

# Mean Value Theorem for Integrals

## Math 111

### Lecture 3

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Mean Value Theorem for Integrals:

If  $f$  is continuous function on  $[a, b]$ , then there exists a number  $c$  ?  
 $(a, b)$  such that

$$\int_a^b f(x) dx = f(c)(b - a).$$

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Proof

Remarks:

- The Mean Value Theorem for Integrals is important for evaluate the definite integral.

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- The Mean Value Theorem for Integrals show the relationship between the definite integral and derivative.

Exercise:

Find the value of  $c$  for the function  $f(x) = x + 1$  defined on  $[0, 1]$  which satisfy the Mean Value Theorem for Integrals?

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Find the value of  $c$  for the function  $f(x) = x^2 + 2x + 1$  defined on  $[0, 1]$  which satisfy the Mean Value Theorem for Integrals?

Exercise

Find the following?



$$\int_{-3}^2 |x + 2| dx?$$

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$$\int_0^{\frac{\pi}{2}} \sin x + \cos x dx?$$

*Thanks for listening.*