Continuity and Differentiability, Application of Derivatives

Time:45 minute | Class 12 scert | Max mark: 23

Answer all

1. (a) Find the relationship between a and b so that the function f defined by

$$f(x) = \left\{ \begin{array}{ll} ax^2 - 1, & x \leq 2 \\ bx + 3, & x > 2 \end{array} \right\}$$

is continuous **(2)**

(b) The number of discontinuity of the function f defined by $f(x) = [x]$ in the interval $(-2, 5)$ is ? **(1)**

2. (a) Find the intervals in which the function $x^2 - 2x + 5$ is strictly increasing. **(2)**

(b) What is the maximum value of the function $sinx + cosx$ **(2)**

3. (a) Find $\frac{dy}{dx}$, $x^y = y^x$ **(3)**

(b) Find the rate of change of area of a circle when radius = 5 cm **(1)**

4. (a) Find $\frac{dy}{dx}$ if $y = x^x + x^{sinx}$ **(3)**

(b) Find two positive numbers such that their sum is 8 and the sum of their squares is minimum **(3)**

5. (a) A wire of length 28 m is to be cut into two pieces. One of the pieces is to be made into a square and the other into a circle. What should be the length of the two pieces so that the combined area of the square and the circle is minimum? **(4)**

(b) Find the minimum value of the function $f(x) = x - 2, x \in [1, 3]$ **(2)**