

MIDTERM EXAMINATION

Spring 2010

MTH101- Calculus And Analytical Geometry

<http://groups.google.com/group/vuZs>

Time: 60 min

Marks: 40

Calculus And Analytical Geometry – I

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

$30^0 = \underline{\hspace{2cm}}$

$\pi$

3



$\pi$

4



$\pi$

6



$\pi$

2



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

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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

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

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

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

- ▶ -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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- ▶  $[f'] [g] - [f] [g']$
- ▶  $[f'] [g']^{g^2}$
- ▶  $[f'] [g] + [f] [g']$
- ▶  $[f'] [g] - [f] [g']$

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

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

- ▶  $(-\infty, -6] \cup [2, +\infty)$
- ▶ **None of these**
- ▶  $(-\infty, 6] \cup [-2, +\infty)$
- ▶  $(-\infty, -6] \cup [-2, +\infty)$

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  $\frac{d}{dx} (3x^9 + 2x^2)$

- ▶  $3x^7 + 2$
- ▶  **$24x^7 + 2$**

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$$f'(x) = \text{—————} \text{ —}$$

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Question No: 10 ( Marks: 1 ) - Please choose one  
 $24x^9 + 2x^2$   
 $\pi$  is a.....number

- ▶ Integer
- ▶ Rational
- ▶ **Irrational**
- ▶ Natural

Question No: 11 ( Marks: 1 ) - Please choose one  
 $\{x : a \leq x \leq b\}$   
The set can be written in the form of interval

- ▶ (a,b)
- ▶ (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  
 $x = y^2$   
The graph is symmetric about----- axis

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- ▶ X-axis
- ▶ Y-axis
- ▶ Origin

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

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

- ▶ -14
- ▶ 0
- ▶  $\infty$
- ▶ Limit does not exist

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

$$\lim_{x \rightarrow a} f(x) = \dots \text{where } f(x) = k$$

The \_\_\_\_\_ (k is a constant)

- ▶ k+2
- ▶ k+1
- ▶ k

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

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

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

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- ▶  $L - \epsilon$
- ▶  $L + \epsilon$
- ▶  $L + 1$
- ▶

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

Question No: 22 ( Marks: 2 )

$\lim_{x \rightarrow 1} (x + 5) = 6$   
 Prove that , 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 )

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

Compute

Question No: 25 ( Marks: 5 )

$$f(x) = x^4 - 4x^3 + 4x^2$$

Find all critical points of

Question No: 26 ( Marks: 5 )

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

Find if

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