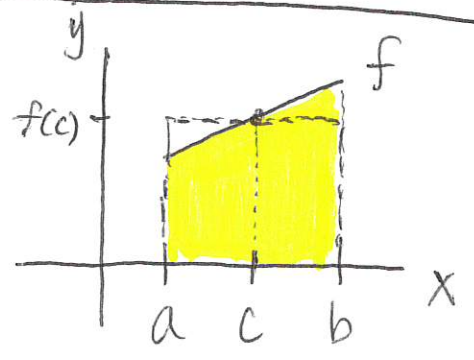


ES: What is MVT for Integrals and average value of a function?

MVT for Integrals

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

Area under the curve = Area of a Rectangle



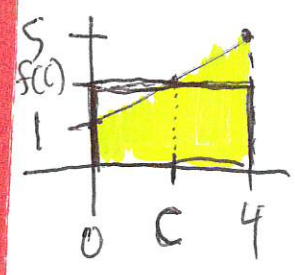
Somewhere between  $[a, b]$  there is a  $c$ , that gives us the height of the rectangle whose area = the area under curve.

How do we use this?

Ex

Find the value  $c$  by the MVT for Integrals:

$f(x) = x + 1$   $[0, 4]$   
 $a$   $b$



$$\int_0^4 (x+1) dx = f(c)(4-0)$$

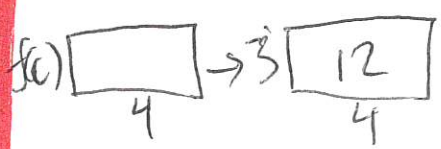
$$12 = f(c)(4)$$

$$\frac{12}{4} = f(c)$$

$$3 = f(c)$$

$$3 = c + 1$$

$$2 = c$$



Average  
value of  
a function

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

$$f(c) = \frac{1}{b-a} \int_a^b f(x) dx$$

height  $\equiv$  Average value of a function

How do  
we use it?

(ex)

Find the average value of  $f(x) = x+1$   
on  $[0, 4]$

$$f_{\text{avg}} = \frac{1}{4-0} \int_0^4 (x+1) dx$$
$$= \frac{1}{4} (12)$$

$$f_{\text{avg}} = \boxed{3}$$
 height of  
rectangle

Summary

Hw #6B pg 288 #45, 46, 47, 50, 51,  
53, 54, 55, 63

due Monday 3/11

Quiz 6  
on Monday  
Hw 6A+6B