Chapter 7.1: The Return of the Chain Rule

Calculus II

Spring 2021

College of the Atlantic

Find the derivatives of the following functions using the chain rule:

$$f(x) = \sin(x^3 + 7) \tag{1}$$

$$f(x) = \sqrt{\sin(x)} \tag{2}$$

$$f(x) = \frac{1}{x^2 - x} \tag{3}$$

$$f(x) = \ln(\cos(x)) \tag{4}$$

$$f(x) = e^{-4x^2} \tag{5}$$

Find the following anti-derivatives:

$$\int x^2 \cos(4x^3)\, dx \tag{6}$$

$$\int t^2 e^{5t^3}\, dt \tag{7}$$

$$\int \frac{1}{1 + 2x}\, dx \tag{8}$$

$$\int \cos(t^2)\, dt \tag{9}$$

$$\int \sqrt{\cos(3t)} \sin(3t)\, dt \tag{10}$$

Evaluate the following definite integrals:

$$\int_0^{\frac{1}{2}} \cos(\pi x)\, dx \tag{11}$$

$$\int_1^2 2xe^{x^2}\, dx \tag{12}$$

$$\int_1^2 e^{x^2}\, dx \tag{13}$$

$$\int_0^2 \frac{x}{(1 + x^2)^2}\, dx \tag{14}$$