Section 4.2 *The mean value theorem*

Learning outcomes

After completing this section, you will inshaAllah be able to

1. explain and apply the Rolle's Theorem
2. explain and apply the Mean Value Theorem

Rolle's Theorem

If a function $f(x)$ satisfies the following:

- $f(x)$ is continuous on $[a,b]$
- $f(x)$ is differentiable on (a,b)
- $f(a) = f(b)$

Hypotheses

See class explanation

Then

there is a number $c \in (a,b)$ such that $f'(c) = 0$

Conclusion

See examples 1, 2 done in class

Mean Value Theorem

If a function $f(x)$ satisfies the following:

- $f(x)$ is continuous on $[a,b]$
- $f(x)$ is differentiable on (a,b)

Hypotheses

See class explanation

Then

there is a number $c \in (a,b)$ such that

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

Conclusion

See examples 3, 4, 5 done in class

End of 4.2