SAMPLE TEST PAPER - 03 FOR CLASS 12

CONTINUITY AND DIFFERENTIABILITY & APPLICATIONS OF DERIVATIVES

This question paper consists of 29 questions divided into four sections – A, B, C and D

Section A contains 4 questions of 1 mark each

Section B contains 8 questions of 2 marks each

Section C contains 11 questions of 4 marks each

Section D contains 6 questions of 6 marks each

Ques No.	Question
1 - 1459981 ***[1 mark]***	Let $U = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$ and $V = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, then $\frac{dU}{dV} =$ (a)$1/2$ (b) x (c) $\frac{1-x^2}{1+x^2}$ (d) 1
2 - 7694 ***[1 mark]***	Differential coefficient of $\sec\left(\tan^{-1}x\right)$ w.r.t x is
3 - 85093 ***[1 mark]***	The number of points at which the function $f(x) = \frac{1}{\log}\lvert x\rvert$ is discontinuous is (1) 0 (2) 1 (3) 2 (4) 3
4 - 7699 ***[1 mark]***	The derivative of $\log_{10} x$ is ?
5 - 1581 ***[2 marks]***	Find the derivative of tan $(2x + 3)$.
6 - 1584 ***[2 marks]***	Find $\frac{dy}{dx}$, if $y + \sin y = \cos x$
7 - 1586	Find the derivative of / given by $f(x) = \tan^{-1}x$ assuming it exists.

[2 marks]	Watch Free Video Solution on Doubtnut
8 - 1763 ***[2 marks]***	Differentiate $\sqrt{\frac{(x-3)(x^2+4)}{3x^2+4x+5}}$ w.r.t x. Watch Free Video Solution on Doubtnut
9 - 1759 ***[2 marks]***	Find $\frac{dy}{dx}$, if $x = a\cos\theta, y = a\sin\theta$. Watch Free Video Solution on Doubtnut
10 - 1868 ***[2 marks]***	The total revenue in Rupees received from the sale of x units of a product is given by $R(x) = 3x^2 + 36x + 5$. Find the marginal revenue, when $x = 5$, where by marginal revenue we mean the rate of change of total revenue with respect to the nu Watch Free Video Solution on Doubtnut
11 - 25850 ***[2 marks]***	6. The radius of a circle is increasing at the rate of 0.7 cm/s. What is the rate of increase of its circumference? Watch Free Video Solution on Doubtnut
12 - 1875 ***[2 marks]***	Find the slope of the tangent to the curve $y = \frac{x-1}{x-2}, x \neq 2$ at $x = 10$. Watch Free Video Solution on Doubtnut
13 - 1579 ***[4 marks]***	Show that the function f defined by $f(x) = \lvert 1 - x + x \rvert,$ where x is any real number, is a continuous function. Watch Free Video Solution on Doubtnut
14 - 1640 ***[4 marks]***	Prove that the function $f(x) = 5x - 3$ is continuous at $x = 0$, at $x = -3$ and at $x = 5$. Watch Free Video Solution on Doubtnut
15 - 1717 ***[4 marks]***	Show that the function defined by $f(x) = \cos(x^2)$ is a continuous function. Watch Free Video Solution on Doubtnut
16 - 16829 ***[4 marks]***	Find $\frac{dy}{dx}$ if $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ Watch Free Video Solution on Doubtnut
17 - 1733 ***[4 marks]***	If $y = 500e^{7x} + 600e^{-7x}$, show that $\frac{d^2y}{dx^2} = 49y$ Watch Free Video Solution on Doubtnut

18 - 1872 ***[4 marks]***	The volume of a cube is increasing at a rate of 9 cubic centimetres per second. How fast is the surface area increasing when the length of an edge is 10 centimetres? Watch Free Video Solution on Doubtnut
19 - 1823 ***[4 marks]***	The radius of an air bubble is increasing at the rate of $\frac{1}{2}cm/s$. At what rate is the volume of the bubble increasing when the radius is 1 cm? Watch Free Video Solution on Doubtnut
20 - 10721 ***[4 marks]***	Show that $y = \log(1+x) - \frac{2x}{2+x}, x > 1$ is an increasing function of x throughout its domain. Watch Free Video Solution on Doubtnut
21 - 1834 ***[4 marks]***	Prove that the logarithmic function is strictly increasing on $(0, \infty)$. Watch Free Video Solution on Doubtnut
22 - 1878 ***[4 marks]***	Find the slope of the normal to the curve $x = 1 - a\sin\theta, y = b\cos^2\theta$ at $\theta = \frac{\pi}{2}$. Watch Free Video Solution on Doubtnut
23 - 1788 ***[4 marks]***	Find local maximum and local minimum values of the function f given by $f(x) = 3x^4 + 4x^3 - 12x^2 + 12$. Watch Free Video Solution on Doubtnut
24 - 1735 ***[6 marks]***	If $y = \left(\tan^{-1}x\right)^2$, show that $\left(x^2+1\right)^2 y_2 + 2x\left(x^2+1\right)y_1 = 2$ Watch Free Video Solution on Doubtnut
25 - 1616 ***[6 marks]***	Verify Mean Value Theorem, if $f(x) = x^3 - 5x^2 - 3x$ in the interval [a, b], where $a = 1 \ and \ b = 3$. Find all $c \in (1, 3)$ for which $f'(c) = 0$. Watch Free Video Solution on Doubtnut
26 - 1836 ***[6 marks]***	Prove that the function f given by $f(x) = \log \sin x \ f(x) = \log \sin x$ is strictly increasing on $\left(0, \frac{\pi}{2}\right)$ and strictly decreasing on $\left(\frac{\pi}{2}, \pi\right)$. Watch Free Video Solution on Doubtnut
27 - 1887 ***[6 marks]***	Find the equations of the tangent and normal to the curve $x^{\frac{2}{3}} + y^{\frac{2}{3}} = 2$ at (1, 1) Watch Free Video Solution on Doubtnut
28 - 1768	Find the equation of tangent to the curve given by $x = a\sin^3 t, y = b\cos^3 t$ ... (1) at a point where $t = \frac{\pi}{2}$.

[6 marks]	Watch Free Video Solution on Doubtnut
29 - 1798 ***[6 marks]***	Prove that the radius of the right circular cylinder of greatest curved surface area which can be inscribed in a given cone is half of that of the cone. Watch Free Video Solution on Doubtnut
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