MATH 152 Assignment 2, Fall 2022.

Michael Monagan

Webassign Exercises

5.4 Exercises 8, 13, 25, 28, 51

5.5 Exercises 1, 4, 44, 67

6.1 Exercises 8, 9, 11, 53.

6.2 Exercises 1, 5, 7.

Written Exercises

1 (Section 5.3)

   (a) State the Fundamental Theorem of Calculus part (2).

   (b) Let $f(x)$ and $g(x)$ be continuous on $[a, b]$. Apply the Fundamental Theorem of Calculus part (2) to show that

$$\int_a^b (f(x) + g(x))\, dx = \int_a^b f(x)dx + \int_a^b g(x)dx.$$

   Hint: let $F(x)$ be an antiderivative of $f(x)$ and $G(x)$ be an antiderivative of $g(x)$.

2 (Section 5.4) Show that $\int \cos(x)^2 dx = \frac{1}{2}x + \frac{1}{4}\sin 2x + C$ by differentiating both sides and using the trig identities $\sin 2A = 2\sin A \cos A$ and $\cos 2A = 2\cos(A)^2 - 1$.

3 (Section 5.4) Water flows out of a storage tank at a rate of $r(t) = 100 - 10t$ litres per minute. Find the amount of water that flows out of the tank during $0 \le t \le 10$.

4 (Section 5.5) Calculate $\int \cot x \, dx$. Use $\cot x = \frac{\cos x}{\sin x}$ and make a substitution.

5 (Section 5.5) Exercise 79: show that the first area equals the second area. Hint: use a substitution.

6 (Section 6.1) Let A be the area between $f(x) = 3 - x^2$ and $g(x) = x^2 - 1$. Sketch A then express A as a definite integral then calculate A using the FTC.

7 Section 6.2 Exercise 47. This is the volume of a cone of radius r and height h. All of the videos online that I watched just "give the formula" $V = \frac{1}{3}\pi r^2 h$ without any explanation.

Midterm 1 is on Wednesday October 5th at 8:30am.

It covers the material covered on Assignments 1 and 2 which is Sections 4.9, 5.1−5.5, 6.1, and 6.2.