DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**

DATE : **DPP NO. :8**

Topic :- CONTINUITY AND DIFFERENTIABILITY

1. If $f(x)=\begin{cases}(x-2)^2\sin\left(\frac{1}{x-2}\right)-|x-1|, & x\neq 2\\ -1, & x=2\end{cases}$ then the set of points where $f(x)$ is differentiable, is

   a) R b) $R-\{1,2\}$ c) $R-\{1\}$ d) $R-\{2\}$

2. The value of f at $x=0$ so that function $f(x)=\frac{2^x-2^{-x}}{x}$, $x\neq 0$ is continuous at $x=0$, is

   a) 0 b) $\log 2$ c) 4 d) $\log 4$

3. If $f(x)=|\log_e x|$, then

   a) $f'(1^+)=1, f'(1^-)=-1$
   b) $f'(1^-)=-1, f'(1^+)=0$
   c) $f'(1)=1, f'(1^-)=0$
   d) $f'(1)=-1, f'(1^+)=-1$

4. Let $f(x)$ be a function such that $f(x+y)=f(x)+f(y)$ and $f(x)=\sin x g(x)$ for all $x,y\in R$. If $g(x)$ is a continuous function such that $g(0)=k$, then $f'(x)$ is equal to

   a) k b) kx c) $kg(x)$ d) None of these

5. The function $f(x)=|x|+|x-1|$, is

   a) Continuous at $x=1$, but not differentiable
   b) Both continuous and differentiable at $x=1$
   c) Not continuous at $x=1$
   d) None of these

6. The set of points of differentiability of the function $f(x)=\begin{cases}\frac{\sqrt{x+1}-1}{x}, & \text{for } x\neq 0\\ 0, & \text{for } x=0\end{cases}$ is

   a) R b) $[0,\infty]$ c) $(-\infty,0)$ d) $R-\{0\}$

7. Given that $f(x)$ is a differentiable function of x and that $f(x).f(y)=f(x)+f(y)+f(xy)-2$ and that $f(2)=5$. Then, $f(3)$ is equal to

   a) 10 b) 24 c) 15 d) None of these

8. If $f(x)=\frac{1}{2}x-1$, then on the interval $[0,\pi]$,

   a) $\tan[f(x)]$ and $\frac{1}{f(x)}$ are both continuous

b) $\tan[f(x)]$ and $\frac{1}{f(x)}$ are both discontinuous

c) $\tan[f(x)]$ and $f^{-1}(x)$ are both continuous

d) $\tan[f(x)]$ s continuous but $\frac{1}{f(x)}$ is not

9. If $f(x) = (x+1)^{\cot x}$ be continuous at $= 0$, then $f(0)$ is equal to

a) 0 b) $-e$ c) e d) None of these

10. Let $f(x) = \begin{cases} \frac{\tan x - \cot x}{x - \frac{\pi}{4}}, & x \neq \frac{\pi}{4} \\ a, & x = \frac{\pi}{4} \end{cases}$ the value of a so that $f(x)$ is continuous at $x = \frac{\pi}{4}$ is

a) 2 b) 4 c) 3 d) 1

11. If $f(x) = \int_{-1}^{x} |t|\, dt, x \geq -1$, then

a) f and f' are continuous for $x + 1 > 0$

b) f is continuous but f' is not so for $x + 1 > 0$

c) f and f' are continuous at $x = 0$

d) f is continuous at $x = 0$ but f' is not so

12. The set of points of discontinuity of the function

$f(x) = \lim_{n\to\infty} \frac{x^{-n} - x^n}{x^{-n} + x^n}, n \in Z$ is

a) $\{1\}$ b) $\{-1\}$ c) $\{-1, 1\}$ d) None of these

13. The number of points of discontinuity of the function

$f(x) = \frac{1}{\log|x|}$, is

a) 4 b) 3 c) 2 d) 1

14. $f(x) = \begin{cases} \frac{\sin 3x}{\sin x}, & x \neq 0 \\ k, & x = 0 \end{cases}$ is continuous, if k is

a) 3 b) 0 c) -3 d) -1

15. For the function $f(x) = \frac{\log_e(1+x) + \log_e(1-x)}{x}$ to be continuous at $= 0$, the value of $f(0)$ is

a) -1 b) 0 c) -2 d) 2

16. Let $f(x) = \begin{cases} \frac{x-4}{|x-4|} + a, & x < 4 \\ a + b, & x = 4 \\ \frac{x-4}{|x-4|} + b, & x > 4 \end{cases}$

Then, $f(x)$ is continuous at $x = 4$, when

a) $a = 0, b = 0$ b) $a = 1, b = 1$ c) $a = -1, b = 1$ d) $a = 1, b = -1$

17. If $f(x) \begin{cases} \frac{[x]-1}{x-1}, & x \neq 1 \\ 0, & x = 1 \end{cases}$ then at $x = 1$, $f(x)$ is

a) Continuous and differentiable

b) Differentiable but not continuous
c) Continuous but not differentiable
d) Neither continuous nor differentiable

18. If $f(x) = \begin{cases} \frac{1-\sqrt{2}\sin x}{\pi - 4x}, \text{ if } x \neq \frac{\pi}{4} \\ a, \quad \text{ if } x = \frac{\pi}{4} \end{cases}$ is continuous at $\frac{\pi}{4}$, then a is equal to

a) 4 b) 2 c) 1 d) 1/4

19. If the function $f:R \to R$ given by $f(x) = \begin{cases} x+a, \text{ if } x \leq 1 \\ 3-x^2, \text{ if } x > 1 \end{cases}$ is continuous at $x = 1$, thyen a is equal to

a) 4 b) 3 c) 2 d) 1

20. If $f:R \to R$ is defined by
$f(x) = \begin{cases} \frac{\cos 3x - \cos x}{x^2}, \quad \text{for } x \neq 0 \\ \lambda, \quad \text{for } x = 0 \end{cases}$ and if f is continuous at $x = 0$, then λ is equal to

a) -2 b) -4 c) -6 d) -8