MATHS

BOOKS - MTG WBJEE MATHS (HINGLISH)

LIMITS AND CONTINUITY

Wb Jee Workout Category 1 Single Option Correct Type

1. The value of $\lim_{x \to 2} \frac{e^{3x-6} - 1}{\sin(2-x)}$, is

A. $3/2$

B. 3

C. -3

D. -1

Answer: C

Watch Video Solution

2. $\lim_{x \to 0} \frac{x[x]}{\sin|x|}$, where $[.]$ denote greater integer function

A. is equal to 0

B. is equal to infinity

C. is equal to 1

D. does not exist

Answer: D

Watch Video Solution

3. let $f(x) = \left[\tan\left(\frac{\pi}{4} + x\right)\right]^{\frac{1}{x}}, x \neq 0$ and $f(x) = k, x = 0$ then the value of k such that $f(x)$ hold continuity at $x = 0$

A. e

B. $\frac{1}{e^2}$

C. e^2

D. None of these

Answer: C

Watch Video Solution

4. $\lim_{x \to 0} \frac{\sin|x|}{x}$

A. is equal to1

B. is equal to 0

C. is equal to infinity

D. does not exist

Answer: D

Watch Video Solution

5. If $f(x) = \begin{cases} \frac{\log(1+2ax) - \log(1-bx)}{x}, & x \neq 0 \\ k, & x = 0 \end{cases}$ is continuous at x = 0, then value of k is

A. a b

B. $a + b$

C. $b - a$

D. $\ln a + \ln b$

Answer: B

Watch Video Solution

6. $\lim_{x \to \infty} \frac{\sqrt{x^2 + \sin^2 x}}{x + \cos x}$

A. is equal to 1

B. is equal to 0

C. is equal to ∞

D. does not exist

Answer: A

Watch Video Solution

7. The value of $\lim_{x \to 1} \frac{x + x^2 + \ldots. + x^n - n}{x - 1}$ is

A. n

B. $\frac{n+1}{2}$

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

D. $\frac{n(n-1)}{2}$

Answer: C

Watch Video Solution

8. The value of $\lim_{x \to 2} ([2 - x] + [x - 2] - x)$ equals (where [.] denotes greatest integer function)

A. -3

B. 0

C. 3

D. 2

Answer: A

Watch Video Solution

9. $\lim_{x \to 3} \frac{5}{\sqrt{3} - \sqrt{x}}$

A. is $10\sqrt{2}$

B. is $+\infty$

C. is $-\infty$

D. does not exist

Answer: D

Watch Video Solution

10. $\lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^{x/2}$ is equal to

A. e

B. e^{-1}

C. e^2

D. $e^{1/2}$

Answer: D

Watch Video Solution

11. Let $L = \lim_{x \to 0} \frac{b - \sqrt{b^2 + x^2} - \frac{x^2}{4}}{x^4}, b > 0$. If L is finite, then

A. $b = 2$

B. $b = 1$

C. $b = \frac{1}{3}$

D. None of these

Answer: D

Watch Video Solution

12. Let $f(x) = \frac{\sqrt{x+3}}{x+1}$, then $\lim_{x \to -3} f(x)$

A. is 0

B. does not exist

C. is $1/2$

D. is $-1/2$

Answer: B

Watch Video Solution

13. Let $f(x) = \frac{1 - \tan x}{4x - \pi}, x \neq \frac{\pi}{4}, x \in \left[0, \frac{\pi}{2}\right]$. If f(x) is continuous in $\left[0, \frac{\pi}{2}\right]$, then $f\left(\frac{\pi}{4}\right)$ is

A. 1

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

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

D. -1

Answer: C

Watch Video Solution

14. $\lim_{n \to \infty} \left(\frac{1}{5}\right)^{\left(\log_{\sqrt{5}}\left(\frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \ldots\ldots \text{n terms}\right)\right)}$ equals

A. 2

B. 4

C. 8

D. 0

Answer: B

Watch Video Solution

15. The function $f(x) = [x]^2 - [x^2]$ is discontinuous at (where $[\gamma]$ is the greatest integer less than or equal to γ), is discontinuous at

A. all integers

B. all integers except 0 and 1

C. all integers except 0

D. all integers except 1

Answer: D

Watch Video Solution

16. A function f(x) is defined as follows for real x

$$f(x) = \begin{cases} 1 - x^2, & \text{for } x < 1 \\ 0, & \text{for } x = 1 \\ 1 + x^2, & \text{for } x > 1 \end{cases}$$, then

A. f(x) is not continuous at x = 1

B. f(x) is continuous at x = 1

C. f(x) is continuous at all real numbers

D. none of these

Answer: A

Watch Video Solution

17. Let f defined on $[-5, 5]$ as $f(x) = \begin{cases} \text{x, if x is rational} \\ \text{-x, if x is irrational} \end{cases}$, then f(x) is

A. continuous at every x except x = 0

B. discontinuous at every x except x = 0

C. continuous everywhere

D. discontinuous every where

Answer: B

Watch Video Solution

18. $\lim_{x \to 0} \frac{\sin\left(\pi \sin^2 x\right)}{x^2} =$

A. π^2

B. 3π

C. 2π

D. π

Answer: D

Watch Video Solution

19. Evaluate $\lim_{x \to 0} \left(\frac{1 + 5x^2}{1 + 3x^2} \right)^{1/x^2}$

A. e^2

B. e

C. $\frac{1}{e}$

D. $\frac{1}{e^2}$

Answer: A

Watch Video Solution

20. $\lim_{x \to 0} \frac{\left(2 + 2x + x^2\right) - 2e^x}{x^2}$ equals

A. 0

B. 2

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

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

Answer: D

Watch Video Solution

21. $\lim_{x \to 0} \frac{\pi^x - 1}{\sqrt{1+x} - 1}$

A. does not exist

B. equals $\log_e(\pi^2)$

C. equals 1

D. lies between 10 and 11

Answer: B

Watch Video Solution

22. If $(\lim)_{x \vec{0}} \frac{\{(a-n)nx - \tan x\}\sin nx}{x^2} - 0,$ where n is nonzero real number, the a is 0 (b) $\frac{n+1}{n}$ (c) n (d) $n + \frac{1}{n}$

A. 0

B. $\frac{n+1}{n^2}$

C. n

D. $\frac{1}{n}+n$

Answer: D

Watch Video Solution

23. If the function $f(x)=\begin{cases}\frac{x^2-(A+2)x+A}{x-2} & , x\neq 2\\ 2 & , \text{for} x=2\end{cases}$

is continuous at x = 2, then

A. A=0

B. A=1

C. $A=-1$

D. $A=2$

Answer: A

Watch Video Solution

24. The value of $\lim_{x \to 1} \left(\frac{\sin x}{x} \right)^{\frac{\sin x}{x - \sin x}}$, is

A. 1

B. $\sqrt{e}$

C. e

D. $\frac{1}{e}$

Answer: B

Watch Video Solution

25. $\lim_{x \to 0} \frac{xy\left(\sqrt{y^2 - (y-x)^2}\right)}{\left(\sqrt{8xy - 4x^2} + \sqrt{8xy}\right)^3}$ equals

A. $\frac{1}{512}$

B. $\frac{1}{128}$

C. $\frac{1}{64}$

D. None of these

Answer: D

Watch Video Solution

26. The value of $\lim_{x \to 0} \frac{1 - \cos x}{2x^2}$ is

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

B. $\frac{1}{3}$

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

D. 0

Answer: c

Watch Video Solution

27. If $\lim_{x \to \infty} \left(1 + \frac{a}{x} + \frac{b}{x^2}\right)^{3x} = e^4$ then the values of a and b are

A. $a = 2, b = 1$

B. $a = 1, b = 2$

C. $a = 1, b \in R$

D. $a = b = 1$

Answer: C

Watch Video Solution

28. Evaluate:

$$(\lim)_{n \to 0} \frac{8}{x^8} \left\{1 - \frac{\cos\left(x^2\right)}{2} - \frac{\cos\left(x^2\right)}{4} + \frac{\cos\left(x^2\right)}{2} \frac{\cos\left(x^2\right)}{4}\right\}$$

A. $\frac{1}{16}$

B. $\frac{1}{32}$

C. $\frac{1}{64}$

D. $\frac{1}{8}$

Answer: B

Watch Video Solution

29. The value of f(0), so that the function

$f(x) = \frac{1 - \cos(1 - \cos x)}{x^4}$ is continuous everywhere is

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

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

C. $\frac{1}{6}$

D. $\frac{1}{6}$

Answer: D

Watch Video Solution

30. $f(x) = \begin{cases} [x] + [-x], & \text{when } x \neq 2 \\ k, & \text{when } x = 2 \end{cases}$

If f(x) is continuous at x = 2, then value of k will be (where $[\cdot]$ denotes G.I.F.)

A. -1

B. 1

C. 0

D. 2

Answer: A

Watch Video Solution

Wb Jee Workout Category 2 Single Option Correct Type

1. $\lim_{x \top i/2} \frac{a^{\cot x} - a^{\cos x}}{\cot x - \cos x} a > 0$ is equal to

A. $\frac{\log_e(\pi)}{2}$

B. $\log_e 2$

C. $\log_e a$

D. a

Answer: C

Watch Video Solution

2. $\lim_{x \to 1} \frac{\sin\left(e^{x-1} - 1\right)}{\log x}$ is equal to

A. 0

B. e

C. $1/e$

D. 1

Answer: B

Watch Video Solution

3. $\lim_{x \to \infty} \frac{(1^4 + 2^4 + 3^4 + ... + x^4)}{x^2(1^2 + 2^2 + ... + x^2)}$ equals

A. $\frac{1}{5}$

B. $\frac{2}{5}$

C. $\frac{3}{5}$

D. None of these

Answer: C

Watch Video Solution

4. $f(x) = x + |x|$ is continuous for

A. $x \in (-\infty, \infty)$

B. $x \in (-\infty, \infty) - \{0\}$

C. only $x > 0$

D. no value of x

Answer: A

Watch Video Solution

5. $\lim_{x \to 0} \frac{\sin^{-1} x - \tan^{-1} x}{x^3}$ equals

A. 1

B. -1

C. 2

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

Answer: D

Watch Video Solution

6. Evaluate : $\lim_{x \to 0} \frac{\int_0^{x^2} \sin \sqrt{t}\, dt}{x^3}$

A. $\frac{3}{2}$

B. $\frac{1}{3}$

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

D. $\frac{2}{3}$

Answer: D

Watch Video Solution

7. $\lim_{n \to \infty} \frac{(n!)^{\frac{1}{n}}}{n}$ equals

A. 1

B. $\frac{1}{e^2}$

C. $\frac{1}{2e}$

D. $\frac{1}{e}$

Answer: D

Watch Video Solution

8. $\lim_{x \to a} \frac{x}{x - a} \int_a^x f(x)dx$ equals

A. $2f(a)$

B. f(a)

C. af(a)

D. 0

Answer: C

Watch Video Solution

9. Let α be the repeated root of $px^2 + qx + r = 0$, then $\lim_{x \to \alpha} \frac{\sin\left(px^2 + qx + r\right)}{(x - \alpha)^2}$ equals

A. 0

B. q

C. r

D. p

Answer: D

Watch Video Solution

10. The value of $\lim_{x \to 0} \frac{\sin^2 x + \cos x - 1}{x^2}$ is

A. 0

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

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

D. 0

Answer: B

Watch Video Solution

11. If $f(x) = \begin{cases} \frac{(5^x-1)^3}{\sin\left(\frac{x}{a}\right)\log\left(1+\frac{x^2}{3}\right)}, & x \neq 0 \\ 9(\log_e 5)^3, & x = 0 \end{cases}$ is continuous at $x = 0$, then value of 'a' equals

A. 3

B. 2

C. 1

D. None of these

Answer: A

Watch Video Solution

12. Let $f(x) = \begin{cases} \frac{\sin(a+1)x + \sin x}{x}, & x < 0 \\ c, & x = 0 \\ \frac{\sqrt{x+bx^2}}{bx^{\frac{3}{2}}}, & x > 0 \end{cases}$

If f(x) is continous at x = 0, then

A. $a + c = 0, b = 1$

B. $a + c = 1, b \in R$

C. $a + c = -1, b \in R$

D. $a + c = -1, b = -1$

Answer: C

Watch Video Solution

13. Let f(x) be a continuous function defined on $[1, 3]$. If f(x) takes only rational values for all x and $f(2) = 10$, then $f(2.5) =$

A. 7.5

B. 12.5

C. 10

D. 15

Answer: C

Watch Video Solution

14. Let $f(x+y)=f(x)+f(y)\,\forall x, y \in R$ If $f(x)$ is continous at x = 0, then $f(x)$ is continuous at

A. all natural numbers only

B. all integers only

C. all rational numbers only

D. all real numbers.

Answer: D

Watch Video Solution

15. Find $\lim_{x \to \infty}\left[\sqrt{x+\sqrt{x+\sqrt{x}}}-\sqrt{x}\right]$

A. 0

B. 2

C. 1

D. $1/2$

Answer: D

Watch Video Solution

Wb Jee Workout Category 3 One Or More Than One Option Correct Type

1. Indicate all correct alternatives if, $f(x) = \frac{x}{2} - 1$, then on the interval $[0, \pi]$

A. $\tan f(x)$ and $\frac{1}{f(x)}$ are continuous

B. $\tan f(x)$ and $\frac{1}{f^{-1}(x)}$ are continuous

C. $\tan f(x)$ and $\frac{1}{f(x)}$ are continuous

D. $\tan f(x)$ is continuous but $\frac{1}{f(x)}$ is not continuous

Answer: C::D

Watch Video Solution

2. If $f(x) = \begin{cases} \frac{e^{\frac{1}{x}}}{1+e^{\frac{1}{x}}}, & x \neq 0 \\ 0, & x = 0 \end{cases}$, then

A. $f(0^+) = 1$

B. $f(0^+) = 0$

C. $f(0^-)) = 1$

D. $f(0^-) = 0$

Answer: B::C

Watch Video Solution

3. $\lim_{x \to \infty} \frac{[x] + [2x] + [3x] + \ldots. + [nx]}{n^2}$, where $[\cdot]$ denotes greatest integer function, is

A. $\frac{x}{3}$

B. $\frac{x}{6}$

C. $\frac{x}{2}$

D. does not exist

Answer: C

Watch Video Solution

4. If $f(x) = \begin{cases} 3x^2 + 12x - 1, & -1 \leq x \leq 2 \\ 37 - x, & 2 < x \leq 3 \end{cases}$, Then

A. f(x) is increasing in $[-1, 2]$

B. f(x) is continuous in $[-1, 3]$

C. f'(2) does not exist

D. f(x) has minimum at x = 2

Answer: A::B::C::D

Watch Video Solution

5. Which of the following is/are discontinous at x = 1 ?

A. $f(x) = \dfrac{1}{1+2^{\tan x}}$

B. $g(x) = \lim\limits_{n\to\infty} \dfrac{1}{1+n\sin^{-2}(\pi x)}$

C. $h(x) = 2^{-2^{(1)^{\frac{1}{1-x}}}}, x \neq 1$ and $h(1) = 1$

D. $\phi(x) = \dfrac{x-1}{|x1|+2(x-1)^2}, x \neq 1$ and $\phi(1) = 1$

Answer: B::C::D

View Text Solution

6. Which of the following is/are unity? (where [.] and {.} denote the greatest integer and fractional part functions, respectively)

A. $\lim\limits_{x\to\infty} \sin\left(\dfrac{x^2+2}{x^2+1}\right)$

B. $\lim\limits_{x\to 0} \left[\dfrac{x^2+2}{x^2+1}\right]$

C. $\lim\limits_{x\to\infty} \left\{\dfrac{x^2+2}{x^2+1}\right\}$

D. $\lim\limits_{x\to\infty} \left(\dfrac{x^2}{x^2+1}\right)$

Answer: B::D

Watch Video Solution

7. If $A = \lim_{x \to -2} \frac{\tan \pi x}{x+2} + \lim_{x \to \infty} \left(1 + \frac{1}{x^2}\right)^x$, then

A. $A > 3$

B. $A > 4$

C. $A < 4$

D. A is a transcedental number

Answer: A::B::D

Watch Video Solution

8. The function, $f(x) = [|x|] - |[x]|$ where [] denotes greatest integer function:

A. is continuous for all positive integers

B. is discontinuous for all non positive integers

C. has finite number of elements is its range

D. is such that its graph does not lie above the x - axis.

Answer: A::B::C::D

Watch Video Solution

9. $\lim_{x \to 0} \left(\frac{1^x + 2^x + 3^x + \ldots . + n^x}{n} \right)^{\frac{a}{x}}$ equals

A. $(n!)^{\frac{a}{n}}$

B. $(n!)^{an}$

C. None of these

D. $(n!)^{\frac{n}{a}}$

Answer: A

Watch Video Solution

10. Given a real valued function f such that

$$f(x)=\begin{cases}\dfrac{\tan^2[x]}{x^2-[x]^2}, & x<0 \text{ and } 1, x=0 \text{ and } \sqrt{\{x\}\cot\{x\}}, x<0\end{cases}$$

where [.] represents greatest integer function then

A. $\lim_{x\to 0^+} f(x)=1$

B. $\lim_{x\to 0^-} f(x)=\sqrt{\cot 1}$

C. $\cot^{-1}\left(\lim_{x\to 0^-} f(x)\right)^2=1$

D. f is continuous at x = 0

Answer: A::B::C

Watch Video Solution

We Jee Previous Years Questions Category 1 Single Option Correct Type

1. The limit of $\left[\dfrac{1}{x^2}+\dfrac{(2)^x}{e^x-1}-\dfrac{1}{e^x-1}\right]$ as $x\to 0$

A. approaches $+\infty$

B. approaches $-\infty$

C. is equal to $\log_e 2$

D. does not exist

Answer: A

Watch Video Solution

2. The limit of $\left[\frac{1}{x}\sqrt{1+x} - \sqrt{1+\frac{1}{x^2}}\right]$ as $x \to 0$

A. does not exist

B. is equal to 1/2

C. is equal to 0

D. is equal to 1

Answer: B

Watch Video Solution

3. The limit of $x \sin\left(e^{-1/x}\right)$ as $x \to 0$

A. is equal to 0

B. is equal to 1/2

C. is equal to e/2

D. does not exist

Answer: A

Watch Video Solution

4. The limit of $\sum_{n=1}^{1000} (-1)^n x^n$ as $x \to \infty$

A. does not exist

B. exists and equals to 0

C. exists and approaches $+\infty$

D. exists and approaches $-\infty$

Answer: C

Watch Video Solution

5. The function $f(x) = \frac{\tan\left\{\pi\left[x - \frac{\pi}{2}\right]\right\}}{2 + [x]^2}$, where [x] denotes the greatest integer elx, is

A. continuous for all values of x

B. discontinous at $x = \pi/2$

C. not differentiable for some values of x

D. discontinuous at $x = -2$

Answer: A

Watch Video Solution

6. LEt $f(x)$ be a differentiable function and $f'(4) = 5$. Then, $\lim_{x \to 2} \frac{f(4) - f(x^2)}{x - 2}$ equals

A. 0

B. 5

C. 20

D. -20

Answer: D

Watch Video Solution

7. If $\lim_{x \to 0} \frac{2a \sin x - \sin 2x}{\tan^3 x}$ exists and is equal to 1, then the value of a is

A. 2

B. 1

C. 0

D. -1

Answer: B

Watch Video Solution

8. Let [x] denote the greatest integer less than or equal to x for any real number x. then $\lim_{x \to \infty} \frac{\left[n\sqrt{2}\right]}{n}$ is equal to

A. 0

B. 2

C. $\sqrt{2}$

D. 1

Answer: C

Watch Video Solution

9. If $\lim_{x \to 0} \frac{axe^x - b\log(1+x)}{x^2} = 3$, then the value of a and b are respectively.

A. 2, 2

B. 1, 2

C. 2, 1

D. 2, 0

Answer: A

Watch Video Solution

10. Let $f: R \to R$ be defined as $f(x) = \{0, x$ is irrational $\sin|x|, x$ is rational Then which of the following is true ?

A. f is discontinuous for all x

B. f is continuous for all x

C. f is discontinuous at $x = k\pi$, where k is an integer.

D. f is continuous at $x = k\pi$, where k an integer.

Answer: D

Watch Video Solution

11. Let

$$x_n = \left(1 - \frac{1}{3}\right)^2 \left(1 - \frac{1}{6}\right)^2 \left(1 - \frac{1}{10}\right)^2 \ldots \left(1 - \frac{1}{\frac{n(n+1)}{2}}\right)^2 . \neq \geq 2.$$

Then the value of $\lim_{n \to \infty} x_n$ is

A. $1/3$

B. $1/9$

C. $1/81$

D. 0

Answer: B

Watch Video Solution

12. Let [x] denote the greatest integer less than or equal to x. Then the value of α for which the function $f(x) = \begin{bmatrix} \frac{\sin[-x^2]}{[-x^2]} & x \neq 0 \\ \alpha & x = 0 \end{bmatrix}$ is continuous at x = 0 is (A) $\alpha = 0$ (B) $\alpha = \sin(-1)$ (C) $\alpha = \sin(1)$ (D) $\alpha = 1$

A. $\alpha = 0$

B. $\alpha = \sin(-1)$

C. $\alpha = \sin(1)$

D. $\alpha = 1$

Answer: C

Watch Video Solution

13. Let $f: [-2, 2] \to R$ be a continuous function such that f(x) assumes only irrationlal values. If $f(\sqrt{2}) = \sqrt{2}$. Then

A. $f(0) = 0$

B. $f\left(\sqrt{2}-1\right)=\sqrt{2}-1$

C. $f\left(\sqrt{2}-1\right)=\sqrt{2}+1$

D. $f\left(\sqrt{2}-1\right)=\sqrt{2}$

Answer: D

Watch Video Solution

14. $\lim_{x\to 1}\left(\frac{1+x}{2+x}\right)^{\frac{1-\sqrt{x}}{1-x}}$

A. is 1

B. does not exist

C. is $\sqrt{\frac{2}{3}}$

D. is ln 2

Answer: C

Watch Video Solution

15. the value of $\lim_{n \to \infty} \frac{\sqrt{n+1} + \sqrt{n+2} + \ldots\ldots\ldots . + \sqrt{2n-1}}{n^{\frac{3}{2}}}$

A. $\frac{2}{3}\left(2\sqrt{2}-1\right)$

B. $\frac{2}{3}\left(\sqrt{2}-1\right)$

C. $\frac{2}{3}\left(\sqrt{2}+1\right)$

D. $\frac{2}{3}\left(2\sqrt{2}+1\right)$

Answer: A

Watch Video Solution

16. If $f''(x) = k, k \neq 0$, then the value of $\lim_{x \to 0} \frac{2f(x) - 3f(2x) + f(4x)}{x^2}$ is

A. k

B. 2k

C. 3k

D. 4k

Answer: C

Watch Video Solution

17. $\lim_{x \to 0} (\sin x)^{2 \tan x}$

A. is 2

B. is 1

C. is 0

D. does not exist

Answer: B

Watch Video Solution

18. The value of $\lim_{n \to \infty} \left[\frac{n}{n^2 + 1^2} + \frac{n}{n^2 + 2^2} + + \frac{1}{2n} \right]$ is

A. $\frac{n\pi}{4}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{4n}$

D. $\frac{\pi}{2n}$

Answer: B

Watch Video Solution

19. $f(x) = 3x^{10} - 7x^8 + 5x^6 - 21x^3 + 3x^2 - 7$, then is the value of $\lim_{h \to 0} \frac{f(1-h) - f(1)}{h^3 + 3h}$ is

A. does not exist

B. is $\frac{50}{3}$

C. is $\frac{53}{3}$

D. is $\frac{22}{3}$

Answer: C

Watch Video Solution

20. Let $f:[a,b] \to R$ be such that f is differentiable in (a, b), f is continuous at x = a & x = b and moreover $f(a) = 0 = f(b)$. Then

A. there exists at least one point c in (a, b) such that $f'(c) = f(c)$

B. $f'(c) = f(x)$ does not hold at any point in (a, b)

C. at every point of (a, b), $f'(x) > f(x)$

D. at every point of (a, b), $f'(x) < f(x)$

Answer: A

Watch Video Solution

21. $\lim_{x \to 0^+} (x^n \ln x), n > 0$

A. does not exist

B. exists and is zero

C. exists and is 1

D. exists and is e^{-1}

Answer: B

Watch Video Solution

22.

$$\lim_{n\to\infty} \frac{3}{n}\left[1+\sqrt{\frac{n}{n+3}}+\sqrt{\frac{n}{n+6}}+\sqrt{\frac{n}{n+9}}+\ldots\ldots+\sqrt{\frac{n}{n+3(n-1)}}\right.$$

A. does not exist

B. is 1

C. is 2

D. is 3

Answer: C

Watch Video Solution

23. The limit of the interior angle of a regular polygon of n sides as $n \to \infty$ is

A. π

B. $\frac{\pi}{3}$

C. $\frac{3\pi}{2}$

D. $\frac{2\pi}{3}$

Answer: A

Watch Video Solution

24. $\lim_{x \to 0^+} (e^x + x)^{(1/x)}$

A. does not exist finitely

B. is 1

C. is e^2

D. is 2

Answer: C

Watch Video Solution

We Jee Previous Years Questions Category 2 Single Option Correct Type

1. Let $f: R \to R$be differentiable at x = 0. If f(0) = 0 and $f'(0) = 2$, then the value of

$$\lim_{x \to 0} \frac{1}{x}[f(x) + f(2x) + f(3x) + \ldots. + f(2015x)] \text{ is}$$

A. 2015

B. 0

C. 2015×2016

D. 2015×2014

Answer: C

Watch Video Solution

2. Let for all $x > 0$, $f(x) = \lim_{n \to \infty} n^{\left(x^{\frac{1}{n}} - 1\right)}$, then

A. $f(x) + f\left(\frac{1}{x}\right) = 1$

B. $f(xy) = f(x) + f(y)$

C. $f(xy) = xf(y) + yf(x)$

D. $f(xy) = xf(x) + yf(x)$

Answer: B

Watch Video Solution

3. Let $f(x) = \begin{cases} -2\sin x & , \text{ if} x \leq -\frac{\pi}{2} \\ A\sin x + B & , \text{ if} -\frac{\pi}{2} < x < \frac{\pi}{2} \\ \cos x & , \text{ if} x \geq \frac{\pi}{2} \end{cases}$

Then

A. f is discontinuous for all A and B

B. f is continuous for al $A = -1$ and B = 1

C. f is continuous for all $A = 1$ and $B = -1$

D. f is continuous for all real values of A, B.

Answer: B

Watch Video Solution

4. A particle starts from a point $z_0 = 1 + i$ where $i = \sqrt{-1}$. It moves horizontally away from origin by 2 units and then vertically away from origin by 3 units to reach a point z_1, From z_1 particle moves $\sqrt{5}$ units in the direction of $2\hat{i} + 3\hat{j}$ and then it moves through Ã n angle of $\cos ec^{-1}2$ in anticlockwise direction of a circle with centre at origin to reach a point z_2. The arg z_1 is given by

A. (2, 3)

B. $\left(\frac{4}{3}, \frac{2}{5}\right)$

C. $\left(\frac{2}{5}, 1\right)$

D. $\left(\frac{4}{3}, 3\right)$

Answer: B

Watch Video Solution

5. The value of $\lim_{x \to 0^+} \frac{x}{p}\left[\frac{q}{x}\right]$, where $[\cdot]$ denotes greatest integer function is

A. $\frac{q}{p}$

B. 0

C. 1

D. ∞

Answer:

Watch Video Solution

We Jee Previous Years Questions Category 3 One Or More Than One Option Correct Type

1. Let t_n denotes the n^{th} term of the infinite series $\frac{1}{1!}+\frac{10}{2!}+\frac{21}{3!}+\frac{34}{4!}+\frac{49}{5!}+\ldots\ldots\ldots\ldots$ Then, $\lim_{n\to\infty} t_n$ is

A. e

B. 0

C. e^2

D. 1

Answer: B

Watch Video Solution

2. Let $f: R \to R$ be such that $f(2x-1)=f(x)$ for all $x \in R$. If f is continuous at x = 1 and f(1) = 1. then

A. $f(2)=1$

B. $f(2)=2$

C. f is continuous only at x = 1

D. f is continuous at all points

Answer: A::D