

Assignment 1 ($4^0/4^1/4^2$)

Subhadip Chowdhury

Problem 1

Integrate the following functions:

1.

$$\int_{-\pi}^{\pi} \frac{\sec^2 x}{e^{\sin x} + 1} dx$$

2.

$$\int \left[\ln(\ln x) + \frac{1}{\ln x} \right] dx$$

Problem 2

Determine the exact values of

(a) $\arctan(\tan[11\pi/4])$

(b) $\sin(2 \arccos[1/2])$

(c) $\sec(\arctan[4/3])$

(d) $\arccos(\sec[7\pi]/2)$

Problem 3 (7.7.72)

Set

$$f(x) = \arctan\left(\frac{a+x}{1-ax}\right), x \neq 1/a$$

(a) Show that $f'(x) = \frac{1}{1+x^2}$.

(b) Show that there is *no* constant C such that

$$f(x) = \arctan(x) + C$$

for all $x \neq 1/a$.

(c) Find constants C_1 and C_2 such that

$$f(x) = \arctan(x) + C_1 \quad \text{for } x < 1/a$$

$$f(x) = \arctan(x) + C_2 \quad \text{for } x > 1/a$$