

MIDTERM EXAMINATION

Spring 2009

MTH101- Calculus And Analytical Geometry (Session - 2)

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

$$h(x) = \frac{1}{(x-2)(x-4)}$$

The domain of the function is

- ▶ $(-\infty, 2) \cup (2, 4) \cup (4, +\infty)$
- ▶ $(-\infty, 2] \cup \{2, 4\} \cup \{4, \infty)$
- ▶ $(-\infty, 2.5) \cup (2.5, 4.5) \cup (4.5, \infty)$
- ▶ All of these are incorrect

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

The graph of $y=4$ is parallel to

- ▶ X-axis
- ▶ Y-axis
- ▶ Both of these
- ▶ None of these

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

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

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

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

π is called

- ▶ An integer
- ▶ A rational number
- ▶ An irrational number
- ▶ A natural number

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

If x and y are both odd integers, which of the following must also be an odd integer?

- ▶ $x+y$
- ▶ $x \cdot y$
- ▶ x/y
- ▶ $x-y$

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

If the $\lim_{x \rightarrow a} f(x) = L$ then the inequality $(L - \varepsilon) < f(x) < L + \varepsilon$ holds in any subset of the interval

► $(a - \delta, a) \cup (a, a + \delta)$

► $(a - 1, a) \cup (a, a + 1)$

► $(a - \varepsilon, a) \cup (a, a + \varepsilon)$

► None of these

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

If the functions f and g are continuous at c then ,which of the following must be continuous

► $f+g$

► $f-g$

► $f.g$

► All of these

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

$\tan(x)$ is continuous every where except at points

► $\pm \frac{k\pi}{2} (k = 1, 3, 5, \dots)$

$$\pm \frac{k\pi}{2} (k = 2, 4, 6, \dots)$$



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



▶ None of these

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

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

▶ $f'(g(x)).g'(x)$

▶ $f'(g(x)) + g'(x)$

▶ $f'(g(x)).f'(x)$

▶ None of these

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

Let f be a function on an interval, and x_1 and x_2 denote the points in that interval, if $f(x_1) = f(x_2)$ for all x_1 and x_2 then we can say that function is a

▶ Constant function

▶ None of these

▶ increasing function

▶ Decreasing function

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

If $f''(x) > 0$ on an open interval (a,b) then f is ----- on (a,b)

- ▶ Concave up
- ▶ Concave down
- ▶ Closed
- ▶ None of these

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

Let L_1 and L_2 be non vertical lines with slopes m_1 and m_2 , respectively Both the lines are parallel if and only if

- ▶ $m_1 = m_2$
- ▶ $m_1 \neq m_2$
- ▶ $m_1 = \frac{1}{m_2}$
- ▶
- ▶ None of these

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

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: 14 (Marks: 1) - Please choose one

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: 15 (Marks: 1) - Please choose one

A differentiable function must be differentiable on the interval

- ▶ $(-\infty, \infty)$
- ▶ (a, ∞) where a is any negative integer
- ▶ $(0, \infty)$
- ▶ None of these

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

For a graph to be symmetric about y-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: 17 (Marks: 1) - Please choose one

If the functions $f(x)$ and $g(x)$ are continuous at a point c then which of the following will not continuous

- ▶ $-f+g$
- ▶ $-f-g$
- ▶ $-f.g$
- ▶ f^g

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

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

where d is a constant

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

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

$$\frac{(x^2 - 4)}{(x - 2)}$$

Natural domain of _____ is

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

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

$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

The formula _____ is called with respect to x of the function f

- ▶ Derivative
- ▶ Slope
- ▶ Tangent
- ▶ None of these

Question No: 21 (Marks: 2)

$$y = f(x) = x^2 \quad \text{at} \quad x = 2$$

Find the tangent line to the graph of

Question No: 22 (Marks: 3)

Let $f(x) = \sqrt{x+1}$ and $g(x) = x+3$. State the domain of f/g .

Question No: 23 (Marks: 5)

By means of slopes, Show that the points lie on the same line
(4, -5) ; (7, 5) ; (10, 15)

Question No: 24 (Marks: 10)

The derivative of a continuous function is given .Find all critical points and determine whether a relative maximum, relative minimum or neither occur there

$$f'(x) = 2\sin^3 x - \sin^2 x \quad ; \quad 0 < x < 2\pi$$