Suggested Problems (Week 1)

MATH 142

Friday 28$^{\text{th}}$ May, 2021

Problem 1. Sketch the curve $f(x) = \frac{\sin x}{2 + \cos x}$.

Problem 2. Find two numbers whose difference is 2021 and whose product is minimum.

Problem 3. Let $f(x) = x^2 + 2^x + 2^2$. Find both the derivative and the antiderivative of $f(x)$.

Problem 4. Recall the problem we did in class about the area under the curve $y = x^2$ between $x = 0$ and $x = 1$. Verify that:

- The area we computed in Lecture 4 satisfies the upper and lower bounds we found for it in Lecture 3 (we found three upper bounds and one lower bound in Lecture 3).

- Check that the area works out to be the same if we use the overestimating rectangles instead of the underestimating rectangles for our approximation, provided we take $n \to \infty$.