Brief Article

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Math 119: Calculus Name:_____ **Exam I** Tutorial

Instructor:_____ *September 29, 1994* Tutorial

Section:_____

Calculators are not allowed. Hand in this answer page only. Record your answers to the multiple choice problems by placing an $\times$ through one letter for each problem on this answer sheet. There are 19 multiple choice questions, worth 5 points each. An additional 5 points will be given for your correct tutorial section number.

You are taking this exam under the honor code.

Find $\dfrac{d}{dx}\left(\dfrac{x^5+1}{x^5-1}\right)$ $\dfrac{-10x^4}{(x^5-1)^2}$ $\dfrac{10x^4}{(x^5-1)^2}$ 1 $\dfrac{10x^9}{(x^5-1)^2}$ 0

Let $f(x) = 6\sqrt{x} - x + 1$. Find $f'(9)$. $f'(9) = 0$ $f'(9)$ is undefined $f'(9) = 1$ $f'(9) = 3$ $f'(9) = 10$

Consider the curve $y = x^3 - 3x$. Find the x-coordinate(s) of the point(s) where the tangent line to this curve is parallel to the x-axis. $x = 1$ and $x = -1$ only $x = 1$ the tangent line is never parallel to the x-axis $x = 3$ and $x = -3$ $x = 0$, $x = \sqrt{3}$ and $x = -\sqrt{3}$

Let $f(x) = \sqrt{-x}$. Find the natural domain of $f(x)$. $(-\infty, 0]$ $(-\infty, 0)$ $[0, \infty)$ $(0, \infty)$ $f(x)$ is not defined for any value of x

Find $\lim\limits_{x\to 1} \dfrac{x-1}{\sqrt{4x-3}-1}$ $\dfrac{1}{2}$ undefined 2 $\dfrac{1}{4}$ 0

Which of the following is equal to $\sin(x - \dfrac{\pi}{6})$ for all x? $\dfrac{\sqrt{3}}{2}\sin x - \dfrac{1}{2}\cos x$ $\dfrac{\sqrt{3}}{2}\sin x + \dfrac{1}{2}\cos x$ $\dfrac{1}{2}\sin x - \dfrac{\sqrt{3}}{2}\cos x$ $-\dfrac{\sqrt{3}}{2}\sin x + \dfrac{1}{2}\cos x$ $\dfrac{1}{2}\sin x + \dfrac{\sqrt{3}}{2}\cos x$

Find $\lim\limits_{x\to 1} \dfrac{x^2-1}{x-1}$ 2 0 -1 1 -2

Let $f(x)$ be a function with $f(1) = 3$ and $f'(1) = 4$. Let $y = x^2 f(x)$. Find $\left.\dfrac{dy}{dx}\right|_{x=1}$ 10 7 12 8 6

Which of the following limits represents the slope of the graph of $y = \dfrac{x-1}{x+1}$ at $x = 1$? $\lim\limits_{h\to 0} \dfrac{1}{h}\left[\dfrac{h}{2+h} - 0\right]$ $\lim\limits_{h\to 0} 0$ $\lim\limits_{h\to 0} \dfrac{1}{h}\left[\dfrac{2+h}{h} - 0\right]$ $\lim\limits_{h\to 0} \dfrac{1}{h}\left[\dfrac{h-1}{h+1} - 0\right]$ $\lim\limits_{h\to 0} \dfrac{1}{h}\left[\dfrac{1-h}{h} - 0\right]$

Suppose $f(x)$ and $g(x)$ are two functions with

$$\lim_{x\to 0} f(x) = 2 \quad \text{and} \quad \lim_{x\to 0} g(x) = 3.$$

Find $\lim\limits_{x\to 0} \dfrac{f(x)+4}{f(x)g(x)}$ 1 $\dfrac{1}{6}$ $\dfrac{2}{3}$ $\dfrac{3}{2}$ the limit does not necessarily exist

Find $\lim\limits_{\theta\to 0} \dfrac{\theta}{\sin 3\theta}$, if it exists. $\dfrac{1}{3}$ 3 1 0 does not exist

Find $\lim\limits_{\theta\to \pi} \dfrac{\theta}{\sin 3\theta}$, if it exists. does not exist $\frac{1}{3}$ π $-\pi$ 0

If $\tan\theta = \frac{3}{4}$ and $0 \le \theta \le \frac{\pi}{2}$, find $\cos 2\theta$. $\dfrac{7}{25}$ $\dfrac{3}{5}$ $\dfrac{16}{25}$ $\dfrac{12}{25}$ $\dfrac{3\pi}{8}$

Find the center of the circle determined by the equation

$$x^2 + y^2 + 6x - 4y - 1 = 0$$

$(-3, 2)$ $(3, 2)$ $(3, -2)$ $(-3, -2)$ $(0, 0)$

Let

$$f(x) = \begin{cases} x+1, & \text{if } x < 1; \\ 3, & \text{if } x = 1; \\ 3x-1, & \text{if } x > 1. \end{cases}$$

Which of the following statements is/are true?

I. $f(x)$ is continuous at $x = 1$.

II. $\lim\limits_{h\to 0} f(1+h)$ exists

III. $\lim\limits_{h\to 0} \dfrac{f(1+h) - f(1)}{h}$ exists. II. but not I. or III. all three are true none of the three is true I. and II. but not III. I. but not II. or III.

An object is thrown upward from the top of a platform. Its height (in feet) at the end of t seconds is given by the function

$$f(t) = -16t^2 + 20t + 10.$$

Find the average velocity of the object for the time interval starting at the instant that it is thrown and ending at time $t = 2$. -12 feet/second -7 feet/second -14 feet/second -24 feet/second -44 feet/second

An object is thrown upward from the top of a platform. Its height (in feet) at the end of t seconds is given by the function

$$f(t) = -16t^2 + 20t + 10.$$

Find the instantaneous velocity of the object at time $t = 2$. -44 feet/second -32 feet/second -10 feet/second -14 feet/second -64 feet/second

Let $y = x^2 + 1$. Find the equation of the tangent line to this curve at the point $(2, 5)$. $y = 4x - 3$ $y = 2x + 1$ $y = 5x - 10$ $y = 5x - 5$ $y = 4x + 5$

Let $f(x) = x^{\frac{3}{2}}(x - 2)$. Find $f'(x)$. $x^{\frac{3}{2}} + \frac{3}{2}x^{\frac{1}{2}}(x - 2)$ $x^{\frac{3}{2}} - \frac{3}{2}x^{\frac{1}{2}}(x - 2)$ $-2x^{\frac{3}{2}} + \frac{3}{2}x^{\frac{1}{2}}(x - 2)$ $-2x^{\frac{3}{2}} - \frac{3}{2}x^{\frac{1}{2}}(x - 2)$ $\frac{3}{2}x^{\frac{1}{2}}$