



MA8151-ENGINEERING MATHEMATICS-I

Unit-1 Differential Calculus

Objective Question Bank

1. The value of $\lim_{x \rightarrow 0} \frac{\sin x}{x}$ is

- (a) 0 (b) not defined (c) 1 (d) π

Ans: (c)

2. Using Squeeze theorem the value of $\lim_{x \rightarrow 0} x^2 \sin \frac{1}{x}$ is

- (a) 0 (b) 1 (c) -1 (d) does not exist

Ans: (a)

3. The value of The value of $\lim_{x \rightarrow 2} \frac{x+3}{x+6}$ is

- (a) 1/2 (b) 5/8 (c) -5/8 (d) -1/2

Ans: (b)

4. If f is continuous at 'a' then

- (a) f(a) should exist (b) $\lim_{x \rightarrow a} f(x)$ exists both on left and right
(c) $\lim_{x \rightarrow a} f(x) = f(a)$ (d) all of these

Ans: (d)

5. For what value of c is the function f continuous at $(-\infty, \infty)$, if $f = \begin{cases} cx^2 + 2x, & x < 2 \\ x^3 - cx, & x \geq 2 \end{cases}$

- (a) 3/2 (b) 2/3 (c) 1/3 (d) 1

Ans: (b)

6. $\lim_{x \rightarrow -2} \frac{x^3 + 2x^2 - 1}{5 - 3x} =$

- (a) -1/11 (b) 1/11 (c) 1/10 (d) 15/11

Ans: (a)

7. $\lim_{x \rightarrow 0} x \cot x =$

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

Ans : (c)

8. The slope of the tangent line to the curve $y = 4x - x^2$ is

(a) 1

(b) 2

(c) 3

(d) 4

Ans : (b)

9. The equation of tangent line to the curve $y = 3x^2 - x^3$ is The

(a) $y = 2x + 1$

(b) $y = 3x + 1$

(c) $y = 3x - 1$

(d) none of these

Ans: (c)

10. The function $f(x) = \begin{cases} x + 2, & x < 0 \\ e^x, & 0 \leq x \leq 1 \\ 2 - x, & x > 1 \end{cases}$ is continuous on the left at $x = 0$

(a) True

(b) False

Ans: (b)

11. If $y = x^{-99}$, then $dy/dx =$

(a) $99 x^{99}$

(b) $99 x^{-99}$

(c) $-99 x^{-98}$

(d) $-99 x^{-100}$

Ans: (d)

12. If $y = \log \sec x$, then $y' =$

(a) $1/\sec x$

(b) $\tan x$

(c) $\sec x \tan x$

(d) $\cos x$

Ans : (b)

13. The equation of motion of a particle is $s = 5t^2 + 3t + 7$, (s in cms and t in secs), the acceleration after

2 seconds is

(a) 14 cm/ s^2

(b) 12 cm/ s^2

(c) 2 cm/ s^2

(d) 10 cm/ s^2

Ans: (a)

14. If $y = \sqrt{x}$, then $dy/dx =$

(a) $1/\sqrt{x}$

(b) $2\sqrt{x}$

(c) $\frac{1}{2\sqrt{x}}$

(d) $-\frac{1}{2\sqrt{x}}$

Ans : (c)

15. If $y = a^x$, then $y' =$

(a) $x a^{x-1}$

(b) a^x

(c) $a^x \log a$

(d) $x^a \log x$

Ans : (c)

16. Find dy/dx , if $y = \sinh^{-1} x$.

(a) $\frac{1}{\sqrt{1+x^2}}$

(b) $\frac{1}{\sqrt{1-x^2}}$

(c) $\frac{-1}{\sqrt{1+x^2}}$

(d) $\frac{-1}{\sqrt{1-x^2}}$

Ans: (a)

17. $\lim_{t \rightarrow 0} \frac{1}{t\sqrt{1+t}} - \frac{1}{t} =$

- (a) $1/2$ (b) $1/4$ (c) $-1/2$ (d) 0

Ans : (c)

18. Equation of the normal line to the curve $y = \sqrt[4]{x}$ at $(1,1)$ is

- (a) $y = 4x + 5$ (b) $y = -4x + 5$ (c) $y = -4x - 5$ (d) $y = -4x - 3$

Ans : (b)

19. The points at which the horizontal tangent occurs on the curve $y = x^4 - 6x^2 + 8$ is

- (a) $(0,8)$ (b) $(\sqrt{3}, -1)$ (c) $(-\sqrt{3}, -1)$ (d) all of these

Ans: (d)

20. If $y = (1 - x^2)^{10}$, then $y' =$

- (a) $10(1 - x^2)^9$ (b) $20(1 - x^2)^9$ (c) $20x(1 - x^2)^9$ (d) $10(1 - 2x)^9$

Ans: (c)

21. The number $f(c)$ is a local maximum value of f if $f(c) \geq f(x)$ when x is near c .

- (a) True (b) False

Ans : (a)

22. The critical points of $f(x) = 2x^3 - 3x^2 - 36x$ are

- (a) $-2, 3$ (b) $2, 3$ (c) $1, 5$ (d) $-1, 5$

Ans : (a)

23. The critical numbers of $f(x) = x^2 + \frac{2}{x}$ are

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

Ans : (d)

24. If $f(x) = \frac{1}{2}(3x - 1)$, $x \leq 3$ the absolute maximum of f is

- (a) 1 (b) 0 (c) 4 (d) $5/2$

Ans : (c)

25. If $f(x) = \sin x + \cos x$ in $(0, 2\pi)$, the interval where f is decreasing is

- (a) $0 < x < \pi/4$ (b) $\pi/4 < x < 5\pi/4$ (c) $5\pi/4 < x < 2\pi$ (d) none of these

Ans : (b)