MIDTERM EXAMINATION

Spring 2010

MTH101- Calculus And Analytical Geometry

Time: 60 min
Marks: 40

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Question No: 1 (Marks: 1) - Please choose one

30^0 = _____

- $\frac{\pi}{3}$
- $\frac{\pi}{4}$
- $\frac{\pi}{6}$
- $\frac{\pi}{2}$

Question No: 2 (Marks: 1) - Please choose one

Let a function f be defined on an interval, and let x_1 and x_2 denotes two distinct points in that interval. If $f(x_1) = f(x_2)$ for all points x_1 and x_2 then which of the following statement is correct?

- f is a decreasing function
- f is an increasing function
- f is a constant function

Question No: 3 (Marks: 1) - Please choose one

Tan(x) is continuous every where except at points

- $\pm \frac{k\pi}{2} (k = 1,3,5,...)$
- $\pm \frac{k\pi}{2} (k = 2,4,6,...)$
- $\pm \frac{k\pi}{2} (k = 1,2,3,4,5,6,...)$
-

Question No: 4 (Marks: 1) - Please choose one

$\lim_{x \to \infty} (-2x) =$

- -2
- 0
- 2
- Does not exist

Question No: 5 (Marks: 1) - Please choose one

Suppose that f and g are differentiable functions of x then

$\frac{d}{dx}[f][g] =$

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$\frac{[f'][g]-[f][g']}{g^2}$

$[f'][g']$

$[f'][g]+[f][g']$

$[f'][g]-[f][g']$

Question No: 6 (Marks: 1) - Please choose one

The solution set of the inequality $|x+4| \geq 2$ is

$(-\infty,-6]U[2,+\infty)$

None of these

$(-\infty,6]U[-2,+\infty)$

$(-\infty,-6]\ U\ [-2,+\infty)$

Question No: 7 (Marks: 1) - Please choose one

A line is called a tangent line to the circle if it meets the circle at precisely ……..

One point

Two points

Infinite points

Question No: 8 (Marks: 1) - Please choose one

Let a function f be defined on an interval, and let x_1 and x_2 denote points in that interval. If $f(x_1) < f(x_2)$ whenever $x_1 < x_2$ then which of the following statement is correct?

f is an increasing function.

f is a decreasing function.

f is a constant function.

Question No: 9 (Marks: 1) - Please choose one

If $f(x) = 3x^8 + 2x + 1$ then $f'(x) =$ _____ ___

$3x^7 + 2$

$24x^7 + 2$

$3x^9 + 2x^2$

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- $24x^9 + 2x^2$

Question No: 10 (Marks: 1) - Please choose one

π is a.....number

- Integer
- Rational
- Irrational
- Natural

Question No: 11 (Marks: 1) - Please choose one

The set $\{x : a \le x \le b\}$ can be written in the form of interval

- (a,b)
- (a,b]
- [a,b]

Question No: 12 (Marks: 1) - Please choose one

Suppose that f and g are differentiable functions of x then

$\frac{d}{dx}\left[\frac{f}{g}\right] =$

- $\frac{[g][f'] - [f][g']}{g^2}$
- $\frac{[g'][f] - [f'][g]}{g^2}$
- $\frac{[g][f'] - [f][g']}{f^2}$
- $\frac{[g'][f] - [f'][g]}{f^2}$

Question No: 13 (Marks: 1) - Please choose one

The graph $x = y^2$ is symmetric about--------- axis

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- X-axis
- Y-axis
- Origin
-

Question No: 14 (Marks: 1) - Please choose one

$$\lim_{x \to -7} \frac{x^2 - 49}{x + 7}$$

- -14
- 0
- ∞
- Limit does not exis
-

Question No: 15 (Marks: 1) - Please choose one

Chain rule is a rule for differentiating_____of functions.

- Product
- Sum
- Difference
- Composition
-

Question No: 16 (Marks: 1) - Please choose one

$\lim_{x \to a} f(x) = ...where\ f(x) = k$

The (k is a constant)

- k+2
- k+1
- k
-

Question No: 17 (Marks: 1) - Please choose one

For any number $\varepsilon > 0$ if we can find an open interval (x_0, x_1) on the x-axis containing the point "a" such that $L - \varepsilon < f(x) < L + \varepsilon$ for each x in (x_0, x_1) except the possible x = a

then we say $\lim_{x \to a} f(x) =$ ---------

▶ *L*

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- $L - \varepsilon$
- $L + \varepsilon$
- $L + 1$
-

Question No: 18 (Marks: 1) - Please choose one

If $2x - y = -3$ then $\frac{dy}{dx} =$

- 2
- -2
- 0
- -3
-

Question No: 19 (Marks: 1) - Please choose one

The graph of the equation $y = x^2 - 4x + 5$ will represent

- Parabola
- Straight line
- Two straight lines
-
- Ellipse
-

Question No: 20 (Marks: 1) - Please choose one

The equation of line of the form $y - y_1 = m(x - x_1)$ is known as

- Point-slope form
- Two points form
- Intercepts form
- Slope intercept form
-

Question No: 21 (Marks: 2)

If $y = 5\cos\left(x^2 + 1\right)$ Find dy/dx by using "The chain rule".

Question No: 22 (Marks: 2)

Prove that $\lim_{x \to 1}\left(x + 5\right) = 6$, using the definition of limit.

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Question No: 23 (Marks: 3)

Find an equation of the tangent line to the curve

$$y = \frac{2}{x^2 + x}$$

at the point where $x = 1$

Question No: 24 (Marks: 3)

Compute $\lim_{x \to 0} \frac{\sin(5x)}{3x}$

Question No: 25 (Marks: 5)

Find all critical points of $f(x) = x^4 - 4x^3 + 4x^2$

Question No: 26 (Marks: 5)

Find $\frac{dy}{dx}$ if $y = x^2(\cot x) - \frac{1}{x^2}$

Best link for solved papers

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