



Time: 120 min
Marks: 80

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

In the notation

$$\int f(x)dx = F(x) + C$$

C represents

- ▶ A polynomial
- ▶ A Constant
- ▶ A Variable
- ▶ None of these

Question No: 3 (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}
- ▶ nx^{n-1}
- ▶ nx^{n+1}

▶ $(n-1)x^{n+1}$

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

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

- ▶ 2
- ▶ -2
- ▶ 0
- ▶ -3

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

$30^0 =$ _____

▶ $\frac{\pi}{3}$

▶ $\frac{\pi}{4}$

▶ $\frac{\pi}{6}$

▶ $\frac{\pi}{2}$

Question No: 6 (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 $(f \circ g)$
- ▶ Quotient (f / g)
- ▶ Product $(f \cdot g)$
- ▶ Sum $(f + g)$

Question No: 7 (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: 8 (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: 9 (Marks: 1) - Please choose one

$$\sum_{k=1}^n f(x_k^*) \Delta x_k$$

The sum is known as:

- ▶ Riemann Sum
- ▶ General Sum
- ▶ Integral Sum
- ▶ Geometric Sum

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

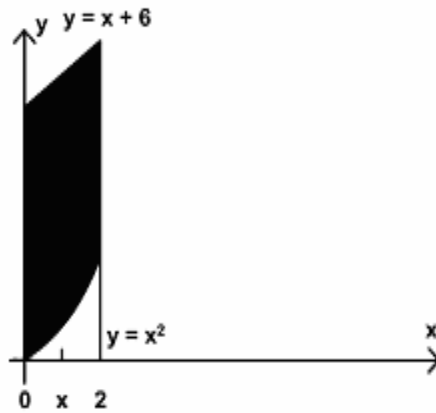
$$\sum_{k=1}^n f(x_k^*) \Delta x_k$$

What does 'n' represent in Riemann Sum ?

- ▶ No. of Circles
- ▶ No. of Rectangles
- ▶ No. of Loops
- ▶ No. of Squares

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

What is the area of the region in the following figure?



$$A = \int_0^2 [(x+6) - (x^2)] dx$$



$$A = \int_x^2 [(x+6) - (x^2)] dx$$



$$A = \int_0^2 [(x+6) + (x^2)] dx$$



$$A = \int_0^x [(x+6) - (x^2)] dx$$



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

If $\int_1^4 f(x) dx = 2$ and $\int_1^4 g(x) dx = 10$ then which of the following is value of

$$\int_1^4 [3f(x) - g(x)] dx$$

?

► 16

► 12

► -4

► -8

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

$$\int_0^1 2x(x^2 + 4) dx = \underline{\hspace{2cm}}$$

☒ $\frac{9}{2}$

☐ 5

☐ 2

☐ 2

☐ 5

☐ $\frac{-9}{2}$

☐ $\frac{-9}{2}$

☐ $\frac{-9}{2}$

☐ $\frac{-9}{2}$

☐ $\frac{-9}{2}$

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

Let f is a smooth function on $[0, 3]$. What will be the arc length L of the curve $y = f(x)$ from

$x = 0$ to $x = 3$?

☐ $L = \int_0^3 \sqrt{1 + [f(x)]^2} dy$

☐ $L = \int_a^b \sqrt{1 + [f'(x)]^2}$

☐ $L = \int_0^3 \sqrt{1 + [f'(x)]^2} dy$

☒ $L = \int_0^3 \sqrt{1 + [f'(x)]^2} dx$

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

Let f be a smooth, nonnegative function on $[1, 3]$. What is the surface area S generated by revolving the portion of the curve $y = f(x)$ between $x = 1$ and $x = 3$ about the x -axis?

$$S = \int_0^2 2\sqrt{1+[f(x)]}dx$$



$$S = \int_0^3 2\pi f(x)\sqrt{1+[f'(x)]}dx$$



$$S = \int_0^2 2\sqrt{1+[f'(x)]}dx$$



$$S = \int_1^3 2\pi f(x)\sqrt{1+[f'(x)]^2}dx$$



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

Let an object is displaced 2m by a force of 2N. What is the work done W?

▶ - 4

▶ 4

▶ 2

▶ 0

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

$$\int_a^{+\infty} f(x)dx = \lim_{l \rightarrow \infty} \int_a^l f(x)dx$$

Consider the improper integral
which of the following can be occurred?

if the limit exists then

▶ Diverges

▶ Converges

▶ Test fail

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

If f is continuous on (a, b] but does not have a limit from the right then the integral

$$\int_a^b f(x)dx = \lim_{l \rightarrow a} \int_l^b f(x)dx$$

defined by

is called :

▶ Improper

- ▶ Proper
- ▶ Line

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

For a sequence $\{a_n\}$ if the difference between successive terms $a_{n+1} - a_n < 0$ then the sequence is known as :

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

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

For a sequence $\{a_n\}$ if the ratio of successive terms $\frac{a_{n+1}}{a_n} > 1$ then the sequence is known as:

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

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

Which of the following is true for the sequence $\{n\}_{n=0}^{\infty}$?

- ▶ Nonincreasing
- ▶ Nondecreasing
- ▶ Increasing
- ▶ Decreasing

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

If $f(n) = a_n$ is the nth term of the sequence and f is differentiable and $f'(n) \leq 0$ then the sequence will be :

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing

► Nonincreasing

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

If Newton's Method is used to approximate the real solutions of the equation

$x^3 + x - 3 = 0$ and the first guess $x_1 = 1$, What is x_2 ?

5

► 4

1

► 4

► $-\frac{1}{2}$

3

► 4

3

► 2

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

Suppose that we apply Newton's Method to approximate the real solutions of the

equation $x^3 - 2x^2 - 1 = 0$. If we start at $x_1 = 2$, then which of the following is value of x_2 ?

► 6

► 2.25

► 0

► 2

Question No: 25 (Marks: 1) - Please choose one

If the sequence of partial sum of a series converges then what will the series show itself?

► Diverges

► Converges

► Gives no information

Question No: 26 (Marks: 1) - Please choose one

The series $\sum u_k$ be a series with positive terms and suppose that $\rho = \lim_{k \rightarrow \infty} \frac{u_{k+1}}{u_k}$ if $\rho > 1$, then which of the following is true?

- ▶ Converges
- ▶ Diverges
- ▶ May converges or diverges
- ▶ Gives no information

Question No: 27 (Marks: 1) - Please choose one

$$\rho = \lim_{k \rightarrow \infty} \frac{u_{k+1}}{u_k}$$

The series $\sum u_k$ be a series with positive terms and suppose that $\rho = 1$ if $\rho = 1$, then which of the following is true?

- ▶ Converges
- ▶ Diverges
- ▶ May converges or diverges
- ▶ Gives no information

Question No: 28 (Marks: 1) - Please choose one

The series $\sum u_k$ be a series with positive terms and suppose that $\rho = \lim_{k \rightarrow \infty} \sqrt[k]{u_k} = \lim_{k \rightarrow \infty} (u_k)^{\frac{1}{k}}$ if $\rho = 1$, then which of the following is true?

- ▶ Converges
- ▶ Diverges
- ▶ May converges or diverges
- ▶ Gives no information

Question No: 29 (Marks: 1) - Please choose one

For an alternating series to be convergent which of the following condition must be satisfied?

- ▶ $\lim_{k \rightarrow \infty} a_k = 1$
- ▶ $a_1 > a_2 > a_3 \dots > a_k > \dots$
- ▶ $a_1 \leq a_2 \leq a_3 \dots \leq a_k \leq \dots$
- ▶ Gives no information

Question No: 30 (Marks: 1) - Please choose one

For an alternating series to be convergent which of the following condition must be satisfied?

▶ $a_1 \geq a_2 \geq a_3 \dots \geq a_k \geq \dots$

▶ $\lim_{k \rightarrow \infty} a_k = 0$

▶ $a_1 \leq a_2 \leq a_3 \dots \leq a_k \leq \dots$

▶ $\lim_{k \rightarrow \infty} a_k = 1$

▶

Question No: 31 (Marks: 1) - Please choose one

What is the base of natural logarithm?

▶ 2.71

▶ 10

▶ 5

▶ Any real number

Question No: 32 (Marks: 1) - Please choose one

A function F is called an antiderivative of a function f on a given interval if
_____ = $f(x)$, for all x in that interval.

▶ $F'(x)$

▶ $F(x)$

▶ $f'(x)$

▶ $f''(x)$

▶

Question No: 33 (Marks: 1) - Please choose one

$\log_b ac =$ _____

▶ $\log_b a + \log_b c$

▶ $\log_b a - \log_b c$

▶ $\frac{\log_b a}{\log_b c}$

▶ $(\log_b a)(\log_b c)$

Question No: 34 (Marks: 1) - Please choose one

$\log_b a^r = \underline{\hspace{2cm}}$

▶ $a \log_b r$

▶ $r \log_b a$

▶ $\frac{\log_b a}{\log_b r}$

▶ $\log_b a + \log_b r$

Question No: 35 (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: 36 (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: 37 (Marks: 1) - Please choose one

What is the sum of following series?

$$1^2 + 2^2 + 3^2 + 4^2 + \text{-----} + n^2$$

- ▶ $\frac{n(n+1)(2n+1)}{6}$
- ▶ $\frac{n(2n)(2n+1)}{6}$
- ▶ $\frac{(n+1)(n+2)}{2}$
- ▶ $\frac{(n+1)(2n+1)}{6}$
- ▶

Question No: 38 (Marks: 1) - Please choose one

$$\sum_{k=1}^n \frac{k^3}{2} = \underline{\hspace{2cm}}$$

$$\frac{n(n+1)}{4}$$



$$\frac{[n(n+1)]^2}{8}$$



$$\frac{n(n+1)(2n+1)}{12}$$



Question No: 39 (Marks: 1) - Please choose one

$$y = \frac{2\sqrt{2}}{3} x^{\frac{3}{2}} - 2x ; 0 \leq x \leq 1$$

Let then which of the following is the length of the curve?

$$L = \int_0^1 \sqrt{1 + \left[\left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} - 2x \right) \right]^2} dx$$



$$L = \int_0^1 \sqrt{\left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} - 2x \right) \right]^2} dx$$



$$L = \int \sqrt{1 + \left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} - 2x \right) \right]^2} dx$$



$$L = \int_0^1 \sqrt{1 + \left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} - 2x \right) \right]^2} dx$$



Question No: 40 (Marks: 1) - Please choose one

If $f(x) = e^{-x}$ at $x = 0$ be the Taylor series, then which of the following is also true?

- ▶ Arithmetic series
- ▶ Maclaurin series
- ▶ Geometric series
- ▶ Harmonic series

Question No: 41 (Marks: 2)

$$u = \frac{\pi}{2} - x$$

$$\int_0^{\pi} \sin\left(\frac{\pi}{2} - x\right) dx$$

Using substitution transform the integral into variable u.

Question No: 42 (Marks: 2)

$$\int_3^{+\infty} \frac{dx}{2x^2}$$

Evaluate the improper integral

Question No: 43 (Marks: 2)

A function $f(x) = 6 - 2x - x^2$ has critical point 1 in an interval $[-4, 3]$. Find the absolute minimum value of the function.

Question No: 44 (Marks: 3)

Find the absolute maximum value of the function:

$$f(x) = 2x^3 + 3x^2 - 12x + 4 \quad \text{on} \quad [-4, 2]$$

Question No: 45 (Marks: 3)

Find the area of the region bounded by the curve $y = x^2 - 4x - 5$ and $y = x + 1$ (do not evaluate).

Question No: 46 (Marks: 3)

$$\left\{ \frac{3}{n^2} \right\}_{n=5}^{\infty}$$

Determine whether the following sequence is strictly monotone:

Question No: 47 (Marks: 5)

Determine whether the sequence converges or diverges. If converges find limit

$$\lim_{n \rightarrow \infty} \frac{3^n + (-1)^n}{3^{n+1} + (-1)^{n+1}}$$

Question No: 48 (Marks: 5)

Find the lengths of the curves

$$x = \frac{t^2}{2}, \quad y = \frac{(2t+1)^{\frac{3}{2}}}{3}, \quad 0 \leq t \leq 4$$

Question No: 49 (Marks: 5)

Evaluate the indefinite integral $\int [(x^4 + 2)] [\cos(x^5 + 10x)] dx$ by substitution method.

Question No: 50 (Marks: 10)

Find the Maclaurin series for $f(x) = e^{2x}$

This paper is solved by our best knowledge. In the case of any error/correction/suggestion, please contact at gulshanvu@yahoo.com, with reference to the concerned paper's number.



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

$y = \frac{x^2}{2}$

Let $y = \frac{x^2}{2}$. Find average rate of change of y with respect to x over the interval $[3, 4]$

▶

7

2

▶

25

14

▶

7

14

▶

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

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

▶

2

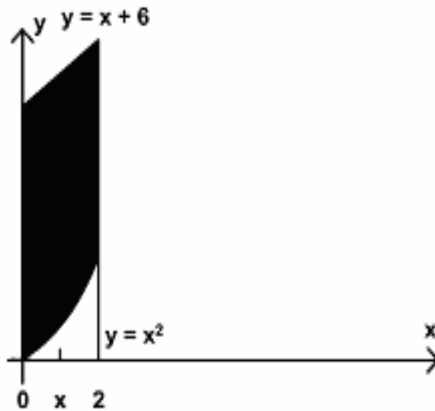
-2

0

-3

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

In the following figure, the area bounded on the sides by the lines are :



- ▶ $x = 0$
- ▶ $x = 2$
- ▶ $x = 0 \text{ and } x = 2$
- ▶ $x = 6$

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

What is the sum of following series?

$1 + 2 + 3 + 4 + ______ + n$

- ▶ $\frac{n+1}{2}$
- ▶ $\frac{(n+1)(n+2)}{2}$
- ▶ $\frac{n(n+2)}{2}$
- ▶ $\frac{n(n+1)}{2}$

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

Let f is a smooth function on $[0, 3]$. What will be the arc length L of the curve $y = f(x)$ from

$x = 0$ to $x = 3$?

- ▶ $L = \int_0^3 \sqrt{1 + [f(x)]^2} dy$

$$L = \int_a^b \sqrt{1 + [f'(x)]^2}$$



$$L = \int_0^3 \sqrt{1 + [f'(x)]^2} dy$$



$$L = \int_0^3 \sqrt{1 + [f'(x)]^2} dx$$



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

The PYTHAGORAS theorem describes the relationship between the sides of▶ **Right angle triangle**

▶ **Right angle triangle**

▶ Isoceleous triangle

▶ Equilateral triangle

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

Which operation can not be applied on the functions?

▶ Subtraction

▶ **Cross product**

▶ Addition

▶ Composition

Question No: 8 (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: 9 (Marks: 1) - Please choose one

Polynomials are always functions

▶ **Continuous**

▶ Discontinuous

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

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

- ▶ $\cos(x) = 0$
- ▶ $\sin(x) = 0$
- ▶ **$\tan(x) = 0$**

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

A differentiable function must be differentiable on the interval

- $(-\infty, \infty)$
- ▶ $(0, \infty)$
- ▶ $(-\infty, \infty)$
- ▶ (a, ∞) where a is any negative integer

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

$$\int \frac{3x^2 + 4x + 1}{x^3 + 2x^2 + x - 3} dx$$

Consider the indefinite integral

Let $t = x^3 + 2x^2 + x - 3$

Is the following substitution correct?

$$\int \frac{3x^2 + 4x + 1}{x^3 + 2x^2 + x - 3} dx = \int \frac{1}{t} dt$$

- ▶ Yes
- ▶ **No**

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

$\log_b ac = \underline{\hspace{2cm}}$

▶ $\log_b a + \log_b c$

▶ $\log_b a - \log_b c$

▶ $\frac{\log_b a}{\log_b c}$

▶ $(\log_b a)(\log_b c)$

▶

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

If a function has an extreme value (either a maximum or a minimum) on an open interval (a,b), then the extreme value occurs at of f

▶ First point

▶ Mid point

▶ **Critical point**

▶ End point

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

The Mean Value Theorem states that "Let function f be differentiable on (a,b) and continuous on $[a, b]$, then there exist at least one point c in (a,b) where"

▶ $f'(c) = \frac{f(b) - f(a)}{b - a}$

▶ $f(c) = \frac{f(b) - f(a)}{b - a}$

▶

▶ $f(c) = \frac{f(a) - f(b)}{b - a}$

▶

▶ $f'(c) = \frac{f(a) - f(b)}{b - a}$

▶

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

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

If there is some function F such that then any function of the form $F(x) + C$ is of $f(x)$

- ▶ Derivative
- ▶ **Antiderivative**
- ▶ Slope
- ▶ Maximum value

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

$$\sum_{k=1}^n f(x_k^*) \Delta x_k$$

The sum is known as:

- ▶ **Riemann Sum**
- ▶ General Sum
- ▶ Integral Sum
- ▶ Geometric Sum

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

$$\int_0^{\frac{\pi}{2}} \cos u \, du$$

If , then which of the following is true?

- ▶ 2
- ▶ **1**
- ▶ 0
- ▶ -1

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

$$\int_0^{\pi} \sin u \, du$$

If , then which of the following is true?

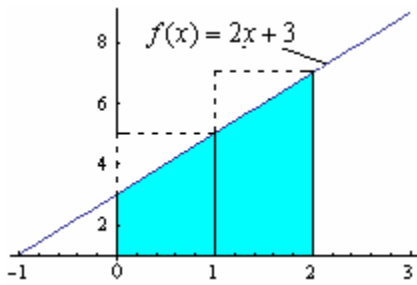
- ▶ 1
- ▶ 2
- ▶ **0**
- ▶ -1

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

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

If there is some function F such that then antiderivatives of $f(x)$ are $F(x) + C$. What does C represents?

- ▶ Polynomial
- ▶ **Constant**
- ▶ Dependent Variable
- ▶ Independent Variable



Which of the following is approximate area of the shaded region by taking x_1^* and x_2^* as right endpoint of equal-length subintervals?

- ▶ 8
- ▶ 10

- ▶ 12
- ▶ 14

Question No: 27 (Marks: 1) - Please choose one

What is the length of each sub-interval, if the interval $[1,3]$ is divided into n sub-intervals of equal length?

- ▶ $\frac{1}{n}$
- ▶ $\frac{2}{n}$
- ▶ $\frac{3}{n}$
- ▶ $\frac{4}{n}$
- ▶

Question No: 28 (Marks: 1) - Please choose one

Evaluate

$$\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2} = \text{-----}$$

- ▶ 4
- ▶ 2
- ▶ 1
- ▶ ∞

Question No: 29 (Marks: 1) - Please choose one

$$\left\{ \frac{1}{2^n} \right\}_1$$

represents the sequence:

$$\frac{-1}{2}, \frac{-1}{4}, \frac{-1}{8}, \dots$$

- ▶

$$\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \dots$$



$$0, 1, \frac{1}{2}, \frac{1}{4}, \dots$$



$$0, 1, 2, 3, \dots$$

Question No: 30 (Marks: 1) - Please choose one

For a sequence $\{a_n\}$ if the difference between successive terms $a_{n+1} - a_n \leq 0$ then the sequence is known as:

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ **Nonincreasing**

Question No: 31 (Marks: 1) - Please choose one

For a sequence $\{a_n\}$ if the ratio of successive terms $\frac{a_{n+1}}{a_n} > 1$ then the sequence is known as:

- ▶ **Increasing**
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

Question No: 32 (Marks: 1) - Please choose one

If the partial sum of a series is finite then the series will/will be:

- ▶ Divergent
- ▶ **Convergent**
- ▶ Give no information

Question No: 33 (Marks: 1) - Please choose one

If the geometric series $a + ar + ar^2 + ar^3 + \dots + ar^{k-1} + \dots$ where $(a \neq 0)$, $|r| < 1$ then which of the following is true for the given series?

- ▶ **Converges**
- ▶ Diverges
- ▶ Gives no information

Question No: 34 (Marks: 1) - Please choose one

If $\rho = \lim_{k \rightarrow +\infty} \sqrt[k]{u_k}$ where $\rho > 1$ then the series $\sum u_k$ with positive terms will /will be.....?

- ▶ **Convergent**

- ▶ Divergent
- ▶ Give no information

Question No: 35 (Marks: 1) - Please choose one

$$\sum_{k=1}^{\infty} (-1)^{k+1} \frac{1}{k}$$

Which of the following is true for the series ?

- ▶ Arithmetic Series
- ▶ Geometric Series
- ▶ **Alternating Harmonic Series**
- ▶ Harmonic Series

Question No: 36 (Marks: 1) - Please choose one

.....is the special case of Tylor's theorem.

▶ **Roll's Theorem**

- ▶ Picard's Method
- ▶ Integration
- ▶ Maclaurin's Theorem

Question No: 37 (Marks: 1) - Please choose one

If f is integrable on a closed interval containing the four points a, b, c and d then

$$\int_a^d f(x) dx = \underline{\hspace{2cm}}$$

▶ $\int_a^b f(x) dx + \int_b^c f(x) dx + \int_c^d f(x) dx$

▶ $\int_a^b f(x) dx + \int_c^d f(x) dx$

▶ $\int_a^c f(x) dx + \int_b^d f(x) dx$

▶ $\int_a^d f(x) dx$

▶

Question No: 38 (Marks: 1) - Please choose one

Suppose f and g are integrable functions on $[a, b]$ and c is a constant, then

$$\int_a^b c [f(x) + g(x)] dx = \underline{\hspace{2cm}}$$

$$\int_a^b f(cx)dx + \int_a^b g(cx)dx$$



$$\int_a^b f(x) dx + \int_a^b g(x) dx$$



$$c \int_a^b f(x)dx + c \int_a^b g(x)dx$$



▶ 0

Question No: 39 (Marks: 1) - Please choose one

What is the difference between the values of the

$$\int_a^b f(x)dx \text{ and } \int_a^b f(t)dt$$

integrals ?

- ▶ Differ by b-a
- ▶ Differ by a-b
- ▶ **No difference**
- ▶ Differ by b+a

Question No: 40 (Marks: 1) - Please choose one

$$\int_{-1}^2 f(x) dx = 5 \quad \int_{-1}^2 g(x) dx = -3$$

If and then which of the following is value

$$\int_{-1}^2 [f(x) + 2g(x)] dx$$

of ?

- ▶ **-1**
- ▶ -8
- ▶ 2
- ▶ 11

Question No: 41 (Marks: 2)

$$\frac{1}{1} + \frac{1}{8} + \frac{1}{27} + \dots + \frac{1}{1000}$$

Express the sum in sigma notation.

$$\sum_{n=1}^{10} (1/n^3)$$

Question No: 42 (Marks: 2)

Only write down the Maclaurin series for e^x

Question No: 43 (Marks: 2)

Evaluate the following integral:

$$\begin{aligned}
 & \int_1^4 \sqrt{x} \, dx \\
 & \int_1^4 \sqrt{x} \, dx \\
 & = \int_1^4 \sqrt{x} \cdot 1 \, dx \\
 & = x\sqrt{x} + \int_1^4 1/\sqrt{x} \cdot 1 \, dx
 \end{aligned}$$

Question No: 44 (Marks: 3)

Evaluate the following sum:

$$\begin{aligned}
 & \sum_{k=1}^6 (k^2 - 5) \\
 & = -4 - 1 + 4 + 11 + 20 + 31 = 61
 \end{aligned}$$

Question No: 45 (Marks: 3)

Find a definite integral indicating the area enclosed by the curves $y = x^2$, $x > 0$ and bounded on the sides by the lines $y = 1$ and $y = 4$. But do not evaluate the integral.

Question No: 46 (Marks: 3)

$$a_n = \left\{ \frac{3}{n^2} \right\}_{n=5}^{\infty}$$

Determine whether the following sequence is strictly monotone or not. If your answer is yes or no, then give reason.

Yes the sequence is strictly monotone because the denominator is increasing

Question No: 47 (Marks: 5)

The region bounded by the y -axis, the graph of the equation $x = y^{\frac{3}{2}}$ and the line $y = 2$ is revolved about y -axis. Find the volume of the resulting solid.

Question No: 48 (Marks: 5)

Compute the following sum:

$$\begin{aligned}
 & \sum_{i=1}^n (4i^2 - i) = (4(1)^2 - 1) + (4(2)^2 - 2) + (4(3)^2 - 3) + (4(4)^2 - 4) + \dots \\
 & = 3 + 14 + 33 + 60 + \dots
 \end{aligned}$$

Question No: 49 (Marks: 5)

Use L'Hopital's rule to evaluate the limit

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{1 - \sin x}{1 + \cos 2x}$$

$$\lim_{x \rightarrow \frac{\pi}{2}} (1 - \sin x) = 0 \quad \lim_{x \rightarrow \frac{\pi}{2}} (1 + \cos 2x) = 0$$

$$= 0/0$$

So by L'Hopital's rule

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{1 - \sin x}{1 + \cos 2x}$$

$$= \lim_{x \rightarrow \frac{\pi}{2}} \frac{d/dx(1 - \sin x)}{d/dx(1 + \cos 2x)}$$

$$= \lim_{x \rightarrow \frac{\pi}{2}} \frac{-\cos x}{-2 \sin 2x} = \frac{\cos \frac{\pi}{2}}{2 \sin \pi} = 0$$

Question No: 50 (Marks: 10)

$$\sum_1^{\infty} \frac{2^n}{n(n+2)}$$

Use the Ratio test to determine whether the series converges or diverges.

$$p = \lim_{k \rightarrow \infty} \frac{u_{k+1}}{u_k} =$$

This paper is solved by our best knowledge. In the case of any error/correction/suggestion, please contact at gulshanvu@yahoo.com, with reference to the concerned paper's number.



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

Let $f(x)$ is a function such that as x approaches a real number a , either from left or right-hand-side, the function values increases or decreases unboundedly then

$$\lim_{x \rightarrow a} f(x)$$

► Exist

► Does not exist

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

$$\frac{d(\sec x)}{dx} =$$

► $(\sec x)(\tan x)$

► $(\sec x)(\tan x)$

►

► $(\operatorname{cosec} x)(\cot x)$

►

► $(\operatorname{cosec} x)(\tan x)$

►

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

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

$$\frac{d}{dx}((c) \{h(x)\}) = \underline{\hspace{2cm}}$$

- ▶ 0
- ▶ $\frac{d}{dx}(h(x))$
- ▶ $\frac{d}{dx}(h(cx))$
- ▶ $c \frac{d}{dx}(h(x))$

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

If f is continuous function such that $\lim_{x \rightarrow -\infty} f(x) = +\infty$ and $\lim_{x \rightarrow +\infty} f(x) = +\infty$
then f has $(-\infty, +\infty)$ on

- ▶ maximum value but no minimum
- ▶ minimum value but no maximum
- ▶ both maximum and minimum value

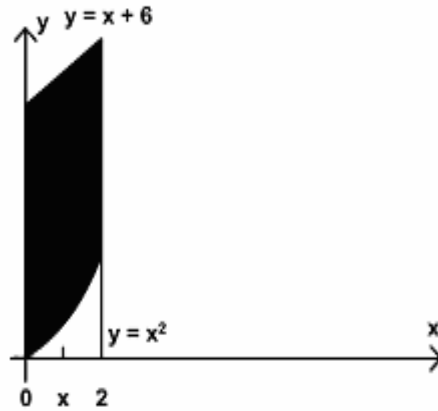
Question No: 5 (Marks: 1) - Please choose one

Sigma notation is represented by which of the following Greek letter?

- ▶ χ
- ▶ η
- ▶ Σ
- ▶ ψ

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

In the following figure, the area enclosed is bounded below by :



- ▶ $y = x + 6$
- ▶ $y = x^2$
- ▶ $x = 2$
- ▶ $x = 0$

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

At what points the two curves: $y = x^2$ and $y = x + 6$ intersect ?

- ▶ $x = 0$ and $x = 2$
- ▶ $x = 0$ and $x = 3$
- ▶ $x = 2$ and $x = 3$
- ▶ $x = -2$ and $x = 3$

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

Let the solid generated by the region enclosed between

$$y = \sqrt{x} \quad ; \quad x = 1, x = 4$$

and the x-axis is revolved about the y-axis. Which of the following equation gives the volumes of a solid by cylindrical shells?

▶
$$V = \int_1^4 2\pi x \sqrt{x} dx$$

$$V = \int_1^4 2x\sqrt{x}dx$$



$$V = \int_0^4 2x\sqrt{x}dx$$



$$V = \int_{-4}^4 2x\sqrt{x}dx$$



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

Let f is a smooth curve on the interval [a, b]. What is the arc length L of the curve f(x) defined over the interval [a, b]?

$$L = \lim_{\max \Delta x \rightarrow 0} \sum_{k=1}^n \sqrt{1 + (f'(x_k^*))}$$



$$L = \sum_{k=1}^n \sqrt{1 + (f'(x_k^*))} \Delta x_k$$



$$L = \lim_{\max \Delta x \rightarrow 0} \sum_{k=1}^n \sqrt{1 + (f'(x_k^*))^2} \Delta x_k$$



$$L = \sum_{k=1}^n \sqrt{1 + (f'(x_k^*))} \Delta x$$



Question No: 10 (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)

- ▶ $(-x, -y)$

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

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

- ▶ X-axis
- ▶ Y-axis
- ▶ Origin

Question No: 12 (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
- ▶ function
- ▶ not a function
- ▶ not a relation

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

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

Domain of the function $y =$ is

- ▶ $(-\infty, 2) \cup (2, +\infty)$
- ▶ $(-\infty, 2)$
- ▶ $(-\infty, 0)$

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

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

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

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



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

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = \text{-----}$$

▶ -1

▶ 2

▶ 0

▶ 1

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

How the series $1 - 3 + 5 - 7 + 9 - 11$ can be expressed in sigma notation?

$$\sum_{k=0}^{k=5} (-1)^k (2k + 1)$$



$$\sum_{k=1}^{k=5} (-1)^k (2k + 1)$$



$$\sum_{k=1}^{k=5} (2k + 1)$$



$$\sum_{k=1}^{k=5} (2k + 1)$$



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

Let the region bounded by the curve $y = \sqrt[3]{x}$, the x-axis, and the line $x = 3$ is revolved about the y-axis to generate a solid. Which of the following equation gives the volume of a solid by cylindrical shells?

$$V = \int_0^3 x^{\frac{3}{2}} dx$$



$$V = 2\pi \int_0^3 \sqrt{x} dx$$



$$V = \int_0^3 2\pi x \sqrt[3]{x} dx$$



$$V = \int_0^3 x \sqrt[3]{x} dx$$



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

$$y = \frac{2\sqrt{2}}{3} x^{\frac{3}{2}} ; 0 \leq x \leq 2$$

Let _____ then which of the following is the length of the curve?

$$L = \int_0^2 \sqrt{\left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} \right) \right]^2} dx$$



$$L = \int \sqrt{1 + \left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} \right) \right]^2} dx$$



$$L = \int_0^2 \sqrt{1 + \left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} \right) \right]^2} dx$$



$$L = \int_0^2 \sqrt{1 + \left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} \right) \right]^2} dx$$



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

2

3

is known as

- ▶ An even number
- ▶ Irrational Number
- ▶ A natural Number

▶ Rational Number

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

$$f'(x_n) = 0 \text{ for some } n$$

For a function f , let

Does the Newton's Method works for approximating the solution of $f(x) = 0$?

▶ Yes

▶ No

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

The Mean Value Theorem states that "Let function f be differentiable on (a,b) and continuous on $[a, b]$, then there exist at least one point c in (a,b) where"

▶
$$f'(c) = \frac{f(b) - f(a)}{b - a}$$

$$f(c) = \frac{f(b) - f(a)}{b - a}$$

▶

$$f(c) = \frac{f(a) - f(b)}{b - a}$$

▶

$$f'(c) = \frac{f(a) - f(b)}{b - a}$$

▶

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

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

If there is some function F such that then any function of

the form $F(x) + C$ is ----- of $f(x)$

- ▶ Derivative
- ▶ Antiderivative
- ▶ Slope
- ▶ Maximum value

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

If f and g are continuous function on an interval $[a, b]$

and $f(x) \geq g(x)$ for $a \leq x \leq b$, then area is bounded by the lines parallel to:

- ▶ X -axis
- ▶ Y-axis
- ▶ Both X -axis and Y-axis

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

What is the sum of following series?

$$1^3 + 2^3 + 3^3 + 4^3 + \dots + n^3$$

$$\frac{n(2n)(2n+1)}{6}$$



$$\frac{(n+1)(n+2)}{2}$$



$$\left[\frac{n(n+2)}{2} \right]^2$$



$$\left[\frac{n(n+1)}{2} \right]^2$$



Question No: 25 (Marks: 1) - Please choose one

$$\frac{5}{7} \times 1^2 + \frac{5}{7} \times 2^2 + \frac{5}{7} \times 3^2 + \frac{5}{7} \times 4^2 \dots + \frac{5}{7} \times n^2 = \underline{\hspace{2cm}}$$

$$\frac{5n(n+1)(2n+1)}{42}$$



- ▶ $\frac{5n(n+1)}{14}$
- ▶ $\frac{5n^2(n+1)^2}{14}$
- ▶ $\frac{5(n+1)(2n+1)}{42}$
- ▶

Question No: 26 (Marks: 1) - Please choose one

$$\int_a^a f(x)dx = \underline{\hspace{2cm}}$$

If point a is in the domain of function f , then

- ▶ $f'(x)$
- ▶ $f(x)$
- ▶ 0
- ▶ 1

Question No: 27 (Marks: 1) - Please choose one

If $a_1 > a_2 > a_3 > \dots > a_n > \dots$, then a sequence $\{a_n\}$ is

- ▶ Increasing
- ▶ Nondecreasing
- ▶ Decreasing
- ▶ Nonincreasing

Question No: 28 (Marks: 1) - Please choose one

For a sequence $\{a_n\}$ if the difference between successive terms $a_{n+1} - a_n \leq 0$ then the sequence is known as:

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

Question No: 29 (Marks: 1) - Please choose one

$$\frac{a_{n+1}}{a_n} < 1$$

For a sequence $\{a_n\}$ if the ratio of successive terms then the sequence is known as:

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

Question No: 30 (Marks: 1) - Please choose one

$$\frac{a_{n+1}}{a_n} \geq 1$$

For a sequence $\{a_n\}$ if the ratio of successive terms then the sequence is known as :

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

Question No: 31 (Marks: 1) - Please choose one

$$a_n = \left\{ \frac{1}{n} \right\}_{n=1}^{\infty}$$

Which of the following option is true for the sequence ?

- ▶ Increasing
- ▶ Decreasing
- ▶ Nonincreasing
- ▶ Nondecreasing

Question No: 32 (Marks: 1) - Please choose one

If the partial sum of a series is finite then the series will/will be:

- ▶ Divergent
- ▶ Convergent
- ▶ Give no information

Question No: 33 (Marks: 1) - Please choose one

If the geometric series $a + ar + ar^2 + ar^3 + \dots + ar^{k-1} + \dots$ where $(a \neq 0)$,
 $|r| < 1$,

then which of the following is true for the given series?

- ▶ Converges
- ▶ Diverges
- ▶ Gives no information

Question No: 34 (Marks: 1) - Please choose one

$$\rho = \lim_{k \rightarrow +\infty} \frac{u_{k+1}}{u_k}$$

If $\rho > 1$ then the series $\sum u_k$ with positive terms will
/will be.....?

- ▶ Convergent
- ▶ Divergent
- ▶ Give no information

Question No: 35 (Marks: 1) - Please choose one

$$\rho = \lim_{k \rightarrow +\infty} \sqrt[k]{u_k}$$

If $\rho > 1$ then the series $\sum u_k$ with positive terms will
/will be.....?

- ▶ Convergent
- ▶ Divergent
- ▶ Give no information

Question No: 36 (Marks: 1) - Please choose one

In alternating series test, which one of the following condition must be satisfied?

▶ $\lim_{k \rightarrow \infty} a_k = 1$

▶ $a_1 > a_2 > a_3 \dots > a_k > \dots$

▶ $a_1 \leq a_2 \leq a_3 \dots \leq a_k \leq \dots$

Question No: 37 (Marks: 1) - Please choose one

$$\sum_{k=1}^{\infty} (-1)^n a_k$$

A series of the form _____ is called _____.

► Alternating series

- Geometric series
- Arithmetic series
- Harmonic series

Question No: 38 (Marks: 1) - Please choose one

Which of the following is the Maclaurin series for e^x ?

► $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots + \frac{x^k}{k!} + \dots$

► $x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots + \frac{x^k}{k!} + \dots$

► $1 + x + \frac{x^3}{3!} + \dots + \frac{x^k}{k!} + \dots$

► $1 - x + \frac{x^3}{3!} - \dots - \frac{x^k}{k!} - \dots$

Question No: 39 (Marks: 1) - Please choose one

Which of the following is the work done W if an object moves in the positive direction along a coordinate line while subject to a force $F(x)$ in the direction of motion over an interval $[0,3]$?

► $W = \int_2^3 3x dx$

► $W = \int_0^3 3x dx$

► $W = \int_0^3 F(x) dx$

$$W = \int_3^0 F(x) dx$$



Question No: 40 (Marks: 1) - Please choose one

Which of the following is the spring constant k if a spring whose natural length is $2m$ exerts a force of $3N$ when stretched $1m$ beyond its natural length?

- $3x$
- $3N/m$
- $2m$
- $3m/N$

Question No: 41 (Marks: 2)

Evaluate the following integral by substitution method.

$$\int x (2x^2 + 1)^{\frac{2}{3}} dx$$

Question No: 42 (Marks: 2)

Find the limits of the integral indicating the area bounded by the

curves $y = x^2$ and $y = x + 6$.

Sol,

Question No: 43 (Marks: 2)

What will be the amount of work done if an object moves $7m$ in the direction of a force of $70N$?

Question No: 44 (Marks: 3)

Evaluate the following integral:

$$\int \frac{5 - 6 \sin^2 x}{\sin^2 x} dx$$

Question No: 45 (Marks: 3)

Find a definite integral indicating the area of the surface generated by revolving

the curve $y = \sqrt[3]{3x}$; $0 \leq y \leq 4$ about the x -axis. But do not evaluate the integral.

Question No: 46 (Marks: 3)

Find the spring constant ' K '; if a force of $10N$ is required to stretch a spring from its natural length of $4.8m$ to a length of $6.8m$?

Question No: 47 (Marks: 5)

$$\frac{d}{dx}[f(x)] = 12x^2 - 6x + 1$$

Let . Find $f(x)$

Sol,

Question No: 48 (Marks: 5)

Use the cylindrical shell to find the volume of the solid generated when the region enclosed by the curve $y = x^3$, $x = 1$, $y = 0$ is revolved about the y -axis.

Question No: 49 (Marks: 5)

Determine whether the sequence $\{a_n\}$ converges or diverges; if it converges then find its limit;

$$a_n = \frac{3n^4 + 1}{4n^2 - 1}$$

where

Question No: 50 (Marks: 10)

Find the area of the region that is enclosed by the curves $y = x^2$ and $y = \sqrt{x}$

$$x = \frac{1}{4} \text{ and } x = 1$$

between .





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

_____ If $y = f(x)$ then the average rate of change of y with respect to x over the interval $[x_0, x_1]$ is the Joining the points $(x_0, f(x_0))$ and $(x_1, f(x_1))$ on the graph of f

- ▶ Slope of the secant line
- ▶ Slope of tangent line
- ▶ Secant line
- ▶ none of these

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

_____ $\frac{(x^2 - 4)}{(x - 2)}$ is
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 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: 4 (Marks: 1) - Please choose one

The series $\sum u_k$ be a series with positive terms and suppose that if $\rho > 1$ then the series

$\rho = \lim_{k \rightarrow \infty} \sqrt[k]{u_k} = \lim_{k \rightarrow \infty} (u_k)^{\frac{1}{k}}$

- ▶ Converges
- ▶ **Diverges**
- ▶ May converge or diverge
- ▶ None of these

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

The series $\sum u_k$ and $\sum v_k$ are convergent series then $(\sum u_k + \sum v_k)$ and $(\sum u_k - \sum v_k)$ will beand.....

- ▶ Convergent, convergent
- ▶ Divergent, divergent
- ▶ **Convergent, divergent**
- ▶ Divergent, convergent

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

The notation $\{\frac{1}{2^n}\}_{-1}^n$ represents the sequence

▶ $2, 1, \frac{1}{2}, \frac{1}{4}, \dots$

▶ 0, 1, 2, 3...

▶ $0, 1, \frac{1}{2}, \frac{1}{4}, \dots$

▶ None of these

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

_____ If f is continuous on $(a, b]$ but does not have a limit from the right then the integral

$$\int_a^b f(x) dx = \lim_{l \rightarrow a} \int_l^b f(x) dx$$

defined by _____ is called Integral

▶ Improper

▶ Proper

▶ None of these

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

_____ An object is displaced 1m by a force of 1N then the work done W is

▶ 2

▶ 0

▶ None of these

▶ 1

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

_____ If f is a smooth function on $[a, b]$ then the arc length L of the curve $y=f(x)$ from $x=a$ to $x=b$ will be

▶ $L = \int_a^b \sqrt{1 + [f'(x)]^2} dx$

$$L = \int_a^b \sqrt{1 + [f'(x)]} dx$$



$$L = \int_0^a \sqrt{1 + [f'(x)]} dy$$



▶ None of these

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

_____ If f is a smooth function on $[0,3]$ then the arc length L of the curve $y=f(x)$ from $x=0$ to $x=3$ will be

$$L = \int_0^3 \sqrt{1 + [f'(x)]^2} dx$$



$$L = \int_a^b \sqrt{1 + [f'(x)]^2}$$



$$L = \int_0^3 \sqrt{1 + [f'(x)]^2} dy$$



▶ None of these

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

_____ By using cylindrical shell to find volume of the solid when the region R in the first quadrant enclosed between $y = 3x$ and $y = 2x^2$ is revolved about the x -axis

$$V = \int_0^{\frac{3}{2}} 2\pi x(3x - 2x^2) dx$$



$$V = \int_0^{\frac{3}{2}} x(3x - 2x^2) dx$$



$$V = \int_0^{\frac{3}{2}} 2\pi(3x - 2x^2) dx$$



▶ None of these

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

By using cylindrical shell to find volume of the solid when the region R in the first quadrant enclosed between $y = x$ and $y = x^2$ is revolved about the y-axis is represented by

$$V = \int_0^3 2\pi x(x - x^2) dx$$



$$V = \int_0^1 x(x - x^2) dx$$



$$V = \int_0^1 2\pi(x - x^2) dx$$



▶ None of these

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

If

$$\int_a^a f(x) dx =$$

a is in the domain of f, then



$$f'(x)$$



$$f(x)$$



▶ 0

▶ None of these

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

$$\int_0^2 x^2 dx$$

Consider the integral , the area on right is bounded by

▶ $y = x^2$

▶ $x = 2$

▶ $x = 0$

▶ None of these

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

The series $1 - 3 + 5 - 7 + 9 - 11$ may written as in sigma notation

$$\sum_{k=0}^{k=5} (-1)^k (2k + 1)$$

▶

$$\sum_{k=1}^{k=5} (-1)^k (2k + 1)$$

▶

$$\sum_{k=1}^{k=5} (2k + 1)$$

▶

▶ None of these

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

$4^2 + 5^2 + 6^2 + 7^2$ in sigma notation may be represented as

$$\sum_{k=2}^{k=7} k^2$$



$$\sum_{k=2}^{k=7} (k+1)^2$$



$$\sum_{k=4}^{k=7} k^2$$



▶ None of these

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

_____ If
a function f is on a closed interval [a,b] ,then f has both a maximum and minimum value on [a,b]

▶ **Continuous**

- ▶ Discontinuous
- ▶ Differentiable
- ▶ None of these

Question No: 18 (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
 $f(x_1) < f(x_2)$ whenever
 $x_1 < x_2$ then the we can say that f is

▶ **Increasing function**

- ▶ **Decreasing function**
- ▶ Constant function
- ▶ None of these

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

_____ If
a function satisfies the conditions

f(c) is defined

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

Exists

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

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: 20 (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: 21 (Marks: 2)

$$a_{n+1} = \frac{1}{3} \left(a_n + \frac{1}{a_n} \right) \text{ for } n \geq 1 \text{ and } a_1 = 2$$

Write down the first two term of the sequence

Question No: 22 (Marks: 2)

Find the integral of the surface area of the portion of the sphere generated by revolving the

$$y = \sqrt{2-x^2}, 0 \leq x \leq \frac{1}{3}$$

curve

(Note: Just find the integral do not solve the integral)

Question No: 23 (Marks: 2)

$$\int_2^5 f(x)dx \quad \int_2^3 f(x)dx = 7, \int_3^4 f(x)dx = 2, \int_5^4 f(x)dx = 5$$

Calculate _____ if

$$\int_2^3 f(x)dx = 7, \int_3^4 f(x)dx = 2, \int_5^4 f(x)dx = 5$$

$$\int_2^5 f(x)dx = 7 + 2 - 5 = 4$$

Question No: 24 (Marks: 3)

_____ Find
the first two Taylor polynomials for $\ln x$ about $x = 3$

Question No: 25 (Marks: 3)

_____ Let
the curve $y = x^{\frac{3}{2}} ; 0 \leq y \leq 2$, then find the surface area generated by revolving the curve. (But do not evaluate)

Question No: 26 (Marks: 3)

$$\frac{1}{1} + \frac{1}{4} + \frac{1}{9} + \dots + \frac{1}{7225}$$

Express the sum _____ in sigma notation but do not evaluate.

$$\frac{1}{1} + \frac{1}{4} + \frac{1}{9} + \dots + \frac{1}{7225}$$

$$\sum_{k=1}^{7225} k^3 + 1$$

Question No: 27 (Marks: 5)

_____ Find
the first four nonzero terms of the Taylor series generated by f at $x = a$
 $f(x) = \frac{1}{1-x}$ at $x = 2$

Question No: 28 (Marks: 5)

Evaluate the Definite Integral using the First fundamental Theorem of Calculus

$$\int_0^1 (x^5 - x^3 + 2x) dx$$
$$\text{Let } u = (x^5 - x^3 + 2x)$$
$$\int_0^1 (u) dx$$

Question No: 29 (Marks: 5)

Express the definite integrals as limits (Do not evaluate the integrals)

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (1 + \cos x) dx$$

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (1 + \cos x) dx$$
$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \lim_{\max xk \rightarrow 0} \sum_{\frac{\pi}{2}}^{\frac{\pi}{2}} (1 + \cos x) dx$$

Question No: 30 (Marks: 10)

Find

the region enclosed by the curves and also find the area

$$y = x^2, y = \sqrt{x}, x = \frac{1}{4}, x = 1$$

Question No: 31 (Marks: 10)

Use x_k^* as the left end point of each subinterval to find the area under $y = mx$ over the interval $[a, b]$, where $m > 0$ and $a \geq 0$

Solution on next page

Suppose $a = 1$ $b = 2$ so $[a, b] = [1, 2]$
 $x_k^* = x_{k-1} = a + (k-1)\Delta x$ (formula for left end point)

$$\Delta x = \frac{b-a}{n} = \frac{2-1}{n} = \frac{1}{n}$$

Suppose k th has area

$$f(x_{k^*})\Delta x = x_{k^*}\Delta x$$

$$\left[1 + \frac{k}{n}\right]\Delta x$$

$$\left[1 + \frac{k}{n}\right]\frac{1}{n}$$

$$\sum_{k=1}^n f(x_{k^*})\Delta x = \sum_{k=1}^n [1 + k - 1]$$

Area by solving

$$\begin{aligned} A &= \lim_{\Delta x \rightarrow 0} \sum_{k=1}^n f(x_{k^*})\Delta x = \lim_{\Delta x \rightarrow 0} \left[\frac{3}{2} - 1 + \frac{1}{2n} \right] \\ &= \frac{3}{2} - 1 + 0 \end{aligned}$$



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

$$y = f(g(h(x)))$$

If

$$u = g(h(x))$$

$$v = h(x) \quad \frac{dy}{dx} = \underline{\hspace{2cm}}$$

then

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

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

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

►

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

If a function f is on a closed interval $[a,b]$, then f has both maximum and minimum value on $[a,b]$.

► Continuous

► Discontinuous

► None of these

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

$$\int_a^x \frac{t^2}{2} dt$$

The expression , represents a function of :

► t

► a

► Both x and a

► x

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

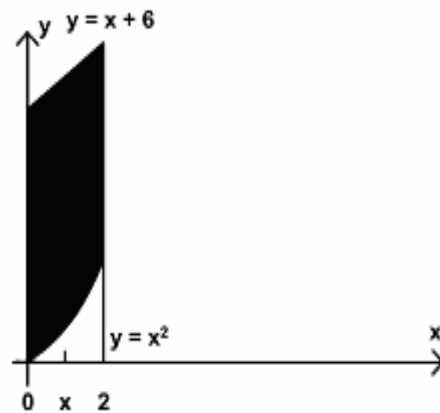
$$\int cf(x)dx = \underline{\hspace{2cm}}$$

if c is a constant

- ▶ 0
- ▶ c
- ▶ $\int f(cx)dx$
- ▶ $c \int f(x)dx$

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

In the following figure, the area enclosed is bounded below by :



- ▶ $y = x + 6$
- ▶ $y = x^2$
- ▶ $x = 2$
- ▶ $x = 0$

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

At what points the two curves: $y = x^2$ and $y = x + 6$ intersect ?

- ▶ $x = 0$ and $x = 2$
- ▶ $x = 0$ and $x = 3$
- ▶ $x = 2$ and $x = 3$
- ▶ $x = -2$ and $x = 3$

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

What is the sum of following series?

$$1 + 2 + 3 + 4 + \dots + n$$

▶ $\frac{n+1}{2}$

▶ $\frac{(n+1)(n+2)}{2}$

▶ $\frac{n(n+2)}{2}$

▶ $\frac{n(n+1)}{2}$

Question No: 10 (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: 11 (Marks: 1) - Please choose one

Let S be a solid bounded by two parallel planes perpendicular to the x-axis at $x = a$ and $x = b$. If, for each x in $[a, b]$, the cross-section area of S perpendicular to the x-axis is $A(x)$, then what is the volume of the solid?

▶ $V = \int_a^b A(y) dx$

▶ $V = \int_a^b A(x) dx$

$$V = \int_0^{A(x)} [b - a] dx$$



$$V = \int_0^{A(x)} [b + a] dx$$



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

Let the solid generated by the region enclosed between

$$y = \sqrt{x} \quad ; \quad x = 1, x = 4$$

and the x-axis is revolved about the y-axis. Which of the following equation gives the volumes of a solid by cylindrical shells?

$$V = \int_1^4 2\pi x \sqrt{x} dx$$



$$V = \int_1^4 2x \sqrt{x} dx$$



$$V = \int_0^4 2x \sqrt{x} dx$$



$$V = \int_{-4}^4 2x \sqrt{x} dx$$



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

If slope m of a none vertical line is m =1 then the angle of inclination of the line is

$$\frac{\pi}{4}$$



- ▶ $\frac{\pi}{2}$
- ▶ $\frac{\pi}{5}$

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

The PYTHAGORAS theorem describes the relationship between the sides of

.....

- ▶ Right angle triangle
- ▶ Isosceles triangle
- ▶ Equilateral triangle

Question No: 15 (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
- ▶ function
- ▶ not a function
- ▶ not a relation

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

$\lim_{x \rightarrow a} f(x) = \dots \dots \dots \text{where } f(x) = k$

The (k is a constant)

- ▶ k+2
- ▶ k+1
- ▶ k

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

$$\int \frac{1}{x^2 + 2} dx$$

Consider the indefinite integral

Let $t = x^2 + 2$

Is the following substitution correct?

$$\int \frac{1}{x^2 + 2} dx = \int \frac{1}{t} dt$$

- ▶ Yes
- ▶ No

Question No: 19 (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: 20 (Marks: 1) - Please choose one

How the series $1 - 3 + 5 - 7 + 9 - 11$ can be expressed in sigma notation?

$$\sum_{k=0}^{k=5} (-1)^k (2k + 1)$$

▶

$$\sum_{k=1}^{k=5} (-1)^k (2k + 1)$$



$$\sum_{k=1}^{k=5} (2k + 1)$$



$$\sum_{k=1}^{k=5} (2k + 1)$$



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

$$\sum_{k=1}^n f(x_k^*) \Delta x_k$$

The sum is known as:

- ▶ Riemann Sum
- ▶ General Sum
- ▶ Integral Sum
- ▶ Geometric Sum

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

$$\sum_{k=1}^n f(x_k^*) \Delta x_k$$

What does 'n' represent in the Riemann Sum ?

- ▶ No. of Circles
- ▶ No. of Subintervals
- ▶ No. of Loops
- ▶ No. of Squares

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

If w and v are continuous functions of y on an interval $[c, d]$ and $w(y) \geq v(y)$ for $c \leq y \leq d$, then area is bounded by the lines parallel to :

- ▶ Y-axis
- ▶ X-axis
- ▶ Both X-axis and Y-axis

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

How the series $2(1) + 2(2) + 2(3) + 2(4) + 2(5)$ can be expressed in sigma notation?

▶ $\sum_{k=0}^5 2k^2$

▶ $\sum_{k=1}^5 2k^2$

▶ $\sum_{k=0}^5 2k$

▶ $\sum_{k=1}^5 2k$

Question No: 25 (Marks: 1) - Please choose one

$\sum_{k=1}^n \frac{k^3}{2} = \underline{\hspace{2cm}}$

▶ $\frac{n(n+1)}{4}$

▶ $\frac{[n(n+1)]^2}{8}$

▶ $\frac{n(n+1)(2n+1)}{12}$

▶ $\frac{(n+1)(2n+1)}{6}$

Question No: 26 (Marks: 1) - Please choose one

If $a_1 < a_2 < a_3 < \dots < a_n < \dots$, then a sequence $\{a_n\}$ is.....

- ▶ Nondecreasing
- ▶ Decreasing

- ▶ Increasing
- ▶ Nonincreasing

Question No: 27 (Marks: 1) - Please choose one

If $a_1 \geq a_2 \geq a_3 \geq \dots \geq a_n \geq \dots$, then a sequence $\{a_n\}$ is

- ▶ Increasing
- ▶ Nondecreasing
- ▶ Decreasing
- ▶ Nonincreasing

Question No: 28 (Marks: 1) - Please choose one

If the difference between successive terms $a_{n+1} - a_n > 0$ then the sequence $\{a_n\}$ is known as:

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

Question No: 29 (Marks: 1) - Please choose one

For a sequence $\{a_n\}$ if the ratio of successive terms $\frac{a_{n+1}}{a_n} > 1$ then the sequence is known as:

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

Question No: 30 (Marks: 1) - Please choose one

For a sequence $\{a_n\}$ if the ratio of successive terms $\frac{a_{n+1}}{a_n} \geq 1$ then the sequence is known as :

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing

- ▶ Nonincreasing

Question No: 31 (Marks: 1) - Please choose one

If $f(n) = a_n$ is the nth term of the sequence and $f(n)$ is differentiable and $f'(n) > 0$ then the sequence will be:

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

Question No: 32 (Marks: 1) - Please choose one

If the geometric series $a + ar + ar^2 + ar^3 + \dots + ar^{k-1} + \dots$ where $(a \neq 0)$, $|r| < 1$ then which of the following is true for the given series?

- ▶ Converges
- ▶ Diverges
- ▶ Gives no information

Question No: 33 (Marks: 1) - Please choose one

If the geometric series $a + ar + ar^2 + ar^3 + \dots + ar^{k-1} + \dots$ where $(a \neq 0)$, $|r| \geq 1$ then which of the following is true for the given series?

- ▶ Converges
- ▶ Diverges
- ▶ Gives no information

Question No: 34 (Marks: 1) - Please choose one

$$\sum_{k=1}^{\infty} u_k$$

$$\sum_{k=1}^{\infty} |u_k|$$

If the series $\sum_{k=1}^{\infty} u_k$ converges but the series $\sum_{k=1}^{\infty} |u_k|$ does not converge, then

$$\sum_{k=1}^{\infty} u_k$$

will _____

- ▶ Converge absolutely
- ▶ Diverge
- ▶ Converge conditionally

Question No: 35 (Marks: 1) - Please choose one

Let $\sum u_k$ be a series with nonzero terms and suppose that

$$\rho = \lim_{k \rightarrow \infty} \frac{|u_{k+1}|}{|u_k|} > 1$$

then which of the following is true?

► The series $\sum |u_k|$ converges

► The series $\sum |u_k|$ diverges

► No conclusion can be drawn.

Question No: 36 (Marks: 1) - Please choose one

Suppose f and g are integrable functions on $[a, b]$ and c is a constant, then

$$\int_a^b c [f(x) + g(x)] dx = \underline{\hspace{2cm}}$$

$$\int_a^b f(cx) dx + \int_a^b g(cx) dx$$

►

$$\int_a^b f(x) dx + \int_a^b g(x) dx$$

►

$$c \int_a^b f(x) dx + c \int_a^b g(x) dx$$

►

► 0

Question No: 37 (Marks: 1) - Please choose one

Which of the following is surface area S generated by revolving the curve $y = f(x)$ between $x = 0$ and $x = 2$ about the x -axis?

$$S = \int_0^2 2\pi f(x) \sqrt{1 + [f'(x)]^2} dx$$



$$S = \int_0^2 2\pi f(x) \sqrt{1 + [f'(x)]^2} dx$$



$$S = \int_0^2 2\pi f(x) \sqrt{1 + [f'(x)]} dx$$



$$S = \int_0^2 2\sqrt{1 + [f'(x)]} dx$$



Question No: 38 (Marks: 1) - Please choose one

Which of the following is area of the surface generated by revolving the curve

$$y = 4\sqrt{x} ; 1 \leq x \leq 4$$

about the x -axis?

$$\int_1^4 2\pi(4\sqrt{x}) \sqrt{1 + [(4\sqrt{x})]^2} dx$$



$$\int_1^4 2\pi(4\sqrt{x}) \sqrt{1 + [(4\sqrt{x})']^2} dx$$



$$\int_1^4 2\pi + \sqrt{1 + [(4\sqrt{x})']^2} dx$$



$$\int_1^4 2\pi(4\sqrt{x}) \sqrt{1 + [(4\sqrt{x})']^2} dx$$



Question No: 39 (Marks: 1) - Please choose one

Which of the following is the work done W if an object moves in the positive direction along a coordinate line while subject to a force $F(x)$ in the direction of motion over an interval $[0,3]$?

$$W = \int_2^3 3x dx$$



$$W = \int_0^3 3x dx$$



$$W = \int_0^3 F(x) dx$$



$$W = \int_3^0 F(x) dx$$



Question No: 40 (Marks: 1) - Please choose one

$$\int_1^0 f(x) dx = 2 \quad \int_0^5 f(x) dx = 1$$

If $\int_1^5 f(x) dx$ and then which of the following is value of

- ?
- ▶ -3
 - ▶ -1
 - ▶ 1
 - ▶ 3

Question No: 41 (Marks: 2)

$$\frac{1}{2\sqrt{x}}$$

Derivative of a function is . Find the original function.

Question No: 42 (Marks: 2)

If $\sum u_k$ is a series with positive terms and $\rho = \lim_{k \rightarrow +\infty} \sqrt[k]{u_k}$; then write the three cases for the series to be convergent, divergent or none.

Question No: 43 (Marks: 2)

Evaluate the following integral:

$$\int_1^3 \frac{1}{x^2} dx$$

Question No: 44 (Marks: 3)

Use the first fundamental theorem of calculus to evaluate the definite integral:

$$\int_0^2 f(x) dx \quad \text{where} \quad f(x) = \begin{cases} x^2 & ; \quad 0 \leq x < 1 \\ x^3 & ; \quad 1 \leq x \leq 2 \end{cases}$$

Question No: 45 (Marks: 3)

$$\sum_{k=2}^{\infty} (-1)^{k-1} \frac{2^{k-1}}{(k-1)!}$$

Show that the series converges absolutely.

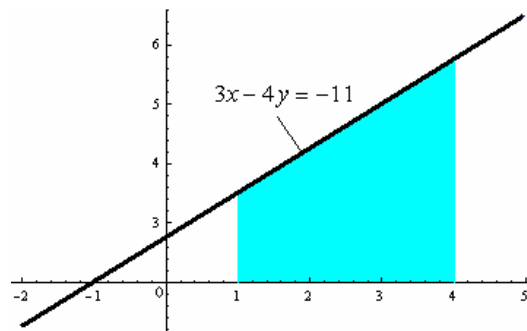
Question No: 46 (Marks: 3)

Express the following definite integral as limit of Riemann Sum. (Do not evaluate the integral)

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x dx$$

Question No: 47 (Marks: 5)

Express area of the shaded region as a definite integral.



Question No: 48 (Marks: 5)

How much work is required to wind the chain onto the pulley if a 100-ft length of steel chain weighting 15 lb/ ft. is dangling from a pulley?

Question No: 49 (Marks: 5)

Evaluate the following integral:

$$\int_1^2 \frac{x^2 + \sqrt{x}}{x^2} dx$$

Question No: 50 (Marks: 10)

Use L'Hopital's Rule to evaluate

$$\lim_{x \rightarrow 0} (1 + \sin x)^{\cot x}$$





(Marks: 1) - Please choose one

Let the region bounded by the curve $y = \sqrt[3]{x}$, the x-axis, and the line $x = 3$ is revolved about the y-axis to generate a solid. Which of the following equation gives the volume of a solid by cylindrical shells?

$$V = \int_0^3 x^{\frac{3}{2}} dx$$



$$V = 2\pi \int_0^3 \sqrt{x} dx$$



$$V = \int_0^3 2\pi x \sqrt[3]{x} dx$$



$$V = \int_0^3 x \sqrt[3]{x} dx$$



(Marks: 1) - Please choose one

For a sequence $\{a_n\}$ if the difference between successive terms $a_{n+1} - a_n \leq 0$ then the sequence is known as:

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

(Marks: 1) - Please choose one

$$\frac{a_{n+1}}{a_n} < 1$$

For a sequence $\{a_n\}$ if the ratio of successive terms is known as:

- ▶ Increasing
- ▶ Decreasing
- ▶ Nondecreasing
- ▶ Nonincreasing

(Marks: 1) - Please choose one

$$\rho = \lim_{k \rightarrow +\infty} \sqrt[k]{u_k}$$

If $\rho > 1$ then the series $\sum u_k$ with positive terms will /will be.....?

- ▶ Convergent
- ▶ Divergent
- ▶ Give no information

(Marks: 1) - Please choose one

In alternating series test, which one of the following condition must be satisfied?

$$\lim_{k \rightarrow \infty} a_k = 1$$

- ▶ $a_1 > a_2 > a_3, \dots > a_k > \dots$
- ▶ $a_1 \leq a_2 \leq a_3, \dots \leq a_k \leq \dots$

(Marks: 1) - Please choose one

$$y = \frac{2\sqrt{2}}{3} x^{\frac{3}{2}} ; 0 \leq x \leq 2$$

Let then which of the following is the length of the curve?

$$L = \int_0^2 \sqrt{\left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} \right) \right]^2} dx$$

►

$$L = \int \sqrt{1 + \left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} \right) \right]^2} dx$$

►

$$L = \int_0^2 \sqrt{1 + \left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} \right) \right]^2} dx$$

►

$$L = \int_0^2 \sqrt{1 + \left[\frac{d}{dx} \left(\frac{2\sqrt{2}}{3} x^{\frac{3}{2}} \right) \right]^2} dx$$

►

(Marks: 1) - Please choose one

2

3

is known as

- An even number
- Irrational Number
- A natural Number

► Rational Number

(Marks: 1) - Please choose one

$$f'(x_n) = 0 \text{ for some } n$$

For a function f , let .

Does the Newton's Method works for approximating the solution of $f(x) = 0$?

► Yes

► No

(Marks: 1) - Please choose one

The Mean Value Theorem states that "Let function f be differentiable on (a,b) and continuous on $[a, b]$, then there exist at least one point c in (a,b) where"

▶ $f'(c) = \frac{f(b) - f(a)}{b - a}$

$f(c) = \frac{f(b) - f(a)}{b - a}$

▶

$f(c) = \frac{f(a) - f(b)}{b - a}$

▶

$f'(c) = \frac{f(a) - f(b)}{b - a}$

▶

(Marks: 1) - Please choose one

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

If there is some function F such that $\frac{d}{dx}[F(x)] = f(x)$ then any function of the form $F(x) + C$ is ----- of $f(x)$

▶ Derivative

▶ Antiderivative

▶ Slope

▶ Maximum value

(Marks: 1) - Please choose one

If f and g are continuous function on an interval $[a, b]$ and $f(x) \geq g(x)$ for $a \leq x \leq b$, then area is bounded by the lines parallel to:

▶ X -axis

▶ Y-axis

▶ Both X -axis and Y-axis

(Marks: 1) - Please choose one

Sigma notation is represented by which of the following Greek letter?

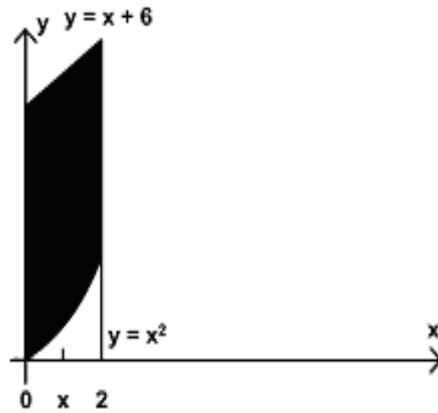
▶ χ

▶ η

- ▶ Σ
- ▶ ψ

(Marks: 1) - Please choose one

In the following figure, the area enclosed is bounded below by :



- ▶ $y = x + 6$
- ▶ $y = x^2$
- ▶ $x = 2$
- ▶ $x = 0$

(Marks: 1) - Please choose one

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

$$\frac{d}{dx}((c) \{h(x)\}) = \underline{\hspace{2cm}}$$

- ▶ 0
- ▶ $\frac{d}{dx}(h(x))$
- ▶ $\frac{d}{dx}(h(cx))$
- ▶ $c \frac{d}{dx}(h(x))$

(Marks: 1) - Please choose one

Let the solid generated by the region enclosed between