

## Section 5.5

### Average Value of a Function

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### AVERAGE VALUE OF A FUNCTION

The [average value of a function  \$f\$](#)  over an interval  $[a, b]$  is defined as

$$\begin{aligned} f_{\text{ave}} &= \frac{1}{b-a} \int_a^b f(x) dx \\ &= \frac{\int_a^b f(x) dx}{b-a} \end{aligned}$$

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### THE MEAN VALUE THEOREM FOR INTEGRALS

**Theorem:** If  $f$  is continuous on  $[a, b]$ , then there exists a number  $c$  in  $[a, b]$  such that

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

that is,

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

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