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

If f is a twice differentiable function at a stationary point x_0 and $f''(x_0) < 0$ then f has relative ..... At x_0

- ► Minima
- ► **Maxima**
- ► None of these

Note:Maxima(If Maxima refers to local maximum)

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

A line $x = x_0$ is called ---------- for the graph of a function f if $f(x) \to +\infty \text{ or } f(x) \to -\infty$ as x approaches x_0 from the right or from the left

- ► Horizontal asymptotes
- ► None of these
- ► **Vertical asymptotes**

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

A line $y = y_0$ is called a ..... for the graph f if

$$\lim_{x \to +\infty} f(x) = y_0 \quad or \quad \lim_{x \to -\infty} f(x) = y_0$$

- Vertical asymptotes
- Horizontal asymptotes
- None of these

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

According to Power-Rule of differentiation, if $f(x) = x^n$ where n is a real number, then

$\frac{d}{dx}[x^n] =$

- x^{n-1}
- $n\,x^{n-1}$
- $n\,x^{n+1}$
- $(n-1)x^{n+1}$

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

If $y = \frac{1}{1-x}$ then $\frac{dy}{dx} =$

- 1
- -1
- $\frac{1}{(1-x)^2}$
- $\frac{-1}{(1-x)^2}$

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

If

$xy = 4$ then $\frac{dy}{dx} =$

- 0
- $\frac{-1}{x^2}$
- $\frac{4}{x^2}$
- $\frac{-4}{x^2}$

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

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

- 2
- -2
- 0
- -3

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

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

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

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

▶

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

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

30^0 = _____

$\frac{\pi}{3}$

▶

$\frac{\pi}{4}$

▶

$\frac{\pi}{6}$

$\frac{\pi}{2}$

▶

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

Consider a function $h(x)$ and a constant c then

$\frac{d}{dx}((c)\{h(x)\})$ = _____

▶ 0

- $\frac{d}{dx}(h(x))$
- $\frac{d}{dx}(h(cx))$
- $c\frac{d}{dx}(h(x))$

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

$\frac{d}{dx}[\text{cosec } x] =$ _____

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

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

Chain rule is a rule for differentiating_____of functions.

- **Product**
- Sum
- Difference

► Composition

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

The power rule, $\frac{d}{dx}[x^n] = nx^{n-1}$ holds if n is _____

► An integer

► A rational number
► An irrational number
► All of the above

Question No: 14 (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: 15 (Marks: 1) - Please choose one

If $f''(x) > 0$ on an open interval (a,b), then which of the following statement is correct?

► f is concave up on (a, b).
► f is concave down on (a, b).
► f is linear on (a, b).

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

If $f''(x) < 0$ on an open interval (a,b) then which of the following statement is correct?

- f is concave up on (a, b).
- **f is concave down on (a, b)**
- f is linear on (a, b).

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

If $x > 0$ then $\frac{d}{dx}[\ln x] =$ _____

- 1
- x
- $\frac{1}{x}$
- $\ln \frac{1}{x}$

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

If $b > 0$ then $\frac{d}{dx}[b^x] =$ _____

- 0
- xb^{x-1}
- $\ln b$
- $b^x \ln b$

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

Let $y=(x^3+2x)^{37}$. Which of the following is correct?

- $\frac{dy}{dx}=(37)(x^3+2x)^{36}$
- $\frac{dy}{dx}=111x^2(x^3+2x)^{36}$
- $\frac{dy}{dx}=(111x^2+74)(x^3+2x)^{36}$
- $\frac{dy}{dx}=(111x^2+74)(x^3+2x)^{38}$

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

What is the base of natural logarithm?

- 2.71
- 10
- 5
- Any real number

Question No: 21 (Marks: 1) - Please choose one

Let x_0 be critical points of the function f. Those critical points for which $f'(x_0) = 0$ are called_____of f

- Local points
- End points
- **Stationary points**

Question No: 22 (Marks: 1) - Please choose one

$\log_b a^r =$ _____

- $a\log_b r$
- $r\log_b a$
- $\dfrac{\log_b a}{\log_b r}$
-
- $\log_b a + \log_b r$

Question No: 23 (Marks: 1) - Please choose one

$\log_b \dfrac{1}{c} =$ _____

- $\log_b c$

- $1-\log_b c$
- $-\log_b c$
- $1+\log_b c$

Question No: 24 (Marks: 1) - Please choose one

$\log_b \frac{1}{t} =$ _____

- $\log_b t$
- $1-\log_b t$
- $1+\log_b t$
- $-\log_b t$

Question No: 25 (Marks: 3)

If $f(x) = x^4 - 8x^2$, determine all relative extrema for the function. Using First Derivative Test.

Solution:

$f = x^4 - 8x^2$

$f` = 4x^3 - 16x^1$

$f` = 0$

$4x^3 - 16x = 0$

$x(4x^2 - 16) = 0$

$x = 0$

$4x^2 - 16 = 0$

$x^2 = \frac{16}{4}$

$x^2 = 4$

$x = \pm 2$

Re*lactive* extreama $(0, \pm 2)$....*Ans*

Question No: 26 (Marks: 5)

Differentiate $y = x^{-2}(4 + 3x^{-3})$

Solution:

$y = 4x^{-2} + 3x^{-3}.x^{-2}$

$= 4x^{-2} + 3x^{-5}$

$\frac{dy}{dx} = 4\frac{d}{dx}(x^{-2}) + 3\frac{d}{dx}(x^{-5})$

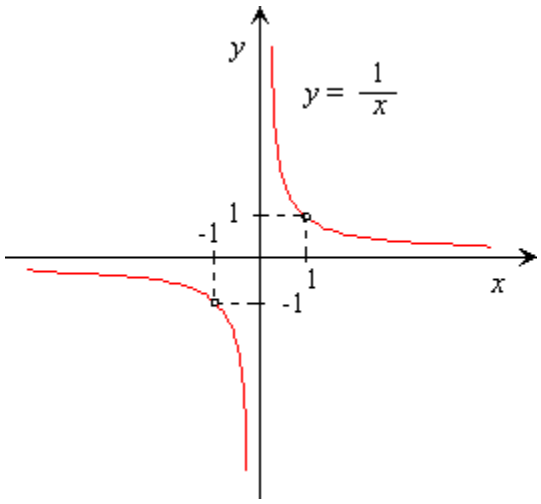
$= 4(-2)x^{-2-1} + 3\frac{d}{dx} - 5x^{-5-1}$

$= -8x^{-3} + (-15x^{-6})$

$\frac{dy}{dx} = -8x^{-3} - 15x^{-6}\cdots\cdots$ Ans

Question No: 27 (Marks: 10)

Determine the intervals in which the graph of the function $f(x) = \frac{1}{x}$ is concave upward or downward.



Solution:

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

$$f`(x) = -\frac{1}{x^2}$$

X	1	2	3	4

F(x)	-1	-0.25	-0.11	-0.625

Conclusion:

$f'(x)$ is increasing when x is from $(0,\infty)$

so,

It is concave up.

$f'(x)$ is decreasing when x is from $(-\infty,0)$

so,

It is concave down

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Created BY Farhan & Ali
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Hackers Group
Mandi Bahauddin
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MIDTERM EXAMINATION

Fall 2008

MTH101- Calculus And Analytical Geometry

Time: 60 min

Marks: 38

For Teacher's Use Only

Q No.	1	2	3	4	5	6	7	8	Total
Marks									
Q No.	9	10	11	12	13	14	15	16	
Marks									
Q No.	17	18	19	20	21				
Marks									

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

The average velocity of a body is V_{ave}

- $\frac{d_1 - d_0}{t_1 - t_0}$
- $\frac{t_1 - t_0}{f(t_0) - f(t_1)}$
- $\lim_{t_1 \to t_0} \frac{f(t_0) - f(t_1)}{t - t}$

  1 0
- None of these

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

Consider two functions $f(x) = x^3 and g(x) = (x+9)$ then $fog(x) =$

- $(x+9)^3$
- $x+3$
- $x+9$
- None of these

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

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

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

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

Consider two functions $f(x) = 3\sqrt{x} and g(x) = \sqrt{x}$ what is true about these functions

- $f(x).g(x) = 3x$
- $\frac{f(x)}{g(x)} = 3x$
-
- $f(g(x)) = 3x$
- None of these -correct

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

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: 6 (Marks: 1) - Please choose one

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

► X-axis
► Y-axis
► Origin
► None of these

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

The chain rule is used for two function f and g, if we have ---------- of these functions

► Product
► Sum
► Composition
► None of these

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

A function f is differentiable function if it is differentiable on the interval

► $(-\infty, \infty)$

- (a,∞) *where a is any negative* int *eger*
- $(0,\infty)$
- None of these

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

A function is said to be continuous function if the function is continuous on the interval

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

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

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

- 1
- 2
- 0
- 1/2

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

For any polynomial $P(x)=c_0+c_1x+\ldots+c_nx^n$ and any real number a

$$\lim_{x\to a}P(x)=c_0+c_1a+\ldots+c_na^n=$$

- $P(a)$
- $P(a+1)$
- $P(a-1)$
- $\frac{1}{P(a)}$
-

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

The no of x and y intercepts for the equation y=1/x

- Two x intercepts
- Two y intercepts
- **No x and no y intercepts**
- None of these

Question No: 13 (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
- None of these

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

If f is a twice differentiable function at a stationary point x_0 and $f''(x_0) < 0$ then f has relative ..... At x_0

- Minima
- **Maxima**
- None of these

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

If the $\lim_{x \to a} f(x) = L$ 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: 16 (Marks: 1) - Please choose one

$\lim_{x \to 5} \frac{\sqrt{x+4}}{x^2+2} =$

- 0
- ∞
- **1/9**
- Limit doesn't exist

Question No: 17 (Marks: 2)

Show that $f(x) = x^2 - 3x + 1$ is a continuous function.

$\lim_{x \to +\infty} = (x^2 - 3x + 1) = +\infty$

And

$\lim = (x^2 - 3x + 1) = +\infty$

Question No: 18 (Marks: 2)

Find the range of function f defined by $f(x) = x^2 + 5$

Question No: 19 (Marks: 3)

Differentiate: $y = (\cos x)^{6x}$

Question No: 20 (Marks: 5)

Differentiate w.r.t. x by chain rule $y = \cos^2(x^3)$

MIDTERM EXAMINATION
Fall 2009
MTH101- Calculus And Analytical Geometry

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

If f is a twice differentiable function at a stationary point x_0 and $f''(x_0) > 0$ then f has relative ……. At x_0

► **Minima**

► Maxima

- None of these

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

If f is a twice differentiable function at a stationary point x_0 and $f''(x_0) < 0$ then f has relative ..... At x_0

- Minima
- **Maxima**
- None of these

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

A line $x = x_0$ is called ---------- for the graph of a function f if $f(x) \to +\infty \text{ or } f(x) \to -\infty$ as x approaches x_0 from the right or from the left

- Horizontal asymptotes
- None of these
- **Vertical asymptotes**

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

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

- $3x^7 + 2$

- $24x^7 + 2$
- $3x^9 + 2x^2$
- $24x^9 + 2x^2$

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

If $y = \frac{1}{1-x}$ then $\frac{dy}{dx} =$

- 1
- -1
- $\frac{1}{(1-x)^2}$
- $\frac{-1}{(1-x)^2}$

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

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

- 2
- -2
- 0
- -3

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

If $x^2 + y^2 = 9$ then $\frac{dy}{dx} =$

- $\frac{x}{y}$
- $\frac{-x}{y}$
- $\frac{-y}{x}$
- $\frac{y}{x}$

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

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

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

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

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

30^0 = _____

$\frac{\pi}{3}$

$\frac{\pi}{4}$

$\frac{\pi}{6}$

$\frac{\pi}{2}$

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

Suppose that f and g are differentiable functions of x then

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

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

Question No: 11 (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: 12 (Marks: 1) - Please choose one

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

► **Composition (f o g)**

► Quotient (f / g)

► Product (f . g)

► Sum (f + g)

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

Chain rule is a rule for differentiating_____of functions.

► Product

► Sum

► Difference

► **Composition**

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

The power rule, $\frac{d}{dx}[x^n] = nx^{n-1}$ holds if n is _____

► An integer

► A rational number

► An irrational number

► **All of the above**

Question No: 15 (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: 16 (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: 17 (Marks: 1) - Please choose one

If $f''(x) > 0$ on an open interval (a,b), then which of the following statement is correct?

- ► f **is concave up on (a, b)**
- ► f is concave down on (a, b).
- ► f is linear on (a, b).

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

If $x > 0$ then $\frac{d}{dx}[\ln x] =$ _____

- 1
- x
- $\frac{1}{x}$
- $\ln \frac{1}{x}$

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

Let $y = (x^3 + 2x)^{37}$. Which of the following is correct?

- $\frac{dy}{dx} = (37)(x^3 + 2x)^{36}$
- $\frac{dy}{dx} = 111x^2(x^3 + 2x)^{36}$
- $\frac{dy}{dx} = (111x^2 + 74)(x^3 + 2x)^{36}$
- $\frac{dy}{dx} = (111x^2 + 74)(x^3 + 2x)^{38}$

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

What is the base of natural logarithm?

- 2.71

▶ 10

▶ 5

▶ Any real number

Question No: 21 (Marks: 1) - Please choose one

If we have $x^2 + y^2 = 1$ then $\frac{dy}{dx} =$ _____

▶ $\frac{-x}{y}$

▶ $\frac{x}{y}$

▶ $\frac{-y}{x}$

▶ None of these

Question No: 22 (Marks: 1) - Please choose one

$\log_b a^r =$ _____

▶ $a\log_b r$

▶ $r\log_b a$

$\frac{\log_b a}{\log_b r}$

▶

▶ $\log_b a + \log_b r$

Question No: 23 (Marks: 1) - Please choose one

$\log_b \frac{1}{c} =$ _____

▶ $\log_b c$

▶ $1 - \log_b c$

▶ $-\log_b c$

▶ $1 + \log_b c$

Question No: 24 (Marks: 1) - Please choose one

$\log_b \frac{1}{t} =$ _____

▶ $\log_b t$

- $1-\log_b t$
- $1+\log_b t$
- $-\log_b t$

Question No: 25 (Marks: 3)

Differentiate: $y = x^{\sqrt{x}}\ e^{5x+6}$

Question No: 26 (Marks: 5)

Differentiate $y = (x^3 + 7x - 1)\ (5x + 2)$

Question No: 27 (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

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

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Created BY Farhan & Ali
BS (cs) 3rd sem
Hackers Group
Mandi Bahauddin
Remember us in your prayers

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MIDTERM EXAMINATION

Spring 2010

MTH101- Calculus And Analytical Geometry

Time: 60 min

Marks: 40

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

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

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

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

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

- $3x^7 + 2$
- $24x^7 + 2$
- $3x^9 + 2x^2$
- $24x^9 + 2x^2$

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 $\{x : a \leq x \leq b\}$ 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

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

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

Question No: 22 (Marks: 2)

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

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: 1 (Marks: 1) - Please choose one

The set {…,-4,-3,-2,-1,0,1,2,3,4,..} is know as set of ……..

- Natural numbers
- Integers

- Whole numbers
- None of these

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

If the $\lim_{x \to a} f(x) = L$ 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: 4 (Marks: 1) - Please choose one

$L - \varepsilon < f(x) < L + \varepsilon$ Can be written as

- $|f(x) - L| < \varepsilon$
- $|f(x) - L| > \varepsilon$
- $|f(x) - L| < \varepsilon + 1$
- None of these

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

If a function satisfies the conditions

f(c) is defined

$\lim_{x \to c^+} f(x)$

Exists

$\lim_{x \to c^+} f(x) = f(c)$

Then the function is said to be

- ► **Continuous at c**
- ► Continuous from left at c
- ► Continuous from right at c
- ► None of these

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

$\frac{d}{dx}[sex] = - - - - -$

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

► None of these

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

$\log_b ac = ------$

► $\log_b a + \log_b c$

► $\log_a b + \log_c b$

► $\log_{a+c} b$

► None of these

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

$\log_b a^r = ------$

► $a\log_b r$

► $r\log_b a$

► $b\log_a r$

► None of these

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

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

► None of these

- Concave up
- **Concave down**
- Closed

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

If f is a twice differentiable function at a stationary point x_0 and $f''(x_0) > 0$ then f has relative ..... At x_0

- **Minima**
- Maxima
- None of these

Question No: 11 (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
- None of these

Question No: 12 (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: 13 (Marks: 1) - Please choose one

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

The (k is a constant) is equal to

- k+2
- k+1
- k
- kf

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

For any polynomial $P(x)=c_0+c_1x+...+c_nx^n$ and any real number a $\lim_{x\to a}P(x)=c_0+c_1a+...+c_na^n=$

- $P(a)$
- $P(a+1)$
- $P(a-1)$
- $\frac{1}{P(a)}$

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

Polynomials are always ..... Function

- Continuous
- Discontinuous

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

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

where d is a constant

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

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

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

- **X-axis**
- Y-axis
- Origin
- None of these

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

Consider two function $f(x) = 3\sqrt{x} and g(x) = \sqrt{x}$ what is true about these functions

- $f(x).g(x) = 3x$
- $f(x)\Big|_{g(x)} = 3x$
- $f(g(x)) = 3x$
- None of these

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

The formula $\lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$ is called …… With respect to x of the function f

- ► **Derivative**
- ► Slope
- ► Tangent
- ► None of these

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

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

- ► $\frac{g.f'-f.g'}{g^2}$
- ► $\frac{g.f'+f.g'}{g^2}$
- ► $\frac{g.f'-f.g'}{g}$
- ► None of these

ASSALAM O ALAIKUM all fellows
ALL IN ONE Mega File
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Question No: 1 (Marks: 1) - Please choose one

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

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

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

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

- ► $(-\infty, 2) U (2, +\infty)$
- ► $(-\infty, 2)$
- ► $(-\infty, 0)$
- ► 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 $m_{2,\text{ respectively}}$ both the lines are perpendicular if and only if

- $m1(-m2) = 1$
- $m1m2 = -1$
  $m1 = -\frac{1}{m2}$
-
- 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

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

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

► $\frac{dy}{du}.\frac{du}{dv}.\frac{dv}{dx}$

- $\frac{dy}{du}+\frac{du}{dv}+\frac{dv}{dx}$
- $\frac{dy}{dx}.\frac{du}{dv}.\frac{dv}{du}$
- 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

$\lim_{x\to 0}\frac{\sin x}{x}$ 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 line