**2. MEAN VALUE THEOREM**

**ROLLE’S MEAN VALUE THEOREM:**

Let be defined in [a, b] such that,

1. is continuous on [a, b].
2. is differentiable on (a, b).

There exists at least one such that .

Geometrically Rolle’s theorem gives tangent parallel to X-axis.

**Note:** differentiable on open interval but why? Hint: Slope can be obtain from one side only at end.

**LAGRANGE’S MEAN VALUE THEOREM:**

Let be defined in [a, b] such that,

1. is continuous on [a, b].
2. is differentiable on (a, b).

There exists at least one such that

Geometrically LaGrange’s mean value theorem gives tangent parallel to line joining points and .

**CAUCHY’S MEAN VALUE THEOREM:**

Let and be defined in [a, b] such that,

1. and are continuous on [a, b].
2. and are differentiable on (a, b).
3. .

Then there exists at least one point such that