BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

Date: 15/11/2021

Subject: Mathematics

Topic : Continuity and Differentiability

Class: Standard XII

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1. The function given by $f(x) = \frac{1}{|x|-1} - \frac{x^2}{2}$ is continuous in

   A. $\mathbb{R} - \{-1, 1\}$

   B. $\mathbb{R} - \{1\}$

   C. $\mathbb{R} - \{-1\}$

   D. $\{-1, 1\}$

2. $f(x) = \text{sgn}(x^3 - x)$ is discontinuous at which of the following points

   A. 0

   B. 1

   C. -1

   D. All the above

3. If $f(x) = [[x]] - [x - 1]$ then which of the following options is CORRECT, (where $[.]$ represents the greatest integer function.)

   A. Discontinuous at $x = 0$

   B. Discontinuous at $x = 1$

   C. Discontinuous at $x = -1$

   D. Continuous at every where

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

4. Let $f(x)=\dfrac{(27-2x)^{1/3}-3}{9-3(243+5x)^{1/5}}, x \neq 0$. If $f(x)$ is continuous at $x=0$, then the value of $f(0)$ is

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

   B. 2

   C. 4

   D. 6

5. The value of $f(0)$, so that the function $f(x)=\dfrac{\sqrt{1+x}-\sqrt[3]{1+x}}{x}$ is continuous at $x=0$ is

   A. $\dfrac{1}{6}$

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

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

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

6. The function given by $f(x)=\dfrac{3x+7}{x^2-5x+6}$ is continuous in

   A. $(2,3]$

   B. $\mathbb{R}-[2,3]$

   C. $\mathbb{R}-\{2,3\}$

   D. None of the above

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

7. If $f(x) = \dfrac{1-\sin x}{\sin 2x}, x \neq \dfrac{\pi}{2}$ is continuous at $x = \dfrac{\pi}{2}$, then the value of $f\left(\dfrac{\pi}{2}\right)$ is

   A. 0

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

   C. 1

   D. 2

8. Let $f(x) = \begin{cases} (x-1)^{\dfrac{1}{2-x}}, & x > 1, x \neq 2 \\ k, & x = 2 \end{cases}$

   The value of k for which f is continuous at $x = 2$ is :

   A. e^{-1}

   B. e^{-2}

   C. e

   D. 1

9. For the function $f(x) = \dfrac{1-\sin x+\cos x}{1+\sin x+\cos x}$. The value of $f(\pi)$, so that $f(x)$ is continuous at $x = \pi$ is

   A. -1

   B. $-\dfrac{1}{2}$

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

   D. 1

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

10. If $f(x) = \begin{cases} \dfrac{(4^x-1)^3}{\sin\left(\frac{x}{a}\right)\ln\left(1+\frac{x^2}{3}\right)}, & x \neq 0 \\ 9(\ln 4)^3, & x = 0 \end{cases}$ is continuous at $x = 0$, then the value of a is

A. 0

B. 1

C. 2

D. 3

11. If $f(x) = \begin{cases} \dfrac{(1-\sin x)}{(\pi-2x)^2}, & x \neq \dfrac{\pi}{2} \\ \lambda, & x = \dfrac{\pi}{2} \end{cases}$ is continuous at $x = \dfrac{\pi}{2}$, then the value of λ is

A. $\dfrac{1}{4}$

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

C. $\dfrac{1}{8}$

D. 1

12. Let $f(x) = \dfrac{\tan\left(\frac{\pi}{4}-x\right)}{\cot 2x}, x \neq \dfrac{\pi}{4}$. If $f(x)$ is continuous at $x = \dfrac{\pi}{4}$, then the value of $f\left(\dfrac{\pi}{4}\right)$ is

A. 1

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

C. 2

D. $\dfrac{1}{4}$

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

13. The value of $f(0)$ such that the function $f(x) = \dfrac{2x - \sin^{-1} x}{2x + \tan^{-1} x}$ is continuous at every point in its domain, is equal to

A. $\dfrac{1}{3}$

B. $-\dfrac{1}{3}$

C. $\dfrac{2}{3}$

D. 2

14. The function $f(x) = x - |x - x^2|$ is

A. continuous at $x = 1$

B. discontinuous at $x = 0$

C. not defined at $x = 1$

D. not defined at $x = 0$

15. The interval where the function $\log(1 + x)$ is continuous, is

A. $(0, \infty)$

B. $(-1, \infty)$

C. $(-\infty, -1)$

D. None of the above

BYJU'S Study Planner for Board Term I
(CBSE Grade 12)

16. If $f(x) = \dfrac{\log_e(1 + x^2 \tan x)}{\sin x^3}, x \neq 0$ is continuous at $x = 0$, then the value of $f(0)$ is

A. -1

B. 0

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

D. 1

17. Let $f(x) = \begin{cases} \sqrt{1+x^2}, & x < \sqrt{3} \\ \sqrt{3}x - 1, & \sqrt{3} \leq x < 4 \\ [x], & 4 \leq x < 5 \\ |1-x|, & x \geq 5 \end{cases}$

where $[x]$ is the greatest integer less than or equal to x.
The number of point(s) of discontinuity of $f(x)$ in $\mathbb{R}$ is

A. 3

B. 0

C. Infinite

D. 1

18. The value of a so that the function $f(x) = \begin{cases} \dfrac{1-\cos 4x}{x^2}, & x < 0 \\ a, & x = 0 \\ \dfrac{\sqrt{x}}{\sqrt{16+\sqrt{x}} - 4}, & x > 0 \end{cases}$

is continuous at $x = 0$ is

A. 2

B. 4

C. 6

D. 8

19. Let $f(x) = 5 - |x - 2|$ and $g(x) = |x + 1|, x \in \mathbb{R}$. If $f(x)$ attains maximum value at α and $g(x)$ attains minimum value at β, then $\lim\limits_{x \to -\alpha\beta} \dfrac{(x-1)(x^2-5x+6)}{x^2-6x+8}$ is equal to:

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

B. $\dfrac{-1}{2}$

C. $\dfrac{3}{2}$

D. $\dfrac{-3}{2}$

20. If the function $f(x) = \begin{cases} a|\pi - x| + 1, & x \leq 5 \\ b|x - \pi| + 3, & x > 5 \end{cases}$ is continuous at $x = 5$, then the value of $a - b$ is :

A. $\dfrac{2}{\pi - 5}$

B. $\dfrac{2}{\pi + 5}$

C. $\dfrac{2}{5 - \pi}$

D. $\dfrac{-2}{\pi + 5}$