

**MIDTERM EXAMINATION
MTH101- Calculus And Analytical Geometry**

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

Consider two function $f(x) = x^2$ and $g(x) = \sqrt{x}$ then $f \circ g(x) =$

- ▶ x
- ▶ x^2
- ▶ \sqrt{x}
- ▶ None of these

Question No: 2 (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: 3 (Marks: 1) - Please choose one

The solution of the inequality $|x - 3| < 3$ is

- ▶ $(-1, 7)$
- ▶ $(1, 7)$
- ▶ $(1, -7)$
- ▶ None of these

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

If a quantity y depends on another quantity x in such a way that each value of x determines exactly one value of y , we say that y is of x

- ▶ relation
- ▶ none of these
- ▶ function

- ▶ not function

Question No: 5 (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: 6 (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 perpendicular if and only if

- ▶ $m_1(-m_2) = 1$
- ▶ $m_1 m_2 = -1$
- ▶ $m_1 = -\frac{1}{m_2}$
- ▶ All of these

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

The equation $(x+4)^2 + (y-1)^2 = 6$ represents a circle having center at and radius

- ▶ $(-4,1),\sqrt{6}$
- ▶ $(-4,1),6$
- ▶ $(-4,-1),\sqrt{6}$
- ▶ None of these

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

The base of the natural logarithm is

- ▶ 2.71
- ▶ 10
- ▶ 5

- ▶ 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

$$\frac{dy}{dx} =$$

If $y=f(g(h(x)))$ and $u=g(h(x))$ and $v=h(x)$ then

- ▶ $\frac{dy}{du} \cdot \frac{du}{dv} \cdot \frac{dv}{dx}$
- ▶ $\frac{dy}{du} + \frac{du}{dv} + \frac{dv}{dx}$
- ▶ $\frac{dy}{dx} \cdot \frac{du}{dv} \cdot \frac{dv}{du}$
- ▶ None of these

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

The $\tan(x)$ is discontinuous at the points where

- ▶ $\cos(x)=0$
- ▶ $\sin(x)=0$
- ▶ $\tan(x)=0$
- ▶ None of these

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

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

Equals to

- ▶ 1
- ▶ 2
- ▶ 3
- ▶ 0

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

Both Sin(x) and Cos(x) have the same limit and function value at x=0 so both are at x=0

- ▶ Continuous
- ▶ Discontinuous
- ▶ Linear
- ▶ None of these

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

For a function f(x) to be continuous on interval (a,b) the function must be continuous

- ▶ At all point in (a,b)
- ▶ Only at a and b
- ▶ At mid point of a and b
- ▶ None of these

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

π is called

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

Question No: 16 (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: 17 (Marks: 2)

$$f(x) = \frac{1}{(x-1)}$$

Let . Find the average rate of change of f over the interval $[3, 5]$.

Question No: 18 (Marks: 2)

Solve this quadratic equation: $ax^2 + bx = 0$

Question No: 19 (Marks: 3)

Find $\frac{dy}{dx}$ if $x^3 + y^3 = 4$

Question No: 20 (Marks: 5)

Find an equation of the line through A (-6, 5) having slope 7.

Question No: 21 (Marks: 10)

Show that the points A(0,2) ; B($\sqrt{3}, -1$) ; C(0,-2) are vertices of right triangle.