

Model Question paper
Differential Calculus 1

11th Standard

Maths

Reg.No. :

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I. Answer all the questions.

II. Use blue pen only.

Time : 02:00:00 Hrs

Total Marks : 65

10 x 1 = 10

Part - A

- 1) $\lim_{x \rightarrow -1} (x) = \dots\dots\dots$
(a) -1 (b) 1 (c) 0 (d) 0.1
- 2) R f(0) for f(x)=|x| is
(a) x (b) 0 (c) -x (d) 1
- 3) $\lim_{x \rightarrow 0} \frac{\sin 5x}{x}$ is.....
(a) 5 (b) $\frac{1}{5}$ (c) 0 (d) 1
- 4) $\lim_{x \rightarrow 0} \frac{2^x - 3^x}{x}$ is
(a) $\log(\frac{3}{2})$ (b) $\log(\frac{2}{3})$ (c) log 2 (d) log 3
- 5) $\lim_{x \rightarrow \infty} (1 - \frac{1}{x})^x$ is.....
(a) e (b) -e (c) $\frac{1}{e}$ (d) 0
- 6) $\lim_{x \rightarrow 1} \frac{1+(x-1)^2}{1+x^2}$ is
(a) $\frac{1}{2}$ (b) 2 (c) $-\frac{1}{2}$ (d) -2
- 7) $\lim_{x \rightarrow 0} \frac{x^3 - 1}{x + 2}$ is
(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) 2 (d) -2
- 8) $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$ is
(a) 2 (b) $\frac{1}{2}$ (c) -2 (d) $-\frac{1}{2}$
- 9) $\lim_{x \rightarrow 0^+} \frac{x}{|x|}$ is
(a) 0 (b) 1 (c) -1 (d) x
- 10) $\lim_{x \rightarrow \infty} \frac{x-2}{x+2}$ is
(a) 2 (b) -2 (c) 1 (d) -1

Part - B

5 x 2 = 10

- 11) Find the Indicated limits $\lim_{x \rightarrow 4} \frac{\sqrt{2x+1}-3}{\sqrt{x-2}-\sqrt{2}}$
- 12) Find the positive integer n such that $\lim_{x \rightarrow 3} \frac{x^n - 3^n}{x - 3} = 108$
- 13) Differentiate: $\tan^{-1} \frac{1+x^2}{1-x^2}$
- 14) Find $\frac{d^3y}{dx^3}$ if $y = x^2 + \cot x$
- 15) Find the third order derivatives of: $x \cos x$

Part - C

5 x 3 = 15

- 16) Find the derivatives of the following functions:
 $\sin^{-1} \left(\frac{1-x}{1+x} \right)$
- 17) Find dy/dx if x and y are connected parametrically by the equations (without eliminating the parameter).
 $x = a \cos \theta, y = b \sin \theta$
- 18) Find dy/dx if x and y are connected parametrically by the equations (without eliminating the parameter).
 $x = a \left(\cos \theta + \log \tan \frac{\theta}{2} \right), y = a \sin \theta$
- 19) Indicated points $f(x) = \begin{cases} \frac{x^3-8}{x^2-4} & \text{if } x \neq 2 \\ 3 & \text{if } x = 2 \end{cases}$ at $x = 2$
- 20) Find the values of a and b so that the function f given by
 $f(x) = \begin{cases} 1, & x \leq 3 \\ ax + b, & 3 < x < 5 \\ 7, & x \geq 5 \end{cases}$ is continuous at x=3 and x=5

Part - D

5 x 5 = 25

- 21) Differentiate the following functions w.r. to x.
 $(x^2 + 2x + x)^{\sqrt{x-1}}$
- 22) Find dy / dx for the following implicit functions.
 $(1 + y^2) \sec x - y \cot x + 1 = x^2$
- 23) Differentiate $\frac{\cos x + \log x}{x^2 + e^x}$

24) Compute $\lim_{x \rightarrow 0} \frac{\sin \beta x}{\sin \alpha x}$, $\alpha \neq 0$

25) Evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{\sin^{-1} x}$

