The Mean Value Theorem for Integrals

Name ______________________________

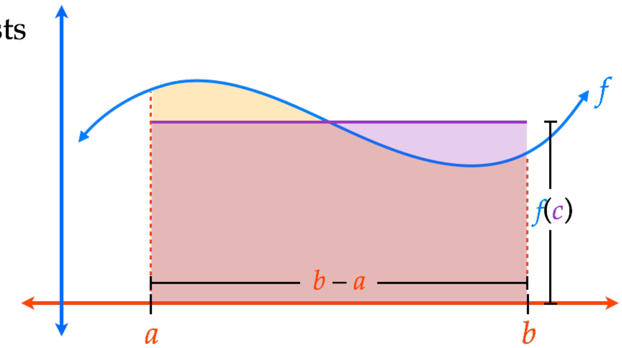
Date _________________ Period ______

Mean Value Theorem for Integrals

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

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

Area under f on $[a,b]$



The Mean Value Theorem only says c exists $[a,b]$, not how to find c.

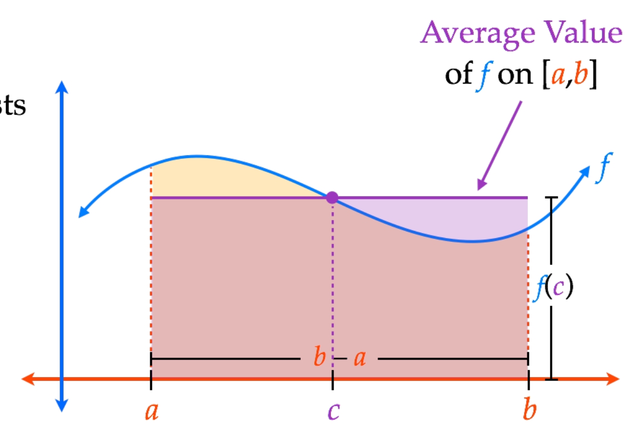
Mean Value Theorem for Integrals

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

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

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

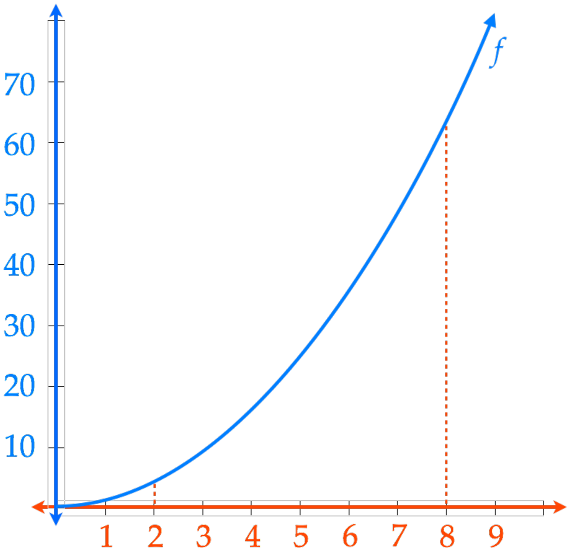
Average Value of f on $[a,b]$



Set $f(c)$ = Average Value of f, solve for c.

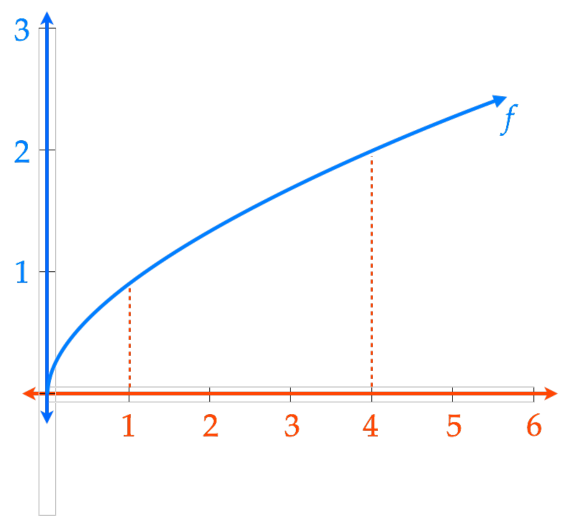
Find the value of c for the following

$f(x) = x^2$ on $[2,8]$



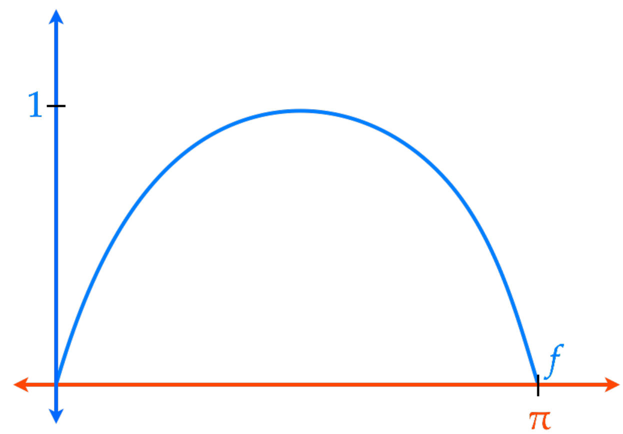
Find the value of c for the following

$f(x) = \sqrt{x}$ on $[1,4]$



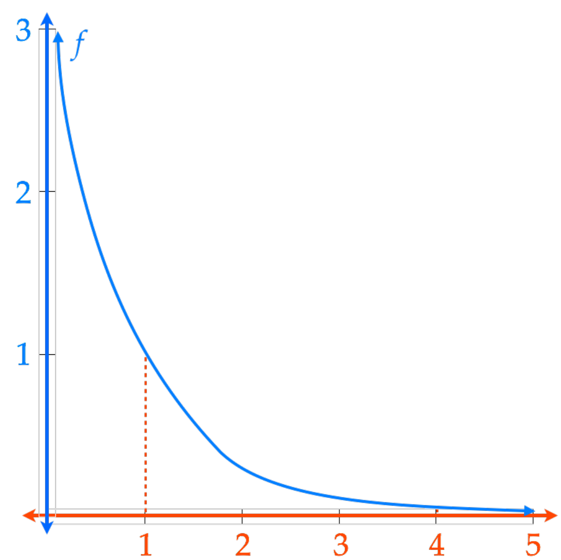
Find the value of c for the following

$$f(x) = \sin x \text{ on } [0,\pi]$$



Find the value of c for the following

$$f(x) = \frac{1}{x^2} \text{ on } [1,4]$$



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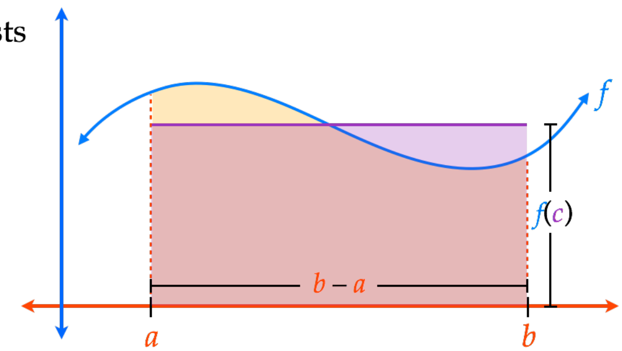
Area under f on $[a,b]$



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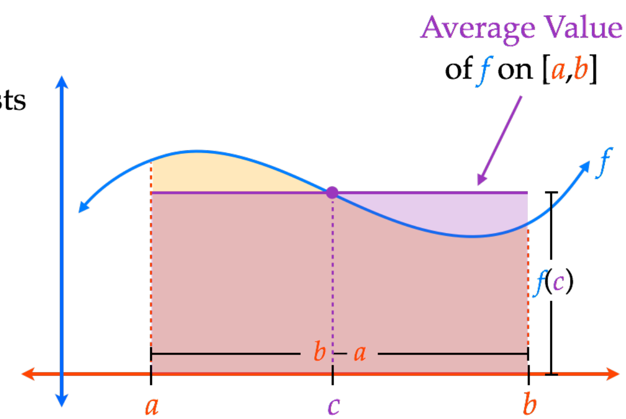
$$f(c)(b-a) = \int_a^b f(x)\,dx$$

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

Average Value of f on $[a,b]$



Set $f(c)$ = Average Value of f, solve for c.