Qu: A value of c for which conclusion of Mean Value th^{m} holds for the function $f(x) = \log_e x$ on the interval $[1,3]$ is

Sol:- Using Lagrange's Mean value th^{m}

Let $f(x)$ be the f^{n} defined on $[a,b]$ then

$$f'(c) = \frac{f(b) - f(a)}{b-a} \qquad \text{---------- (1)}$$

$c \in [a,b]$

$$f(x) = \log_e x \quad \therefore \quad f'(x) = \frac{1}{x}$$

$$\text{or } \frac{1}{c} = \frac{f(3) - f(1)}{3-1}$$

$$\frac{1}{c} = \frac{\log_e 3 - \log_e 1}{2} = \frac{\log_e 3}{2}$$

$$c = \frac{2}{\log_e 3} \Rightarrow \boxed{c = 2\log_3 e}$$

Ans