MAT133

WRITTEN HOMEWORK 6 **Due: Sunday, August 13, 2023 at 11:59pm**

All solutions to be written in appropriate details. Please submit your solution to Crowdmark.

NOTE: *This version contain solutions to the problems. Solutions are not written in best details, so students are expected to fill in some of these gaps in their submissions.*

Question 1. Let $f(x) = (x^5 + x^2 + 1)e^{x^3+1}$ and $g(x) = e^{x^3+1}$.

(a) Draw a rough sketch of the graphs of the functions $y = f(x)$, $y = g(x)$ and the region bounded between $y = f(x)$, $y = g(x)$ and vertical lines $x = 0$ and $x = \frac{1}{2}$. You can use any online graphing tools you want.

(b) Find the area of the region bounded between $y = f(x)$, $y = g(x)$ and vertical lines $x = 0$ and $x = \frac{1}{2}$.

Explain your steps.

Solution **(a)** The graphs can be drawn using the online tool like Desmos.

(b) The area we want to find is given by the following integral:

$$\text{Area} = \int_0^{1/2} (f(x) - g(x))\,dx = \int_0^{1/2} x^2(x^3 + 1)e^{x^3+1}dx.$$