

5.4 – The Fundamental Theorem of Calculus (FTC), Part 2

FTC 2

If f is continuous on $[a, b]$ and F is an antiderivative of f , then

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

Find the following definite integrals.

1. $\int_1^2 (5 - x^{-1}) dx$

2. $\int_{-\pi/2}^{\pi/3} \cos \alpha d\alpha$

$$3. \int_4^9 \frac{3x+1}{\sqrt{x}} dx$$

$$4. \int_1^5 f(x) dx, \text{ where } f(x) = \begin{cases} x^3 - 1, & 1 \leq x \leq 2 \\ 11 - 2x, & 2 < x \leq 5 \end{cases}$$

5. $\int_0^3 |3x^2 - 4x + 1| dx$

6. $\int_0^{3\pi} |\sin \theta| d\theta$