



Problem 1. [4 points] Calculate the following primitives:

a) [2 points]

$$\int \frac{4x^4 - x^3 - 46x^2 - 20x + 153}{(x-2)(x-3)(x+3)} dx$$

b) [2 points]

$$\int x \tan^2(2x) dx$$

Problem 2. [2 points] Given the function

$$f(x) = \begin{cases} \frac{e^x - 1 - x}{x^2}, & x < 0 \\ a + b \int_0^x e^{-t^4} dt, & x \geq 0. \end{cases}$$

calculate a and b so that it is continuous and differentiable.

Problem 3. [4 points] a) [2 points] Calculate the area delimited by the curves $x^2 + y^2 = 1$ and $x^2 + y^2 = 2x$.

b) [2 points] Calculate the volume of the solid generated when the region between the curves $y = x$ and $y = \sin x$ revolves around the x axis, with $0 \leq x \leq \pi$.
