

Applications of Derivatives Assignment

APPLICATION OF DERIVATIVES

QUESTION 1:

Find the intervals for which the given function is (i) Strictly increasing (ii) Strictly decreasing :

$$f(x) = (x + 2)^3 (x - 5)^3$$

QUESTION 2:

Find the intervals in which the given function is (i) Strictly increasing (ii) Strictly decreasing :

$$f(x) = \log \sin 2x ; 0 < x < \pi/2$$

QUESTION 3:

Find the interval in which the function f is decreasing

$$f(x) = \frac{4 \sin x - 2x - x \cos x}{2 + \cos x}$$

QUESTION 4:

Find the intervals in which the function f is (i) increasing (ii) decreasing.

QUESTION 5:

Find the distance from the origin of normal at any point θ to the curve $x = 3 \cos \theta + 3 \theta \sin \theta$;
 $y = 3 \sin \theta - 3 \theta \cos \theta$

QUESTION 6:

Find the equation of the normal to curve $4x^2 = 8y$ which passes through the point (1, 2).

QUESTION 7:

Find points on the given curve at which the tangents are parallel to y-axis

$$\frac{x^2}{25} + \frac{y^2}{16} = 1$$

QUESTION 8:

Find the equation of all lines having slope 2 that are tangents to the curve

$$y = \frac{1}{x-3}, x \neq 3$$

QUESTION 9

Discuss the applicability of Lagrange's mean value theorem for the function:

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$$f(x) = |\sin x| \text{ in the interval } \left[-\frac{\pi}{2}, \frac{\pi}{2} \right]$$

QUESTION 10: Use Differentials to find the value of $(33)^{\frac{1}{5}}$

QUESTION 11:

Show that the height of the cylinder of greatest volume that can be inscribed in a right circular cone of height h and having semi vertical angle α is one third that of the cone and the greatest

$$\text{volume of cylinder is } \frac{4}{27} \pi h^3 \tan^2 \alpha$$

QUESTION 12:

Show that a closed right circular cylinder of a given total surface area and maximum volume is such that its height is equal to the diameter of the base

QUESTION 13:

Find the points at which the function f given by $f(x) = (x - 2)^4(x + 1)^3$ has

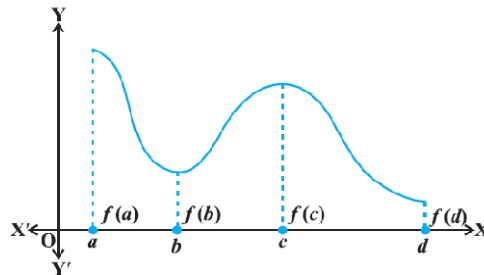
(i) local maxima (ii) local minima (iii) point of inflexion .

Also find the (iv) local maximum value and the (v) local minimum value

QUESTION 14:

If the radius of a sphere is measured as 9 m with an error of 0.03 m, then find the approximate error in calculating its surface area.

QUESTION 15:



Four points : a,b,c, and d are marked on the X- axis .At which of the four points does the function f have local minima/Maximum, absolute minimum/maximum. What are the local minima/Maximum, absolute minimum/maximum values?

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