

Print

National Testing Agency

Question Paper Name :	Differential Calculus 25th March 2021 Shift2
Subject Name :	Differential Calculus
Creation Date :	2021-03-25 22:30:41
Duration :	180
Number of Questions :	100
Total Marks :	100
Display Marks:	Yes

Differential Calculus

Group Number :	1
Group Id :	512452149
Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	100
Is this Group for Examiner? :	No

Differential Calculus-1

Section Id :	512452795
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	100

Number of Questions to be attempted :

100

Section Marks :

100

Mark As Answered Required? :

Yes

Sub-Section Number :

1

Sub-Section Id :

512452802

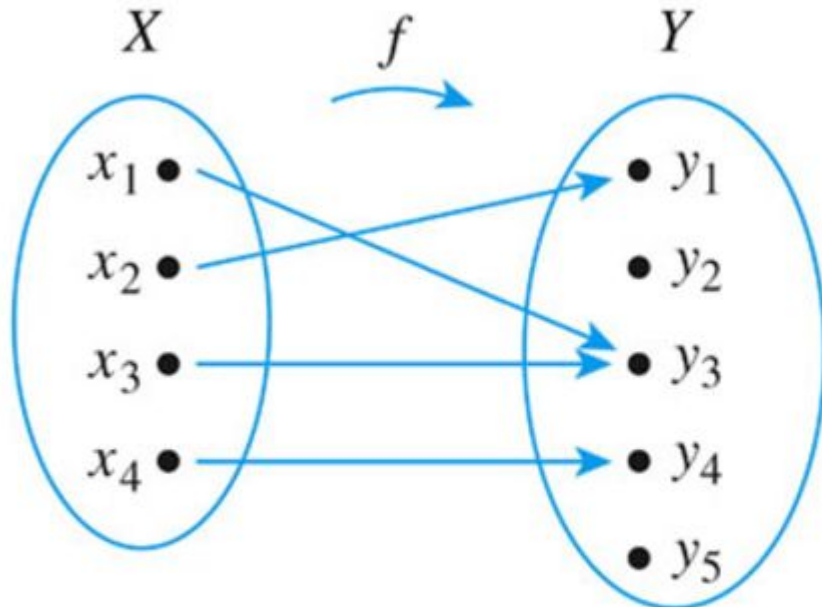
Question Shuffling Allowed :

Yes

Question Number : 1 Question Id : 51245212939 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

Range of the function represented by the following arrow diagram is_____



1. $\{y_1, y_2, y_3, y_4, y_5\}$
2. $\{y_1, y_2, y_3, y_4\}$
3. $\{y_1, y_3, y_4\}$
4. None of the above

Options :

51245239857. 1

51245239858. 2

51245239859. 3

51245239860. 4

Question Number : 2 Question Id : 51245212940 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The graph of the function $f(x) = 3x + 5$ is a _____

1. straight line
2. circle
3. ellipse
4. parabola

Options :

51245239861. 1

51245239862. 2

51245239863. 3

51245239864. 4

Sub-Section Number :

2

Sub-Section Id :

512452803

Question Shuffling Allowed :

Yes

Question Number : 3 Question Id : 51245212941 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

State True/False: $\lim_{x \rightarrow 1^-} (x + 3) = 3$

1. True
2. False

Options :

51245239865. 1

51245239866. 2

Sub-Section Number :

3

Sub-Section Id :

512452804

Question Shuffling Allowed :

Yes

Question Number : 4 Question Id : 51245212942 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 1} \frac{x^2 - 16}{x - 4} = \underline{\hspace{2cm}}$$

1. 1

2. 3

3. 5

4. 6

Options :

51245239867. 1

51245239868. 2

51245239869. 3

51245239870. 4

Sub-Section Number :

4

Sub-Section Id :

512452805

Question Shuffling Allowed :

Yes

Question Number : 5 Question Id : 51245212943 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 0^-} \frac{1}{x} = -\infty$$

1. True

2. False

Options :

51245239871. 1

51245239872. 2

Sub-Section Number :

5

Sub-Section Id :

512452806

Question Shuffling Allowed :

Yes

Question Number : 6 Question Id : 51245212944 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 1} \frac{x^3 + 3x^2 - 7}{x^2 + 8} = \underline{\hspace{2cm}}$$

1. $\frac{7}{17}$

2. $-\frac{1}{3}$

3. $-\frac{1}{17}$

4. $\frac{1}{17}$

Options :

51245239873. 1

51245239874. 2

51245239875. 3

51245239876. 4

Question Number : 7 Question Id : 51245212945 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 16} \frac{x-16}{\sqrt{x}-4} = \underline{\hspace{2cm}}$$

1. 2
2. 3
3. 4
4. 8

Options :

- 51245239877. 1
- 51245239878. 2
- 51245239879. 3
- 51245239880. 4

Question Number : 8 Question Id : 51245212946 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$$\text{If } 45 - \frac{x^2}{4} \leq u(x) \leq 45 + \frac{x^2}{2} \quad \forall x \neq 0, \text{ then } \lim_{x \rightarrow 0} u(x) = \underline{\hspace{2cm}}$$

1. 0
2. 5
3. 45
4. None of the above

Options :

- 51245239881. 1
- 51245239882. 2
- 51245239883. 3
- 51245239884. 4

Sub-Section Number :

6

Sub-Section Id :

512452807

Question Shuffling Allowed :

Yes

Question Number : 9 Question Id : 51245212947 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A function $f(x)$ has right hand limit L at c , if, for every number $\epsilon > 0$, there exists a corresponding number $\delta > 0$ such that $|f(x) - L| < \epsilon$ if $0 < x - c < \delta$

1. True
2. False

Options :

51245239885. 1
51245239886. 2

Sub-Section Number :

7

Sub-Section Id :

512452808

Question Shuffling Allowed :

Yes

Question Number : 10 Question Id : 51245212948 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

For the function $f(x) = \frac{x^2 + x - 6}{x^3 - 4}$, _____

1. f is continuous at $x=0$
2. f is continuous at $x=2$
3. f is not continuous at $x=2$
4. f is continuous at every point on the real line

Options :

51245239887. 1
51245239888. 2
51245239889. 3
51245239890. 4

Question Number : 11 Question Id : 51245212949 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 1} \frac{\sin x}{x} = \underline{\hspace{2cm}}$$

1. 0
2. 1
3. 2
4. $\sin 1$

Options :

51245239891. 1
51245239892. 2
51245239893. 3
51245239894. 4

Question Number : 12 Question Id : 51245212950 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No
Correct Marks : 1 Wrong Marks : 0

(a, ∞)

1. $\{x \in \mathbb{R} : x > a\}$
2. $\{x \in \mathbb{R} : x \geq a\}$
3. $\{x \in \mathbb{R} : x < a\}$
4. $\{x \in \mathbb{R} : x \leq a\}$

Options :

51245239895. 1
51245239896. 2
51245239897. 3
51245239898. 4

Sub-Section Number :

8

Sub-Section Id :

512452809

Question Shuffling Allowed :

Yes

Question Number : 13 Question Id : 51245212951 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

For the curve $y = f(x)$, the slope at the point P having coordinates $(x_0, f(x_0))$ is given by $\lim_{x_1 \rightarrow x_0} \frac{f(x_1) - f(x_0)}{x_1 - x_0}$

1. True
2. False

Options :

51245239899. 1

51245239900. 2

Sub-Section Number :

9

Sub-Section Id :

512452810

Question Shuffling Allowed :

Yes

Question Number : 14 Question Id : 51245212952 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The slope of the curve $y = \frac{1}{x}$ at $x = a$ is _____

1. $-\frac{1}{a}$
2. $\frac{1}{a^2}$
3. $-\frac{1}{a^2}$
4. $\frac{1}{a}$

Options :

51245239901. 1

51245239902. 2

51245239903. 3

51245239904. 4

Question Number : 15 Question Id : 51245212953 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The derivative of $y = 300x + 777$ with respect to x is _____.

1. 777
2. 1077
3. 300
4. None of the above

Options :

51245239905. 1
51245239906. 2
51245239907. 3
51245239908. 4

Question Number : 16 Question Id : 51245212954 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$\frac{d}{dx}[\cot x] =$

1. $\csc^2 x$
2. $-\csc^2 x$
3. $\sec^2 x$
4. $-\sec^2 x$

Options :

51245239909. 1
51245239910. 2
51245239911. 3
51245239912. 4

Question Number : 17 Question Id : 51245212955 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Where does the slope of the curve $y = \frac{2}{x}$ equal $-\frac{1}{2}$?

1. At the points $(\frac{1}{2}, 2)$ and $(-\frac{1}{2}, -2)$
2. At the points $(2, 1)$ and $(-2, -1)$
3. At the points $(3, \frac{1}{3})$ and $(-2, -\frac{1}{2})$
4. At the points $(-3, -\frac{1}{3})$ and $(-2, -\frac{1}{2})$

Options :

51245239913. 1
51245239914. 2
51245239915. 3
51245239916. 4

Question Number : 18 Question Id : 51245212956 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The second derivative of $r = \frac{1}{3s^2} - \frac{5}{2s}$ with respect to s is ____

1. $\frac{2}{s^4} - \frac{5}{s^3}$
2. $-\frac{2}{s^4} - \frac{5}{s^3}$
3. $\frac{2}{s^4} + \frac{5}{s^3}$
4. $-\frac{2}{s^4} + \frac{5}{s^3}$

Options :

51245239917. 1
51245239918. 2
51245239919. 3
51245239920. 4

Question Number : 19 Question Id : 51245212957 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 0} \frac{\sqrt{1+x}-1}{x} =$$

1. $\frac{1}{2}$
2. $-\frac{1}{2}$
3. -2
4. 2

Options :

- 51245239921. 1
- 51245239922. 2
- 51245239923. 3
- 51245239924. 4

Question Number : 20 Question Id : 51245212958 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow \pi} \frac{x \cos x + \pi}{\sin x} =$$

1. 0
2. 1
3. 2
4. 3

Options :

- 51245239925. 1
- 51245239926. 2
- 51245239927. 3
- 51245239928. 4

Question Number : 21 Question Id : 51245212959 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If $xy = 1$ then $\frac{dy}{dx} =$ _____

1. $\frac{y}{x^2}$
2. $-\frac{y}{x^2}$
3. $\frac{1}{x^2}$
4. $-\frac{1}{x^2}$

Options :

51245239929. 1
51245239930. 2
51245239931. 3
51245239932. 4

Question Number : 22 Question Id : 51245212960 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If $15x^2 - 14y \frac{dy}{dx} = 0$, then $\frac{d^2y}{dx^2} =$ _____

1. $\frac{420xy^2 - 220x^4}{196y^3}$
2. $\frac{420xy^2 - 225x^4}{190y^3}$
3. $\frac{420xy^2 + 225x^4}{196y^3}$
4. $\frac{420xy^2 - 225x^4}{196y^3}$

Options :

51245239933. 1
51245239934. 2
51245239935. 3

51245239936. 4

Question Number : 23 Question Id : 51245212961 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If $y + \sin y = x$, then $\frac{d^2 y}{dx^2} = \underline{\hspace{2cm}}$

1. $-\frac{\sin y}{(1+\cos y)^3}$
2. $\frac{\sin y}{(1+\cos y)^3}$
3. $\frac{\cos y}{(1+\cos y)^3}$
4. $-\frac{\cos y}{(1+\cos y)^3}$

Options :

51245239937. 1
51245239938. 2
51245239939. 3
51245239940. 4

Question Number : 24 Question Id : 51245212962 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$\frac{d^n}{dx^n} \left(\frac{1}{x} \right) = \underline{\hspace{2cm}}$

1. $\frac{(-1)^{n+1} (n!)}{x^n}$
2. $\frac{(-1)^n (n!)}{x^n}$
3. $\frac{(-1)^{n+1} (n!)}{x^{n+1}}$
4. $\frac{(-1)^n (n!)}{x^{n+1}}$

Options :

51245239941. 1

51245239942. 2

51245239943. 3

51245239944. 4

Question Number : 25 Question Id : 51245212963 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$$\frac{d^n}{dx^n} [\cos(ax + b)] = \underline{\hspace{2cm}}$$

1. $a^n \cos(ax + b + n\pi)$
2. $a^n \cos(ax + b + \frac{n\pi}{2})$
3. $a^n \sin(ax + b + \frac{n\pi}{2})$
4. None of the above

Options :

51245239945. 1

51245239946. 2

51245239947. 3

51245239948. 4

Sub-Section Number :

10

Sub-Section Id :

512452811

Question Shuffling Allowed :

Yes

Question Number : 26 Question Id : 51245212964 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Suppose u and v are two functions of x possessing derivatives of n th order. Then the n th derivative of the product function uv is given by

$$(uv)_n = u_n v + {}^n C_1 u_{n-1} v_1 + {}^n C_2 u_{n-2} v_2 + \cdots + {}^n C_n u v_n$$

1. True
2. False

Options :

51245239949. 1

51245239950. 2

Sub-Section Number :

11

Sub-Section Id :

512452812

Question Shuffling Allowed :

Yes

Question Number : 27 Question Id : 51245212965 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If $y = (x^2 - 1)^n$, then _____

1. $(x^2 - 1) y_{n+2} - 2 x y_{n+1} + n (n + 1) y_n = 0$
2. $(x^2 - 1) y_{n+2} - 2 x y_{n+1} - n (n + 1) y_n = 0$
3. $(x^2 - 1) y_{n+2} + 2 x y_{n+1} + n (n + 1) y_n = 0$
4. $(x^2 - 1) y_{n+2} + 2 x y_{n+1} - n (n + 1) y_n = 0$

Options :

51245239951. 1

51245239952. 2

51245239953. 3

51245239954. 4

Question Number : 28 Question Id : 51245212966 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If f is differentiable at $x = x_0$, then the local linearization of f at x_0 is _____

1. $L(x) = f(x_0) - f'(x_0)(x + x_0)$
2. $L(x) = f(x_0) + f'(x_0)(x + x_0)$
3. $L(x) = f(x_0) - f'(x_0)(x - x_0)$
4. $L(x) = f(x_0) + f'(x_0)(x - x_0)$

Options :

- 51245239955. 1
- 51245239956. 2
- 51245239957. 3
- 51245239958. 4

Question Number : 29 Question Id : 51245212967 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$d\left(\frac{x}{x+1}\right) =$ _____

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

Options :

- 51245239959. 1
- 51245239960. 2
- 51245239961. 3
- 51245239962. 4

Question Number : 30 Question Id : 51245212968 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The estimated percentage change in f while moving from x_0 to a nearby point $x_0 + dx$ is

- _____
1. $\frac{f(x_0)}{df \times 100}$
 2. $\frac{f(x_0)}{df} \times 100$
 3. $\frac{df}{f(x_0)}$
 4. $\frac{df}{f(x_0)} \times 100$

Options :

51245239963. 1
51245239964. 2
51245239965. 3
51245239966. 4

Sub-Section Number :

12

Sub-Section Id :

512452813

Question Shuffling Allowed :

Yes

Question Number : 31 Question Id : 51245212969 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

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

1. True
2. False

Options :

51245239967. 1
51245239968. 2

Sub-Section Number :

13

Sub-Section Id :

512452814

Question Shuffling Allowed :

Yes

Question Number : 32 Question Id : 51245212970 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The function $f(x) = x^4 - 2x^2$ is strictly increasing in the interval _____

1. $(-\infty, 3)$
2. $(-\infty, 0)$
3. $(3, \infty)$
4. $(0, 3)$

Options :

- 51245239969. 1
- 51245239970. 2
- 51245239971. 3
- 51245239972. 4

Question Number : 33 Question Id : 51245212971 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If f has a local maximum or minimum value at an interior point c and if f is differentiable at c , then _____

1. $f'(c) > 0$
2. $f'(c) < 0$
3. $f'(c) = 0$
4. None of the above

Options :

- 51245239973. 1

51245239974. 2

51245239975. 3

51245239976. 4

Question Number : 34 Question Id : 51245212972 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If $p(x)$ is a polynomial of even degree and if the leading coefficient is positive, then

1. there is an absolute minimum but no absolute maximum
2. there is an absolute maximum but no absolute minimum
3. there is neither absolute minimum nor absolute maximum
4. there is absolute maxima

Options :

51245239977. 1

51245239978. 2

51245239979. 3

51245239980. 4

Sub-Section Number :

14

Sub-Section Id :

512452815

Question Shuffling Allowed :

Yes

Question Number : 35 Question Id : 51245212973 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Suppose f is continuous in the closed interval $[a, b]$ and differentiable in the open interval (a, b) , then there is a point c in the open interval (a, b) at which $\frac{f(b)+f(a)}{b-a} = f'(c)$

1. True
2. False

Options :

51245239981. 1

51245239982. 2

Question Number : 36 Question Id : 51245212974 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If two functions $f(x)$ and $g(x)$ are differentiable in a closed interval $[a, b]$ and $g'(x) \neq 0$ for any value of x in $[a, b]$, then there exists at least one value c of x belonging to the open interval (a, b) such that $\frac{f(b)-f(a)}{g(b)-g(a)} = \frac{f'(c)}{g'(c)}$

1. True
2. False

Options :

51245239983. 1

51245239984. 2

Sub-Section Number :

15

Sub-Section Id :

512452816

Question Shuffling Allowed :

Yes

Question Number : 37 Question Id : 51245212975 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

For the function $y = \frac{25}{x-30}$, $x \neq 30$, _____

1. $y = 25$ is a horizontal asymptote
2. $x = 25$ is a vertical asymptote
3. $y = 30$ is a horizontal asymptote
4. $x = 30$ is a vertical asymptote

Options :

51245239985. 1

51245239986. 2

51245239987. 3

51245239988. 4

Question Number : 38 Question Id : 51245212976 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Asymptotes of $x^2 - y^2 = 1$ are _____

1. $y = -x$ and $y = x$
2. $y = 1 - x$ and $y = 1 + x$
3. $y = -x - 1$ and $y = x + 1$
4. $y = 2 - x$ and $y = 2 + x$

Options :

51245239989. 1

51245239990. 2

51245239991. 3

51245239992. 4

Question Number : 39 Question Id : 51245212977 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A horizontal asymptote to the graph of the function $f(x) = \frac{x+3}{x+2}$ is _____

1. $y = -x$
2. $y = 0$
3. $y = 30$
4. $y = 1$

Options :

51245239993. 1

51245239994. 2

51245239995. 3

51245239996. 4

Question Number : 40 Question Id : 51245212978 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The curve $x^2y^2 = (x^2 + y^2)^2$ has _____

1. no horizontal asymptote
2. no vertical asymptote
3. $y = 30$ is an asymptote
4. $y = -1$ and $y = 1$ are asymptotes

Options :

51245239997. 1

51245239998. 2

51245239999. 3

51245240000. 4

Question Number : 41 Question Id : 51245212979 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The graph of $f(x) = x^2 - 3x + 4$ defined on the domain $D = \{0, 1, 2, 3\}$ is _____

1. Graph of $f = \{(0, 4), (1, 2), (2, 2), (3, 4)\}$
2. Graph of $f = \{(0, 4), (1, 2), (2, 22), (3, 4)\}$
3. Graph of $f = \{(0, 4), (1, 2), (2, 2), (3, 14)\}$
4. Graph of $f = \{(0, 4), (1, 12), (2, 2), (3, 4)\}$

Options :

51245240001. 1

51245240002. 2

51245240003. 3

51245240004. 4

Question Number : 42 Question Id : 51245212980 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The graph of $y = \sqrt{3}x^2$ is _____

1. symmetrical about the x-axis
2. symmetrical about the y-axis
3. symmetrical about the origin
4. symmetrical about both the x- and y-axes

Options :

- 51245240005. 1
- 51245240006. 2
- 51245240007. 3
- 51245240008. 4

Question Number : 43 Question Id : 51245212981 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Graph of $x^3 + y^3 = 8xy$ is _____

1. symmetrical about the x-axis
2. symmetrical about the y-axis
3. symmetrical about the origin
4. symmetrical about the line $y = x$

Options :

- 51245240009. 1
- 51245240010. 2
- 51245240011. 3
- 51245240012. 4

Question Number : 44 Question Id : 51245212982 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

600th term of the sequence $((-1)^n : n \in \mathbb{N})$

1. 100
2. -100
3. -1
4. 1

Options :

51245240013. 1
51245240014. 2
51245240015. 3
51245240016. 4

Sub-Section Number : 16
Sub-Section Id : 512452817
Question Shuffling Allowed : Yes

Question Number : 45 Question Id : 51245212983 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A sequence of real numbers (u_n) converges if there is a real numbers L such that for every $\varepsilon > 0$ there is a positive integer N such that $|u_n - L| \geq \varepsilon \quad \forall n \geq N$

1. True
2. False

Options :

51245240017. 1
51245240018. 2

Sub-Section Number : 17
Sub-Section Id : 512452818

Question Shuffling Allowed :

Yes

**Question Number : 46 Question Id : 51245212984 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No
Correct Marks : 1 Wrong Marks : 0**

The sequence $(-1, 20, -1, 20, \dots, -1, 20, \dots)$ _____

1. converges to 2
2. converges to -1
3. does not converge to any real number
4. converges to some real number

Options :

- 51245240019. 1
- 51245240020. 2
- 51245240021. 3
- 51245240022. 4

Sub-Section Number :

18

Sub-Section Id :

512452819

Question Shuffling Allowed :

Yes

**Question Number : 47 Question Id : 51245212985 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No
Correct Marks : 1 Wrong Marks : 0**

The sequence $\left\{ (-1)^n \frac{n-9}{n} \right\}$ converges to 0.

1. True
2. False

Options :

- 51245240023. 1
- 51245240024. 2

Sub-Section Number :

19

Sub-Section Id :

512452820

Question Shuffling Allowed :

Yes

Question Number : 48 Question Id : 51245212986 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following is the Fibonacci sequence?

1. (1, 1, 2, 2, 4, 6, 10, 16, 26, 42, ...)
2. (0, 1, 2, 3, 4, 6, 10, 16, 26, 42, ...)
3. (1, 1, 2, 3, 5, 8, 10, 16, 26, 42, ...)
4. (1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...)

Options :

51245240025. 1

51245240026. 2

51245240027. 3

51245240028. 4

Question Number : 49 Question Id : 51245212987 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If a non decreasing sequence converges, it converges to _____

1. its least upper bound.
2. its upper bound.
3. its lower bound.
4. its greatest lower bound.

Options :

51245240029. 1

51245240030. 2

51245240031. 3

51245240032. 4

Question Number : 50 Question Id : 51245212988 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Limit of the sequence $\left\{ \frac{405-9n^6}{n^6+3} \right\}$ is _____

1. 9
2. -9
3. 0
4. 1

Options :

- 51245240033. 1
- 51245240034. 2
- 51245240035. 3
- 51245240036. 4

Question Number : 51 Question Id : 51245212989 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The sequence $\left((-1)^n \frac{1}{n} \right)$ _____

1. converges to 1
2. converges to -1
3. converges to 0
4. doesn't converge

Options :

- 51245240037. 1
- 51245240038. 2
- 51245240039. 3
- 51245240040. 4

Question Number : 52 Question Id : 51245212990 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$$\lim_{n \rightarrow \infty} \left(\frac{n+1}{n-1} \right)^n = \underline{\hspace{2cm}}$$

1. e^2
2. e
3. $\frac{1}{e}$
4. doesn't exist

Options :

51245240041. 1
51245240042. 2
51245240043. 3
51245240044. 4

Question Number : 53 Question Id : 51245212991 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The sum of the series $0.3 + 0.03 + 0.003 + 0.0003 + \dots$ is _____

1. $\frac{1}{3}$
2. $-\frac{1}{3}$
3. $\frac{1}{9}$
4. $-\frac{1}{9}$

Options :

51245240045. 1
51245240046. 2
51245240047. 3
51245240048. 4

Question Number : 54 Question Id : 51245212992 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which one of the following series converges?

1. $1 + 2 + 3 + \dots$
2. $\sum_{n=1}^{\infty} n^2$
3. $\sqrt{\frac{1}{2}} + \sqrt{\frac{2}{3}} + \sqrt{\frac{3}{4}} + \dots$
4. $\frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \dots$

Options :

- 51245240049. 1
- 51245240050. 2
- 51245240051. 3
- 51245240052. 4

Question Number : 55 Question Id : 51245212993 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The series $\sum_{n=1}^{\infty} \frac{1}{n^p} = \frac{1}{1^p} + \frac{1}{2^p} + \frac{1}{3^p} + \dots + \frac{1}{n^p} + \dots$ converges if _____

1. $p=1$
2. $p=0$
3. $p>0$
4. $\backslash(p>1\backslash)$

Options :

- 51245240053. 1
- 51245240054. 2
- 51245240055. 3
- 51245240056. 4

Sub-Section Number :

20

Sub-Section Id :

512452821

Question Shuffling Allowed :

Yes

Question Number : 56 Question Id : 51245212994 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No
Correct Marks : 1 Wrong Marks : 0

The series $\sum_{n=1}^{\infty} \frac{1}{2^n - 1}$ converges

1. True
2. False

Options :

51245240057. 1

51245240058. 2

Sub-Section Number :

21

Sub-Section Id :

512452822

Question Shuffling Allowed :

Yes

Question Number : 57 Question Id : 51245212995 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No
Correct Marks : 1 Wrong Marks : 0

Which one of the following series is absolutely convergent?

1. $1 - \frac{1}{2^3} + \frac{1}{3^3} - \frac{1}{4^3} + \frac{1}{5^3} - \dots$
2. $1 - \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{4}} - \frac{1}{\sqrt{16}} + \dots$
3. $1 - \frac{1}{2^{0.1}} + \frac{1}{3^{0.1}} - \frac{1}{4^{0.1}} + \frac{1}{5^{0.1}} - \dots$
4. $1 - 2 + 3 - 4 + \dots + (-1)^n n + \dots$

Options :

51245240059. 1

51245240060. 2

51245240061. 3

51245240062. 4

Sub-Section Number :

22

Sub-Section Id :

512452823

Question Shuffling Allowed :

Yes

Question Number : 58 Question Id : 51245212996 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Let $\sum_{n=1}^{\infty} u_n$ be a series with nonzero terms and suppose that $\rho = \lim_{n \rightarrow +\infty} \frac{|u_{n+1}|}{|u_n|} = 1$, then the series converges absolutely.

1. True
2. False

Options :

51245240063. 1

51245240064. 2

Sub-Section Number :

23

Sub-Section Id :

512452824

Question Shuffling Allowed :

Yes

Question Number : 59 Question Id : 51245212997 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The power series $\sum_{n=0}^{\infty} x^n = 1 + x + x^2 + \dots + x^n + \dots$ _____

1. doesn't converge at $x = 1$
2. converges at $x = 1$
3. converges at $x = 1010$
4. converges at $x = 2.2$

Options :

51245240065. 1

51245240066. 2

51245240067. 3

51245240068. 4

Question Number : 60 Question Id : 51245212998 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The radius of convergence of $\sum_{n=0}^{\infty} n!x^n = 1 + x + 2!x^2 + 3!x^3 + \dots$ is _____

1. $+\infty$

2. 1

3. 0

4. $\frac{1}{2}$

Options :

51245240069. 1

51245240070. 2

51245240071. 3

51245240072. 4

Question Number : 61 Question Id : 51245212999 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The interval of convergence of the series $1 + x + x^2 + x^3 + \dots$ is _____

1. $(1, \infty)$

2. $(-1, 1)$

3. $(-\frac{1}{2}, \frac{1}{2})$

4. $(-2, 2)$

Options :

51245240073. 1

51245240074. 2

51245240075. 3

51245240076. 4

Question Number : 62 Question Id : 51245213000 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which one of the following is the cosine series?

1. $1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \dots$
2. $x + \frac{x^3}{3!} + \frac{x^5}{5!} + \dots$
3. $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \dots$
4. $1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \dots$

Options :

51245240077. 1

51245240078. 2

51245240079. 3

51245240080. 4

Question Number : 63 Question Id : 51245213001 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The parametric equations $x = \cos t$, $y = \sin t$ (t varies over the closed interval $[0, 2\pi]$) represents _____

1. a parabola
2. an ellipse
3. a circle
4. a straight line

Options :

51245240081. 1

51245240082. 2

51245240083. 3

51245240084. 4

Question Number : 64 Question Id : 51245213002 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$\frac{dy}{dx}$ when $x = 2t + 3$ and $y = t^2 - 1$ is _____

1. $2t$

2. t

3. $-t$

4. $-2t$

Options :

51245240085. 1

51245240086. 2

51245240087. 3

51245240088. 4

Question Number : 65 Question Id : 51245213003 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

$\frac{d^2y}{dx^2}$ when $x = 2t - t^3$ and $y = t - t^2$ is _____

1. $\frac{-4+12t^2-12t^3}{(2+3t^2)^3}$
2. $\frac{-4+12t^2+12t^3}{(2-3t^2)^3}$
3. $\frac{4+12t^2-12t^3}{(2-3t^2)^3}$
4. $\frac{-4+12t^2-12t^3}{(2-3t^2)^3}$

Options :

51245240089. 1
51245240090. 2
51245240091. 3
51245240092. 4

Question Number : 66 Question Id : 51245213004 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which one of the following is the Cartesian equivalent of the curve whose polar equation is $r \cos(\theta - \frac{\pi}{4}) = \sqrt{2}$?

1. $x + y = 4$
2. $x + y = \frac{1}{2}$
3. $x + y = 2$
4. $x - y = 2$

Options :

51245240093. 1
51245240094. 2
51245240095. 3
51245240096. 4

Question Number : 67 Question Id : 51245213005 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which one of the following is the polar equivalent of the curve whose Cartesian equation is

$$x^2 + (y - 4)^2 = 16 ?$$

1. $r^2 = -8r \sin \theta$
2. $r^2 = -8r \cos \theta$
3. $r^2 = 8r \cos \theta$
4. $r^2 = 8r \sin \theta$

Options :

51245240097. 1
51245240098. 2
51245240099. 3
51245240100. 4

Question Number : 68 Question Id : 51245213006 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The polar equation $r = 7 \cos 3\theta$ has _____

1. 2 equally spaced petals of radius 7
2. 3 equally spaced petals of radius 7
3. 6 equally spaced petals of radius 7
4. 9 equally spaced petals of radius 7

Options :

51245240101. 1
51245240102. 2
51245240103. 3
51245240104. 4

Question Number : 69 Question Id : 51245213007 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The curvature at any point of a circle is _____

1. the radius of circle.
2. twice the radius of circle.
3. the reciprocal of the radius of circle.
4. the reciprocal of twice the the radius of circle.

Options :

51245240105. 1
51245240106. 2
51245240107. 3
51245240108. 4

Question Number : 70 Question Id : 51245213008 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The radius of curvature of the ellipse $\frac{x^2}{9} + \frac{y^2}{16} = 2$ at the point (3, 4) is _____

1. $-\frac{125}{24}$
2. $\frac{125}{24}$
3. $-\frac{125}{2}$
4. 2

Options :

51245240109. 1
51245240110. 2
51245240111. 3
51245240112. 4

Question Number : 71 Question Id : 51245213009 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0

The radius of curvature of the curve $x = a(t + \sin t)$, $y = a(1 - \cos t)$ at a point t in parametric coordinates is _____

1. $\rho(t) = 4a \cos t$
2. $\rho(t) = 2a \cos \left(\frac{1}{2}t\right)$
3. $\rho(t) = a \cos \left(\frac{1}{2}t\right)$
4. $\rho(t) = 4a \cos \left(\frac{1}{2}t\right)$

Options :

51245240113. 1

51245240114. 2

51245240115. 3

51245240116. 4

Sub-Section Number :

24

Sub-Section Id :

512452825

Question Shuffling Allowed :

Yes

Question Number : 72 Question Id : 51245213010 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Formula for radius of curvature in polar coordinates is $\rho(\theta) = \frac{[r^2 + \left(\frac{dr}{d\theta}\right)^2]^{3/2}}{r^2 + 2\left(\frac{dr}{d\theta}\right)^2 - r\left(\frac{d^2r}{d\theta^2}\right)}$

1. True
2. False

Options :

51245240117. 1

51245240118. 2

Sub-Section Number :

25

Sub-Section Id :

512452826

Question Shuffling Allowed :

Yes

Question Number : 73 Question Id : 51245213011 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No
Correct Marks : 1 Wrong Marks : 0

The inverse of the function $f(x) = 2x - 3$ is _____

1. $f^{-1}(x) = \frac{x+3}{2}$
2. $f^{-1}(x) = \frac{x+2}{3}$
3. $f^{-1}(x) = \frac{x-3}{2}$
4. $f^{-1}(x) = \frac{x-2}{3}$

Options :

- 51245240119. 1
- 51245240120. 2
- 51245240121. 3
- 51245240122. 4

Question Number : 74 Question Id : 51245213012 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No
Correct Marks : 1 Wrong Marks : 0

$\lim_{(x,y) \rightarrow (0,1)} \frac{235x^{3/2}}{\sqrt{13x^2+15y^2+170}} =$ _____

1. 0
2. -1
3. $\frac{1}{2}$
4. $-\frac{1}{2}$

Options :

- 51245240123. 1
- 51245240124. 2
- 51245240125. 3

51245240126. 4

Question Number : 75 Question Id : 51245213013 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The value of $\frac{\partial^3 u}{\partial y \partial x^2}$ where $u = u(x, y) = y^2 e^x + x^2 y^3 + 16$ is _____

1. $2ye^x + 6y^2$
2. $2ye^x - 6y^2$
3. $-2ye^x + 6y^2$
4. $-2ye^x - 6y^2$

Options :

51245240127. 1
51245240128. 2
51245240129. 3
51245240130. 4

Question Number : 76 Question Id : 51245213014 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

If $w = x + 2y + z^2$, $x = \frac{u}{v}$, $y = u^2 + \ln v$, $z = 2u$, then $\frac{\partial w}{\partial v} =$ _____

1. $-\frac{2}{v} + \frac{u}{v^2}$
2. $-\frac{2}{v} - \frac{u}{v^2}$
3. $\frac{2}{v} - \frac{u}{v^2}$
4. $\frac{2}{v} + \frac{u}{v^2}$

Options :

51245240131. 1
51245240132. 2
51245240133. 3

51245240134. 4

Sub-Section Number :

26

Sub-Section Id :

512452827

Question Shuffling Allowed :

Yes

Question Number : 77 Question Id : 51245213015 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

A function $f(x, y)$ is differentiable at (x_0, y_0) if

$$\lim_{(\Delta x, \Delta y) \rightarrow (0, 0)} \frac{\Delta f - f_x(x_0, y_0)\Delta x - f_y(x_0, y_0)\Delta y}{\sqrt{(\Delta x)^2 + (\Delta y)^2}} = 0$$

1. True
2. False

Options :

51245240135. 1

51245240136. 2

Sub-Section Number :

27

Sub-Section Id :

512452828

Question Shuffling Allowed :

Yes

Question Number : 78 Question Id : 51245213016 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The function $f(x) = \frac{1}{x}$ _____

1. is not continuous for any nonzero real number
2. is continuous for any nonzero real number
3. is continuous when $x = 0$
4. is not continuous when $x = -1$

Options :

51245240137. 1

51245240138. 2

51245240139. 3

51245240140. 4

Sub-Section Number :

28

Sub-Section Id :

512452829

Question Shuffling Allowed :

Yes

Question Number : 79 Question Id : 51245213017 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The function $\sin 2\pi x$ is π periodic

1. True
2. False

Options :

51245240141. 1

51245240142. 2

Question Number : 80 Question Id : 51245213018 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The series $1 - 2 + 3 - 4 + \dots + (-1)^{n-1}n + \dots$ is convergent.

1. True
2. False

Options :

51245240143. 1

51245240144. 2

Sub-Section Number :

29

Sub-Section Id :

512452830

Question Shuffling Allowed :

Yes

Question Number : 81 Question Id : 51245213019 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. The natural domain of $f(x) = \frac{x^2-4}{x+2}$	I. The set of real numbers except -3
B. The natural domain of $f(x) = \frac{x^2-4}{x-2}$	II. The set of real numbers except 2
C. The natural domain of $f(x) = \frac{x^2-4}{-x+2}$	III. The set of real numbers except -2
D. The natural domain of $f(x) = \frac{x^2-4}{x+3}$	IV. The set of real numbers except 2

Choose the **correct** answer from the options given below:

1. A - I, B -II , C -III , D -IV
2. A -III , B -II , C -IV , D -I
3. A -II , B -III , C -IV , D -I
4. A -II , B -I , C -IV , D - III

Options :

51245240145. 1
51245240146. 2
51245240147. 3
51245240148. 4

Question Number : 82 Question Id : 51245213020 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. For a real valued function f of real variable, to shift the graph of $y=f(x)$ straight up _____	I. add a negative constant to the right-hand side of the formula $y=f(x)$
B. For a real valued function f of real variable, to shift the graph of $y=f(x)$ straight down _____	II. add a positive constant to x
C. For a real valued function f of real variable, to shift the graph of $y=f(x)$ to left _____	III. add a positive constant to the right-hand side of the formula $y=f(x)$
D. For a real valued function f of real variable, to shift the graph of $y=f(x)$ to right _____	IV. add a negative constant to x

Choose the **correct** answer from the options given below:

1. A -I , B -III , C -II , D - IV
2. A -IV , B -III , C -I , D -II
3. A -III , B -II , C -I , D - IV
4. A -III , B -I , C -II , D -IV

Options :

- 51245240149. 1
- 51245240150. 2
- 51245240151. 3
- 51245240152. 4

Question Number : 83 Question Id : 51245213021 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. $\frac{d}{dx}(x^3)$	I. $8x^7$
B. $\frac{d}{dx}(x)$	II. $5x^4$
C. $\frac{d}{dx}(x^5)$	III. 1
D. $\frac{d}{dx}(x^8)$	IV. $3x^2$

Choose the **correct** answer from the options given below:

1. A -I , B -III , C -IV , D -II
2. A -IV , B -III , C -II , D -I
3. A -IV , B -I , C -III , D -II
4. A - IV, B -II , C -III , D - I

Options :

- 51245240153. 1
- 51245240154. 2
- 51245240155. 3
- 51245240156. 4

Question Number : 84 Question Id : 51245213022 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. The function $f(x) = x$ is _____	I. is continuous at the point $x = 2$
B. The function $f(x) = \frac{1}{x}$	II. continuous at the point $x = 0$
C. The function $f(x) = \frac{1}{x^2-4}$ is _____	III. continuous at every real number
D. The function $f(x) = \tan x$ is _____	IV. not continuous at $x = 2$

Choose the **correct** answer from the options given below:

1. A -III , B -I , C -IV , D - II
2. A - IV, B -I , C -III , D -II
3. A - I, B -III , C -II , D -IV
4. A -III , B -IV , C -II , D - I

Options :

- 51245240157. 1
- 51245240158. 2
- 51245240159. 3
- 51245240160. 4

Question Number : 85 Question Id : 51245213023 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. The polar equation $r = 1$ represents a _____	I. straight line
B. The polar equation $\theta = 3$ represents a _____	II. (0, 0)
C. A polar coordinate of the point (0, 0) is _____	III. circle
D. Cartesian coordinate of the point in the polar form $(1, \pi/2)$ is _____	IV. (0, 1)

Choose the **correct** answer from the options given below:

1. A -III , B -I , C -IV , D -II
2. A -I , B -III , C -II , D -IV
3. A - III , B -I , C -II , D -IV
4. A -I , B -III , C -IV , D -II

Options :

- 51245240161. 1
- 51245240162. 2
- 51245240163. 3
- 51245240164. 4

Question Number : 86 Question Id : 51245213024 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. The natural domain of the function $f(x, y) = \frac{1}{x-y}$ is _____	I. the entire plane
B. The natural domain of the function $f(x, y) = \frac{y}{2x}$ is _____	II. $\{(x, y) \in \mathbb{R}^2 : y \neq 0\}$
C. The natural domain of the function $f(x, y) = \frac{3(x^2+y^2)}{y}$ is _____	III. $\{(x, y) \in \mathbb{R}^2 : x \neq 0\}$
D. The natural domain of the function $f(x, y) = \sin xy$ is _____	IV. $\{(x, y) \in \mathbb{R}^2 : x \neq y\}$

Choose the **correct** answer from the options given below:

1. A -IV , B -I , C -II , D -III
2. A -IV , B -III , C -II , D - I
3. A - IV , B -II , C -I , D -III
4. A -III , B -II , C -I , D -IV

Options :

51245240165. 1
51245240166. 2
51245240167. 3
51245240168. 4

Question Number : 87 Question Id : 51245213025 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. $\frac{\partial}{\partial x}(x + y)$	I. -1
B. $\frac{\partial}{\partial x}(-x + y)$	II. 2
C. $\frac{\partial}{\partial y}(x + 2y)$	III. 3
D. $\frac{\partial}{\partial x}(3x + y)$	IV.1

Choose the **correct** answer from the options given below:

1. A -IV , B -I , C -II , D - III
2. A -IV , B -II , C -I , D -III
3. A -IV , B -I , C -III , D -II
4. A -IV , B -III , C -II , D - I

Options :

51245240169. 1

51245240170. 2

51245240171. 3

51245240172. 4

Question Number : 88 Question Id : 51245213026 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. A function f is strictly decreasing on an interval I if for all $x, y \in I$	I. an increasing function
B. A function f is strictly increasing on an interval I if for all $x, y \in I$	II. a decreasing function
C. $f(x) = x, x \in \mathbb{R}$ is _____	III. $x < y$ implies $f(x) < f(y)$
D. $f(x) = -x^2, x > 0$ is _____	IV. $x < y$ implies $f(x) > f(y)$

Choose the **correct** answer from the options given below:

1. A -IV , B -III , C -II , D -I
2. A -III , B -IV , C -I , D -II
3. A - IV, B - III, C -I , D -II
4. A -III , B -IV , C -II , D - I

Options :

51245240173. 1
51245240174. 2
51245240175. 3
51245240176. 4

Question Number : 89 Question Id : 51245213027 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. $\lim_{x \rightarrow \infty} \left(5 + \frac{1}{x}\right)$	I. 25
B. $\lim_{x \rightarrow \infty} \left(-5 + \frac{1}{x}\right)$	II. -25
C. $\lim_{x \rightarrow \infty} \left(25 + \frac{1}{x}\right)$	III. -5
D. $\lim_{x \rightarrow \infty} \left(-25 + \frac{1}{x}\right)$	IV. 5

Choose the **correct** answer from the options given below:

1. A - IV, B -III , C -II , D -I
2. A -IV , B -III , C I- , D -II
3. A -III , B -IV , C -II , D -I
4. A - III, B -IV , C -I , D -II

Options :

51245240177. 1

51245240178. 2

51245240179. 3

51245240180. 4

Question Number : 90 Question Id : 51245213028 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Match **List I** with **List II**

List I	List II
A. The n th partial sum of the series $\sum_{n=1}^{\infty} \frac{1}{2^{n-1}}$ is _____	I. n
B. The n th partial sum of the series $\sum_{n=1}^{\infty} 1$ is _____	II. $\frac{n(n+1)}{2}$
C. The n th partial sum of the series $\sum_{n=1}^{\infty} n$ is _____	III. $2 - \left(\frac{1}{2}\right)^{n-1}$
D. The n th partial sum of the series $\sum_{n=1}^{\infty} 2$ is _____	IV. $2n$

Choose the **correct** answer from the options given below:

1. A - III , B - I , C -II , D -IV
2. A -III , B -II , C -I , D -IV
3. A -III , B -I , C -IV , D -II
4. A -I , B -III , C -II , D - IV

Options :

51245240181. 1
 51245240182. 2
 51245240183. 3
 51245240184. 4

Sub-Section Number :

30

Sub-Section Id :

512452831

Question Shuffling Allowed :

Yes

Question Number : 91 Question Id : 51245213029 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which one of the following is (are) FALSE?

- A. Bolzano's Intermediate Value Theorem holds for continuous functions on closed and bounded intervals.
- B. Bolzano's Intermediate Value Theorem holds for discontinuous functions on closed and bounded intervals.
- C. Bolzano's Intermediate Value Theorem holds for functions on closed and bounded intervals.
- D. Bolzano's Intermediate Value Theorem holds for step functions on closed and bounded intervals.

Choose the **correct** answer from the options given below:

- 1. A, B and D only
- 2. B and D only
- 3. A, B and C only
- 4. B, C, and D only

Options :

- 51245240185. 1
- 51245240186. 2
- 51245240187. 3
- 51245240188. 4

Question Number : 92 Question Id : 51245213030 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following is (are) FALSE?

- A. Differentiable functions are continuous
- B. Continuous functions are differentiable
- C. Differentiable functions are not continuous
- D. Continuous functions are not differentiable

Choose the **correct** answer from the options given below:

- 1. A, B and D only
- 2. B, C, and D only
- 3. A only
- 4. B only

Options :

- 51245240189. 1
- 51245240190. 2
- 51245240191. 3
- 51245240192. 4

Question Number : 93 Question Id : 51245213031 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following is (are) increasing function(s)

A. $f(x) = \cos x, x \in \mathbb{R}$

B. $f(x) = \sin x, x \in \mathbb{R}$

C. $f(x) = \tan x, -\pi/2 < x < \pi/2$

D. $f(x) = 5 + \tan x, -\pi/2 < x < \pi/2$

Choose the **correct** answer from the options given below:

1. A, B and D only
2. C and D only
3. C only
4. D only

Options :

51245240193. 1

51245240194. 2

51245240195. 3

51245240196. 4

Question Number : 94 Question Id : 51245213032 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following function(s) is (are) decreasing?

A. $f(x) = x, 0 < x < 100$

B. $g(x) = x^2, 0 < x < 100$

C. $h(x) = x^3, 0 < x < 100$

D. $-x^2, 0 \leq x < 1000$

Choose the **correct** answer from the options given below:

1. A, B and D only
2. B, C and D only
3. A, C and D only
4. D only

Options :

51245240197. 1

51245240198. 2

51245240199. 3

51245240200. 4

Question Number : 95 Question Id : 51245213033 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The function $f(x) = 5x^2$ has _____

- A. maximum at $x = 0$
- B. minimum at $x = 0$
- C. minimum at $x = 10$
- D. maximum at $x = -10$

Choose the **correct** answer from the options given below:

- 1. A, B and D only
- 2. A only
- 3. B only
- 4. C only

Options :

- 51245240201. 1
- 51245240202. 2
- 51245240203. 3
- 51245240204. 4

Question Number : 96 Question Id : 51245213034 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

For the function $f(x) = -\csc(2x)$, the local minimum points are _____

- A. $x = n\pi + \frac{\pi}{2}$ for each integer n
- B. $x = n\pi$ for each integer n
- C. $x = n\pi + \frac{\pi}{2}$ for each even integer n
- D. $x = n\pi + \frac{\pi}{2}$ for each odd integer n

Choose the **correct** answer from the options given below:

- 1. A, B and D only
- 2. A only
- 3. B and C only
- 4. B only

Options :

- 51245240205. 1
- 51245240206. 2
- 51245240207. 3
- 51245240208. 4

Question Number : 97 Question Id : 51245213035 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following limits have the value 0.

A. $\lim_{x \rightarrow 0} \sin x$

B. $\lim_{x \rightarrow 0} \tan x$

C. $\lim_{x \rightarrow 0} (x^2 + x)$

D. $\lim_{x \rightarrow 0} \cos x$

Choose the **correct** answer from the options given below:

1. A, B and D only
2. A and B only
3. B, C, and D only
4. A, B, and C only

Options :

51245240209. 1

51245240210. 2

51245240211. 3

51245240212. 4

Question Number : 98 Question Id : 51245213036 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Which of the following parametric equations represent(s) the portion of the curve $y = \sin x$ over the interval $[-2\pi, 2\pi]$?

A. $x = t, y = \cos t, -2\pi \leq t \leq 2\pi$

B. $x = t, y = -\cos t, -2\pi \leq t \leq 2\pi$

C. $x = t, y = \sin t, -2\pi \leq t \leq 2\pi$

D. None of the above

Choose the **correct** answer from the options given below:

1. A, B and D only
2. A only
3. C only
4. A and B only

Options :

51245240213. 1

51245240214. 2

51245240215. 3

51245240216. 4

Question Number : 99 Question Id : 51245213037 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

Another polar coordinate of the point with the polar coordinate $(5, -3\pi/2)$ is _____

A. $(5, \pi/2)$

B. $(5, 0)$

C. $(5, -\pi)$

D. $(5, \pi)$

Choose the **correct** answer from the options given below:

1. A only
2. A and B only
3. A and C only
4. A and D only

Options :

51245240217. 1

51245240218. 2

51245240219. 3

51245240220. 4

Question Number : 100 Question Id : 51245213038 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0

The cardioid $r = 1 - \cos \theta$ is _____

- A. not symmetric about the x-axis
- B. symmetric about the x-axis
- C. tangent at the origin is the y-axis
- D. tangent at the origin the line $y = x$

Choose the **correct** answer from the options given below:

- 1. A and D only
- 2. B only
- 3. A and C only
- 4. B and C only

Options :

- 51245240221. 1
- 51245240222. 2
- 51245240223. 3
- 51245240224. 4