Definition of a Definite Integral

Name ____________________

Date ____________ Period ______

Definition of the Definite Integral

Let f be defined on $[a,b]$. f is integrable on $[a,b]$ (provided the limit exits) and is defined by…

upper limit

$$\int_a^b f(x)\,dx = \lim_{n\to\infty} \underbrace{\sum_{i=1}^{n} f(x_i)\cdot\Delta x}_{\text{Riemann Sum} \Rightarrow S(n)} = \lim_{n\to\infty} S(n) = \text{Area}$$

lower limit

Riemann Sum => $S(n)$

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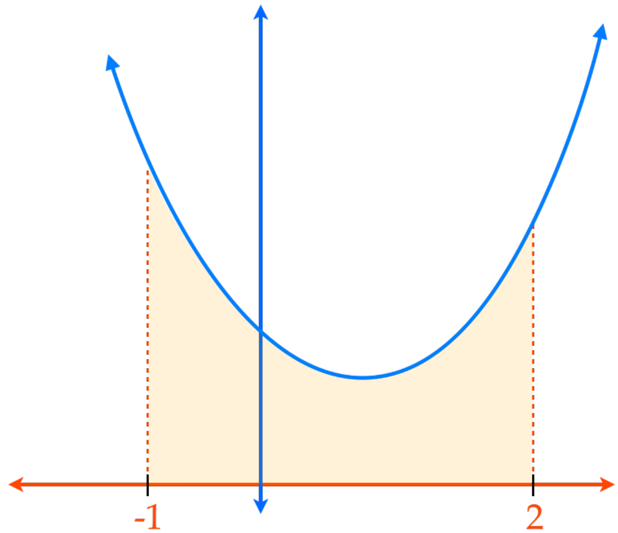
$$\text{Area} = \int_a^b f(x)\,dx = \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\cdot\Delta x = \lim_{n\to\infty} S(n)$$

Riemann Sum => $S(n)$

Write the following in Definite Integral Notation

The area under $f(x) = 2x^2 - x + 1$ on [-1,2]

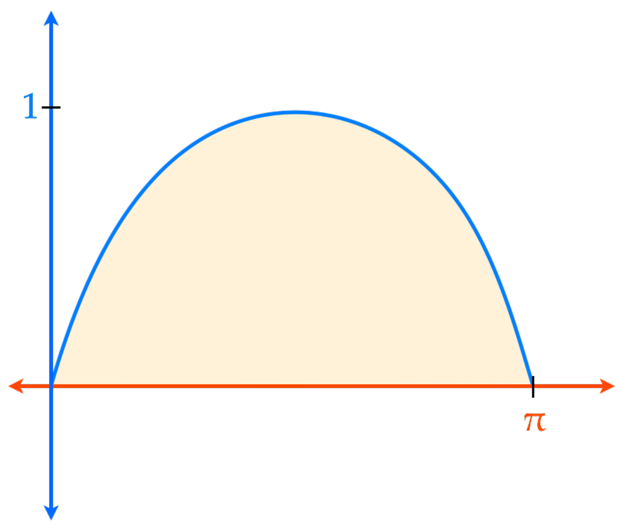
$$\int_{-1}^{2} 2x^2 - x + 1 \, dx$$



Write the following in Definite Integral Notation

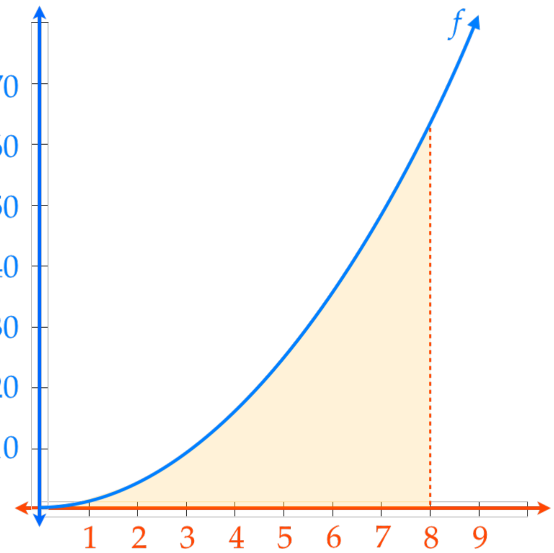
The area under $f(x) = \sin x$ on $[0,\pi]$

$$\int_{0}^{\pi} \sin x \, dx$$



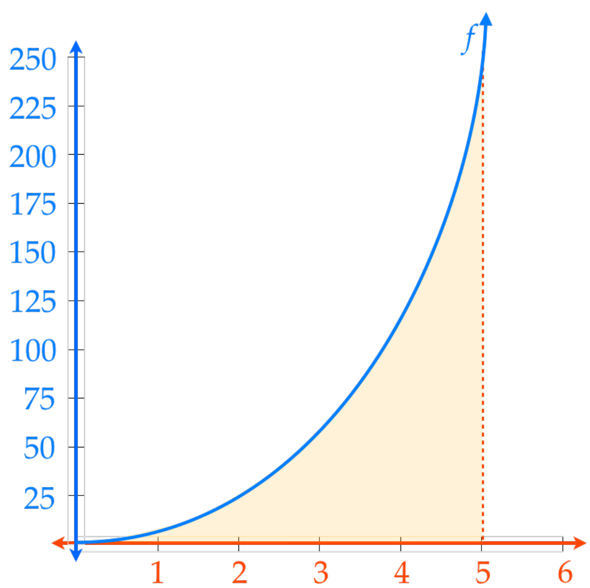
Find the area under $f(x) = x^2$ on $[0,8]$

$$\text{Area} = \int_0^8 x^2 \, dx$$



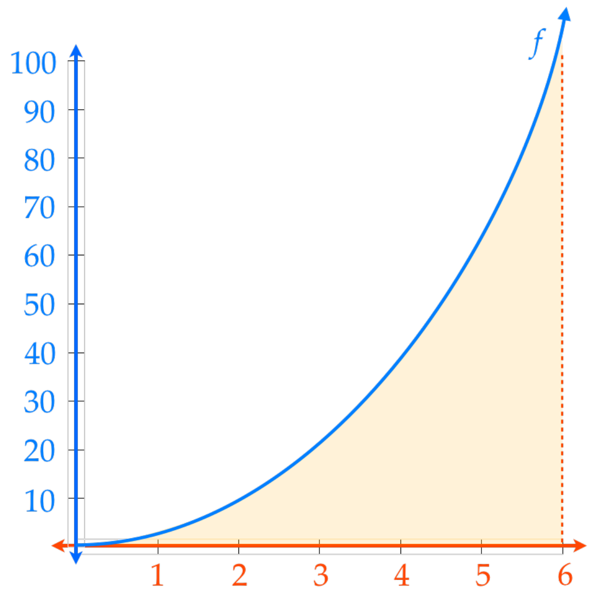
Find the area under $f(x) = 2x^3$ on $[0,5]$

$$\text{Area} = \int_0^5 2x^3 \, dx$$



Find the area under $f(x) = 3x^2$ on $[0,6]$

$$\text{Area} = \int_0^6 3x^2 \, dx$$



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