ASSALAM O ALAIKUM all fellows
ALL IN ONE Mega File
MTH101 Midterm PAPERS,
MCQz & subjective
Created BY Farhan & Ali
BS (cs) 3rd sem
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Remember us in your prayers

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MIDTERM EXAMINATION
Fall 2009
MTH101- Calculus And Analytical Geometry (Session - 5)

Ref No: 1087754

Time: 60 min

Marks: 42

Student Info	
StudentID:	BC090400057
Center:	OPKST
ExamDate:	12/17/2009 12:00:00 AM

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	22	23	24	
Marks									
Q No.	25	26	27						
Marks									

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 $f(x) \to +\infty \, or \, f(x) \to -\infty$ 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

► <mark>Horizontal asymptotes</mark>

► **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 $y = \dfrac{1}{1-x}$ then $\dfrac{dy}{dx} =$

► 1

► -1

► $\dfrac{1}{(1-x)^2}$

► $\dfrac{-1}{(1-x)^2}$

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

If

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

▶ 0

▶ $\dfrac{-1}{x^2}$

▶ $\dfrac{4}{x^2}$

▶ $\dfrac{-4}{x^2}$

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

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

▶ 2

▶ -2

▶ 0

▶ -3

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

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

▶ $\dfrac{1}{1 + \sin^2 x}$

▶ $\dfrac{-\sin x}{1 + \sin^2 x}$

▶

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

►

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

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

$$\frac{d}{dx}\left((c)\,\{h(x)\}\right) = \underline{\qquad}$$

► 0

► $\dfrac{d}{dx}\big(h(x)\big)$

► $\dfrac{d}{dx}\big(h(cx)\big)$

► $c\,\dfrac{d}{dx}\big(h(x)\big)$

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

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

► $\dfrac{1}{1+\cos^2 x}$

► $\dfrac{-\cos x}{1-\cos^2 x}$

► $\dfrac{-\cos x}{1-\cos^2 x}$

► $\dfrac{1}{1-\cos^2 x}$

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

Chain rule is a rule for differentiating _____ of functions.

► **Product**

► Sum

► Difference

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

The power rule, $\dfrac{d}{dx}[x^n] = nx^{n-1}$ 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 <mark>is concave down on (a, b)</mark>

▶ f is linear on (a, b).

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

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

▶ 1

▶ x

▶ $\dfrac{1}{x}$

▶ $\ln \dfrac{1}{x}$

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

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

▶ 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} = $ _____

▶ $\log_b c$

$\blacktriangleright$ $1 - \log_b c$

$\blacktriangleright$ $-\log_b c$

$\blacktriangleright$ $1 + \log_b c$

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

$$\log_b \frac{1}{t} = \underline{\qquad}$$

$\blacktriangleright$ $\log_b t$

$\blacktriangleright$ $1 - \log_b t$

$\blacktriangleright$ $1 + \log_b t$

$\blacktriangleright$ $-\log_b t$

Question No: 25   (Marks: 3)

If $f(x) = x^4 - 8\,x^2$, 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:

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

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

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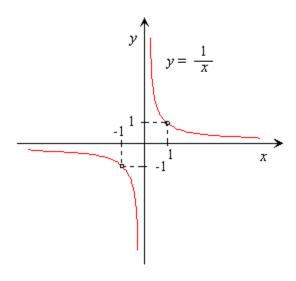
$$= 4(-2)x^{-2-1} + 3\frac{d}{dx} - 5x^{-5-1}$$

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

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

Question No: 27   (Marks: 10)

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

Solution:

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

$f\,'(x) = -\dfrac{1}{x^2}$

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

MIDTERM EXAMINATION

Fall 2008
MTH101- Calculus And Analytical Geometry

Time: 60 min

Marks: 38

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}

► $\dfrac{d_1 - d_0}{t_1 - t_0}$

► $\dfrac{t_1 - t_0}{f(t_0) - f(t_1)}$

► $\lim_{t_1 \to t_0} \dfrac{f(t_0) - f(t_1)}{t_1 - t_0}$

► 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

► $f(x).g(x)=3x$

► $f(x)/g(x)=3x$

► $f(g(x))=3x$

► 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

$Lim\limits_{x \to 0} \dfrac{\sin x}{x}$

► 1

► 2

► 0

► 1/2

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

For any polynomial $P(x) = c_0 + c_1 x + \ldots + c_n x^n$ and any real number a

$\lim\limits_{x \to a} P(x) = c_0 + c_1 a + \ldots + c_n a^n =$

▶ $P(a)$

▶ $P(a+1)$

▶ $P(a-1)$

▶ $\dfrac{1}{P(a)}$

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 $f(x) \to +\infty \, or \, f(x) \to -\infty$ 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 $y = \dfrac{1}{1-x}$ then $\dfrac{dy}{dx} =$

▶ 1

▶ -1

▶ $\dfrac{1}{(1-x)^2}$

▶ $\dfrac{-1}{(1-x)^2}$

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

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

▶ 2

▶ -2

▶ 0

▶ -3

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

_____ If

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

▶ $\dfrac{x}{y}$

▶ $\dfrac{-x}{y}$

▶ $\dfrac{-y}{x}$

▶ $\dfrac{y}{x}$

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

_____

$\dfrac{d}{dx}[\sec x] = \underline{\hspace{2cm}}$

▶ $\dfrac{1}{1 + \sin^2 x}$

▶ $\dfrac{-\sin x}{1 + \sin^2 x}$

▶ $\dfrac{1}{1 - \sin^2 x}$

► $\dfrac{\sin x}{1-\sin^2 x}$

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

$30^0 =$ _____

► $\dfrac{\pi}{3}$

► $\dfrac{\pi}{4}$

► $\dfrac{\pi}{6}$

► $\dfrac{\pi}{2}$

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

Suppose that f and g are differentiable functions of x then

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

▶ $\dfrac{[f'][g]-[f][g']}{g^2}$

▶ $[f'][g']$

▶ $[f'][g]+[f][g']$

▶ $[f'][g]-[f][g']$

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

Suppose that f and g are differentiable functions of x then

$$\dfrac{d}{dx}\left[\dfrac{f}{g}\right] =$$

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

▶

▶ $\dfrac{[g'][f]-[f'][g]}{g^2}$

▶ $\dfrac{[g][f']-[f][g']}{f^2}$

▶ $\dfrac{[g'][f]-[f'][g]}{f^2}$

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, $\dfrac{d}{dx}[x^n] = nx^{n-1}$ 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 $\dfrac{d}{dx}[\ln x] = $ _____

▶ 1

▶ x

▶ $\dfrac{1}{x}$

▶ $\ln \dfrac{1}{x}$

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 $\dfrac{dy}{dx} =$ _____

► $\dfrac{-x}{y}$

► $\dfrac{x}{y}$

► $\dfrac{-y}{x}$

► 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

$$\log_b \frac{1}{c} = \underline{\hspace{2cm}}$$

► $\log_b c$

► $1 - \log_b c$

► $-\log_b c$

► $1 + \log_b c$

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

$$\log_b \frac{1}{t} = \underline{\hspace{2cm}}$$

► $\log_b t$

► $1 - \log_b t$

► $1 + \log_b t$

► $-\log_b t$

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

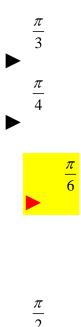$f'(x) = 2Sin^3 x - Sin^2 x \quad ; \quad 0 < x < 2\pi$

MIDTERM   EXAMINATION
Spring 2010
MTH101- Calculus And Analytical Geometry

Time: 60 min
Marks: 40

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

30^0 = _____

► $\dfrac{\pi}{3}$

► $\dfrac{\pi}{4}$

► $\dfrac{\pi}{6}$

► $\dfrac{\pi}{2}$

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

▶ $\pm\dfrac{k\pi}{2}\,(k=1,3,5,...)$

▶ $\pm\dfrac{k\pi}{2}\,(k=2,4,6,...)$

▶ $\pm\dfrac{k\pi}{2}\,(k=1,2,3,4,5,6,...)$

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

$\lim\limits_{x\to\infty}(-2x)=$

▶ -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

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

► $\dfrac{[f'][g]-[f][g']}{g^2}$

► $[f'][g']$

► $[f'][g]+[f][g']$

► $[f'][g]-[f][g']$

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 <mark>is an increasing function.</mark>

► 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 $f'(x) =$ _____

► $3x^7 + 2$

► <mark>$24x^7 + 2$</mark>

► $3x^9 + 2x^2$

► $24x^9 + 2x^2$

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

_____

π is a ....number

► Integer

► Rational

► <mark>Irrational</mark>

► Natural

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

_____

The set $\{x : a \le x \le b\}$ 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

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

► $\dfrac{[g][f']-[f][g']}{g^2}$

► $\dfrac{[g'][f]-[f'][g]}{g^2}$

► $\dfrac{[g][f']-[f][g']}{f^2}$

► $\dfrac{[g'][f]-[f'][g]}{f^2}$

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

The $\lim_{x \to a} f(x) = ...where\ f(x) = k$　(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 $\dfrac{dy}{dx} =$

▶ **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

► <mark>**Point-slope form**</mark>
► 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 $\lim\limits_{x \to 0} \frac{\sin(5x)}{3x}$

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

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

▶ $\dfrac{\sin x}{1 - \sin^2 x}$

▶ $\dfrac{-\sin x}{1 - \sin^2 x}$

▶ $\dfrac{1}{1 - \sin^2 x}$

▶

► 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

The $\lim_{x \to a} f(x) \; where \; f(x) = k$ (k is a constant) is equal to

► k+2

► k+1

● ► **k**

► kf

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

For any polynomial $P(x) = c_0 + c_1 x + ... + c_n x^n$ and any real number a $\lim_{x \to a} P(x) = c_0 + c_1 a + ... + c_n a^n =$

► $P(a)$

► $P(a+1)$

► $P(a-1)$

► $\dfrac{1}{P(a)}$

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 $\lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$ 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 $f \; and \; g$ are differentiable function of x then $\dfrac{d}{dx}(\dfrac{f}{g})$

► $\dfrac{g.f' - f.g'}{g^2}$

► $\dfrac{g.f' + f.g'}{g^2}$

► $\dfrac{g.f' - f.g'}{g}$

► None of these

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 $\dfrac{(x^2 - 4)}{(x - 2)}$ 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 $m_{2, respectively}$ both the lines are perpendicular if and only if

► m1(-m2) = 1

► m1m2 = -1

► $m1 = -\dfrac{1}{m2}$

► **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

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

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

▶

$$\frac{dy}{dx} \cdot \frac{du}{dv} \cdot \frac{dv}{du}$$

▶

▶ 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

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

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