

29 Lesson 29

29.1 Definite Integrals

In the last lecture, we learned how to approximate the (signed) area under the curve of $f(x)$ from a to b using n rectangles. To do so, we defined left and right Riemann sums. As we increase n in such a computation, the estimated area gets closer to the exact (signed) area. In fact, if we send n to infinity, we actually get the exact (signed) area.

We use a **definite integral** to denote the exact (signed) area under the curve of $f(x)$ on $[a, b]$, namely

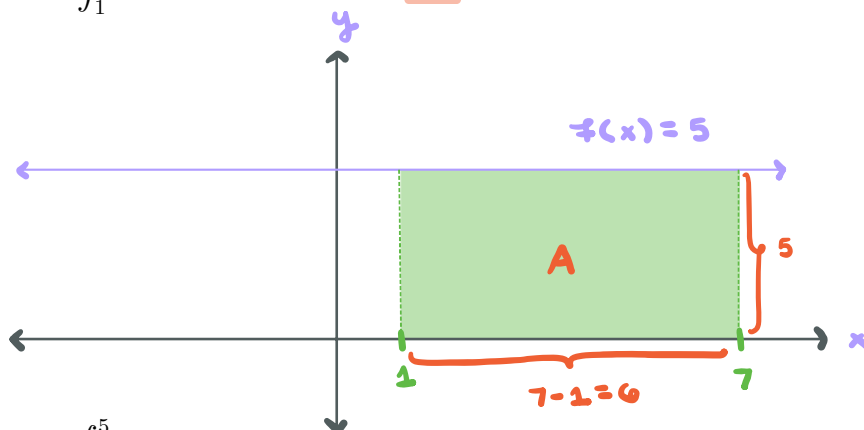
$$\int_a^b f(x) dx.$$

We say that a and b are the **lower and upper limits of integration**, respectively.

Example: Evaluate

$$\int_1^7 5 dx = A = 5 \cdot 6 = 30$$

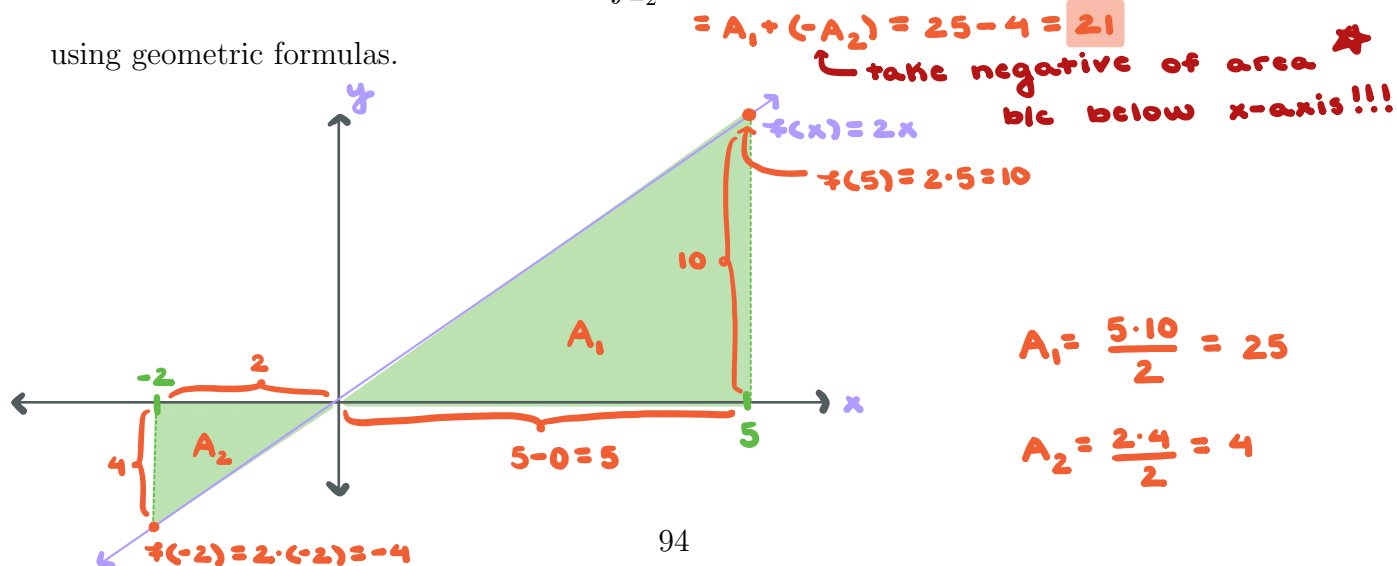
using geometric formulas.



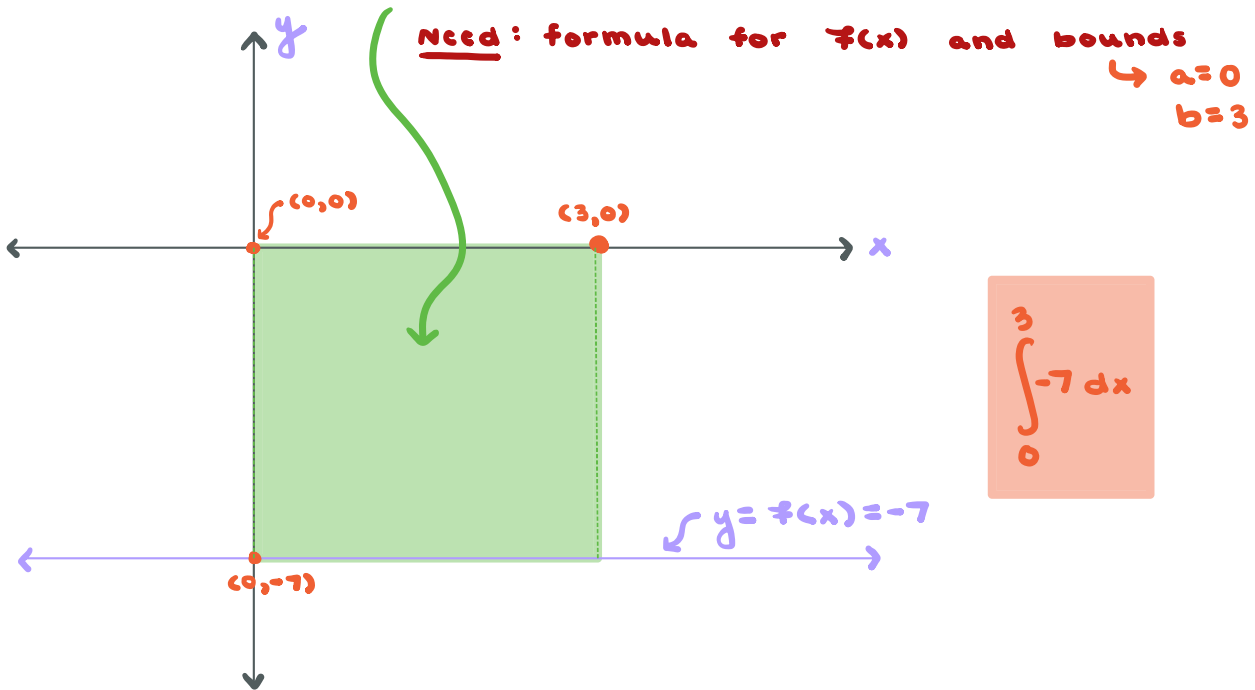
Example: Evaluate

$$\int_{-2}^5 2x dx$$

using geometric formulas.



Example: Write down the definite integral that represents the shaded area.



Example: Write down the definite integral that represents the shaded area.

