Math 119 Name:____________________

Exam I Instructor:____________________

March 17, 1997 Section:____________________

Let $f(x) = \sqrt{x}$. For what value of x is the tangent to this curve parallel to the line $-x + 8y = 10$? 16 4 2 -2 -4

A ladder $8\,m$ long leans against a wall $6\,m$ high. If the lower end of the ladder is pulled away from the wall at a rate of $2\,m/sec$, how fast ($radian/sec$) is the angle between the top of the ladder and the wall changing when the angle is $60^\circ = \frac{\pi}{3}$ radians? $\frac{1}{2}$ 2 π $\frac{1}{2}\pi$ 1

If $y = \sin(x + y)$, find $\frac{dy}{dx}$. $\frac{\cos(x+y)}{1-\cos(x+y)}$ $\frac{-\cos(x+y)}{1-\cos(x+y)}$ $\frac{\cos(x+y)}{1+\cos(x+y)}$ $\frac{\cos(x+y)}{1-\sin(x+y)}$ $\frac{-\sin(x+y)}{1-\cos(x+y)}$

Find $\frac{d}{dx}\tan^2\sqrt{x}$. $\frac{\tan\sqrt{x}\sec^2\sqrt{x}}{\sqrt{x}}$ $\frac{\tan\sqrt{x}\sec^2 x}{\sqrt{x}}$ $\frac{-\tan\sqrt{x}\sec^2\sqrt{x}}{x}$ $\frac{-\sec\sqrt{x}\sec^2 x}{\sqrt{x}}$ $\frac{\sec\sqrt{x}\tan^2\sqrt{x}}{x}$

Find $\frac{dy}{dx}$ if $\frac{1}{x} + \frac{1}{y} = 1$. $-\frac{y^2}{x^2}$ $\frac{y^2}{x^2}$ $\frac{y}{x}$ $-\frac{y}{x}$ $\frac{1}{x^2} - \frac{1}{y^2}$

Find $\lim_{x\to 2}\frac{\sin(x-2)}{x^2-2x}$. $\frac{1}{2}$ 1 -1 0 does not exist.

Suppose f has a derivative at c and $f'(c) < 0$. Which of the following statements is true? f can not have either a local maximum or local minimum at c. f must have a local maximum at c. f must have a local minimum at c. c must be a critical point of f.

Find the equation of the line tangent to the curve $xy + x^2y^2 = 2$ at $(1,1)$ $y = -x + 2$ $y = -x - 2$ $y = x + 1$ $y = 2$ $y = x + 2$

Suppose

$$f(x) = \begin{cases} \sin x & \text{if } x \le 0 \\ \tan x & \text{if } 0 < x < \pi/2 \\ \cos x & \text{if } x \ge \pi/2 \end{cases}$$

Where is f continuous? Everywhere but $x = \pi/2$ Everywhere but $x = 0$ Everywhere but $x = 0$ and $x = \pi/2$ Everywhere Nowhere

If a ball is thrown upward with an initial velocity of $40\,ft/sec$ from the top of a 30 foot building, its height after t seconds is given by the formula

$$h = -16t^2 + 40t + 30\,.$$

How many seconds after it is thrown does it stop moving upwards and start moving downwards? 5/4 3/5 6/5 3/2 7/8

Which of the following statements is true for a function $f(x) = x^3$? it has a critical point at $x = 0$ but neither a local maximum nor local minimum there it has no critical point it has a critical point, local maximum and local minimumat $x = 0$ it has a local maximum and local minimum at $x = 0$ but not a critical point there it has a critical point at $x = 0$ and a local maximum at $x = 0$ but not a local minimum there

Which statement is true? If $f'(r)$ exists, then $\lim_{x\to r} f(x) = f(r)$ $D(\sec x) = D(\tan^2 x)$ If $f'(x) > 0$ for all x in (a,b), then f is decreasing on $[a,b]$. $\frac{d^2y}{dx^2} = \left(\frac{dy}{dx}\right)^2$ If f has an absolute minimum value at c, then $f'(c) = 0$

Suppose that $h(x) = f(x)g(x)$ and $F(x) = (f \circ g)(x)$ where $f(1) = 2, f'(1) = -1, f'(0) = 3, g(1) = 0$ and $g'(1) = 1$. Find $h'(1)$ and $F'(1)$. 2 and 3 -1 and 3 -1 and 0 2 and 0 0 and -2

Suppose f is a differentiable function such that $f(g(x)) = x$ and $f'(x) = 2 + f(x)$. What is $g''(x)$? $\frac{-1}{(x+2)^2}$ $\frac{-1}{(x+2)}$ $\frac{1}{(x+2)^2}$ $\frac{1}{(x+2)}$ $-x$

Partial Credit Find the local, absolute maximum and absolute minimum values of $f(x) = x - \sqrt{2}\sin x$ on $[0,\pi]$.

Partial Credit Determine whether the following statement is true or false and state the reason of your determination.

If $f'(c) = 0$, then f has a local maximum or minimum at c.

That's all folks!