4}$ (D) $\frac{2}{5}$ (E) DNE

_____ 2. Let $f$ be the function defined by $f(x)=x^3+x$. If $g(x)=f^{-1}(x)$ and $g(2)=1$, what is the value of $g'(2)$? (A) $\frac{1}{13}$ (B) $\frac{1}{4}$ (C) $\frac{7}{4}$ (D) 4 (E) 13

_____ 3. Find the global max and min of $f(x)=x^3-3x+1$ on the interval $[0,2]$.

(A) Global max at $x=0$; Global min at $x=1$ (B) Global max at $x=2$; Global min at $x=0$

(C) Global max at $x=2$, $x=-1$; Global min at $x=1$ (D) Global max at $x=1$; Global min at $x=1$

(E) Global max at $x=2$; Global min at $x=1$

_____ 4. The critical values of $f(x)=xe^{-x}$ are:

(A) $x=-1$ (B) $x=1$ (C) $x=1,\ x=-1$ (D) $x=0\ \ x=1$ (E) No critical values

_____ 5. If $f(x)=x^2+2x$, then $\frac{d}{dx}\left[f(\ln x)\right]=$

(A) $\frac{2\ln x+2}{x}$ (B) $2x\ln x+2$ (C) $2\ln x+2$ (D) $2\ln x+\frac{2}{x}$ (E) $\frac{2x+2}{x}$

_____ 6. The value of the derivative of $y=\frac{\sqrt[3]{x^2+8}}{\sqrt[4]{2x+1}}$ at $x=0$ is

(A) $-1$ (B) $-\frac{1}{2}$ (C) 0 (D) $\frac{1}{2}$ (E) 1

_____ 7. $\frac{d}{dx}\left[xe^{\ln x^2}\right]=$ (A) $1+2x$ (B) $x+x^2$ (C) $3x^2$ (D) $x^3$ (E) $x^2+x^3$

_____ 8. $\lim_{h\to 0}\frac{\ln(e+h)-1}{h}$ is

(A) $f'(e)$, where $f(x)=\ln x$ (B) $f'(e)$, where $f(x)=\frac{\ln x}{x}$ (C) $f'(1)$, where $f(x)=\ln x$

(D) $f'(1)$, where $f(x)=\ln(x+e)$ (E) $f'(0)$, where $f(x)=\ln x$

_____ 9. The slope of the line tangent to the graph of $\ln(xy)=x$ at the point where $x=1$ is

(A) 0 (B) 1 (C) $e$ (D) $e^2$ (E) $1-e$

_____ 10. If $f(x)=\left(x^2+1\right)^x$, then $f'(x)=$

(A) $x\left(x^2+1\right)^{x-1}$ (B) $2x^2\left(x^2+1\right)^{x-1}$ (C) $x\ln\left(x^2+1\right)$

(D) $\ln\left(x^2+1\right)+\frac{2x^2}{x^2+1}$ (E) $\left(x^2+1\right)^x\left[\ln\left(x^2+1\right)+\frac{2x^2}{x^2+1}\right]$

Part II: AB Free Response:

11. (1992 AB4/BC1) Consider the curve defined by the equation $y + \cos y = x + 1$ for $0 \le y \le 2$® .

(a) Find $\frac{dy}{dx}$ in terms of *y*.

(b) Write an equation for each vertical tangent to the curve.

(c) Find $\frac{d^2y}{dx^2}$ in terms of *y*.