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Class – 12th   **Chapter-7**   **Subject Maths**

Worksheet-32   Differentiation

1. Verify Rolle's theorem for the functions given below:

(a) $f(x) = e^x(\sin x - \cos x);$ $x \in [\pi/4, \ 5\pi/4]$ (b) $f(x) = (x-a)^m(x-b)^n;$ $x \in [a, b], m, n \in N$

(c) $f(x) = |x|;$ $x \in [-1, 1]$ (d) $f(x) = x^2 + 2x - 8;$ $x \in [-4, 2]$

(e) $f(x) = \begin{cases} x^2 + 1 & ; \ 0 \le x \le 1 \\ 3 - x & ; \ 1 < x \le 2 \end{cases}$ (f) $f(x) = [x];$ $x \in [-2, 2]$

2. Verify Rolle's theorem for the functions given below :

(a) $f(x) = x^2 + 5x + 6;$ $x \in [-3, -2]$ (b) $f(x) = e^{-x} \sin x;$ $x \in [0, \pi]$

(c) $f(x) = \sqrt{x(1-x)};$ $x \in [0, 1]$ (d) $f(x) = \cos 2x;$ $x \in [0, \pi]$

3. Verify Lagrange's mean value theorem for the functions given below:

(a) $f(x) = x + \dfrac{1}{x};$ $x \in [1, 3]$ (b) $f(x) = \dfrac{x^2 - 4}{x - 1};$ $x \in [0, 2]$

(c) $f(x) = x^2 - 3x + 2;$ $x \in [-2, 3]$ (d) $f(x) = \dfrac{1}{4x - 1};$ $x \in [1, 4]$