Fundamental Theorem of Calculus: Part 2

Goal: • Understands how to evaluate a definite integral for basic functions on $[a, b]$
Terminology: • Total Area

Discussion: Why are the following properties true?

$$\int_a^b f(x)dx + \int_b^c f(x)dx = \int_a^c f(x)dx$$

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

We want to evaluate the following integral where a, b could be anything on the domain of f.

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

Example: Evaluate the following

$$\int_{-1}^{2} (x^2 - 4x + 1)dx$$

Practice: Evaluate the following

$$\int_{0}^{1} \left(x^{99} + \frac{1}{\sqrt{3x+1}}\right) dx$$

Practice: Evaluate the following

$$\int_{-4}^{-2} \frac{3-x}{x} dx$$

If we don't include the bounds we are shorthanding a way to write the general antiderivatvie of a function

$$\int f(x)dx = \int_0^x f(t)dt = F(x) + C$$

Example: Evaluate

$$\int \frac{x+1}{x-1}dx$$

Practice: Evaluate

$$\int \frac{2x^2 - x + 3}{x+1}dx$$

Practice Problems: 10.1 # 1 (NOT e, h, m, n, p)
11.2 # 1a-m, 2a-e, 3ab, 4

11.2 # Problem Plus