

## MIDTERM EXAMINATION

Spring 2009

MTH101- Calculus And Analytical Geometry (Session - 2)

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

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The set of rational number is a subset of

- ▶ Odd integers
- ▶ Real number
- ▶ Integers
- ▶ Natural numbers

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

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If  $n-5$  is an even integer, what is the next larger consecutive even integer?

- ▶  $n-2$
- ▶  $n-4$
- ▶  $n-7$
- ▶  $n-3$

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

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$(a - \delta, a) \cup (a, a + \delta)$  Can also be written as

- ▶  $0 < |x - a| < \delta$

▶  $0 > |x - a| > \delta$

▶  $0 > |x - a| > \delta + 1$

▶ None of these

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

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$$\lim_{x \rightarrow 0} \frac{\sin x}{x}$$

Equals to

▶ 1

▶ 2

▶ 3

▶ 0

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

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$$\frac{d}{dx} [\cos ec x] = \text{-----}$$

▶ None of these

▶  $\frac{-\cos x}{1 - \cos^2 x}$

▶

▶  $\frac{\cos x}{1 - \cos^2 x}$

▶

$$\frac{1}{1 - \cos^2 x}$$



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

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$$\frac{d}{dx}[\sec x] = \text{-----}$$

$$\frac{\sin x}{1 - \sin^2 x}$$



$$\frac{-\sin x}{1 - \sin^2 x}$$



$$\frac{1}{1 - \sin^2 x}$$



▶ None of these

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

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If  $g$  is differentiable at a point  $x$  and  $f$  is differentiable at a point  $g(x)$ , then the -----  
----- is differentiable at point  $x$ .

▶ Composition  $f(g(x))$

▶ Product  $f(g(x))$

▶ Composition  $f(g(x+f))$

▶ None of these

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

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

- ▶  $f'(g(x)).g'(x)$
- ▶  $f'(g(x)) + g'(x)$
- ▶  $f'(g(x)).f'(x)$
- ▶ None of these

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

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The base of the natural logarithm is

- ▶ 2.71
- ▶ 10
- ▶ 5
- ▶ None of these

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

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

- ▶ (a,b)
- ▶ [a,b]
- ▶ (a,b]

- ▶ None of these

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

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The set of all points in the coordinate plane which are at a fixed distance away from a given fixed point represents

- ▶ Parabola
- ▶ Straight line
- ▶ Circle
- ▶ None of these

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

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For a graph to be symmetric about x-axis means, for each point (x,y) on the graph, the point ----- is also on the graph

- ▶ (x,-y)
- ▶ (-x,y)
- ▶ (-x,-y)
- ▶ None of these

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

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

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

- Intercepts form

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

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Polynomials are always ..... Function

- Continuous
- Discontinuous

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

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$$\frac{D}{Dx}[dh(x)] = \text{----}$$

where  $d$  is a constant

- $dh(x)$
- $dh'(x)$
- 0
- None of these

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

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

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

- None of these

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

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The centre and the radius of the circle  $(x+5)^2 + (y-3)^2 = 16$  is

- (-5,3) ,4
- (5,-3),16
- (5,-3),4
- None of these

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

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Natural domain of  $\frac{(x^2 - 4)}{(x - 2)}$  is

- $(-\infty, 2) \cup (2, +\infty)$
- $(-\infty, 2)$
- $(-\infty, 0)$
- None of these

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

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If  $y = f(z)$  then  $f'$  is the function whose value at z is the .....  
Rate of change of y with respect z at a point z

- ▶ Instantaneous
- ▶ Random
- ▶ Average
- ▶ None of these

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

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Suppose that  $f$  and  $g$  are differentiable function of  $x$  then  $\frac{d}{dx}\left(\frac{f}{g}\right)$

- ▶  $\frac{g \cdot f' - f \cdot g'}{g^2}$
- ▶  $\frac{g \cdot f' + f \cdot g'}{g^2}$
- ▶  $\frac{g \cdot f' - f \cdot g'}{g}$
- ▶ None of these

**Question No: 21 ( Marks: 2 )**

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Find  $\frac{dy}{dt}$  if  $y = \left(\frac{2t+4}{3t-1}\right)^3$  using the chain rule.

**Question No: 22 ( Marks: 3 )**

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What is the concavity of the function  $f(t) = -2(t-1)(t-2) + 3t^2$  ? Show it from the



graph.

**Question No: 23 ( Marks: 5 )**

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A particle, initially at (7, 5), moves along a line of slope  $m = -2$  to a new position (x, y)

Find the value of y if  $x = 9$

**Question No: 24 ( Marks: 10 )**

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Differentiate w.r.t. x by chain rule  $y = \sqrt{x + \sqrt{x}}$