Practice problems for midterm 4

Calculus I, section 10
December 4, 2022

These are practice problems for the content of the fourth midterm. This is not a practice test, and you should not expect it to necessarily approximate the test in either length or difficulty; the problems on the test will likely be shorter and easier, at least on average. However, if you know the material well enough to be able to solve these problems, you are well-prepared for the midterm.

Full written solutions will be posted by Monday night for your use in studying. I encourage you to attempt them prior to that on your own.

Problem 1.

(a) Find $\displaystyle\int_0^1 -2x\,dx$.

(b) Find an antiderivative of $\frac{x^2+1}{x}$.

The above problem is primarily directed towards Objective 13 (integrals).

Problem 2. Find $\displaystyle\int_0^3 2^x\,dx$.

The above problem is primarily directed towards Objective 14 (the fundamental theorem of calculus).

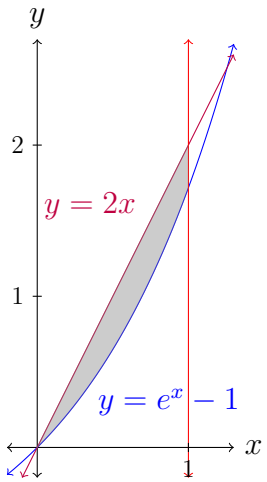
Problem 3. Find $\displaystyle\int \frac{1}{2x-5}\,dx$.

The above problem is primarily directed towards Objective 15 (u-substitution).

Problem 4. Find $\displaystyle\int_1^2 e^{4x+1}\,dx$.

The above problem is primarily directed towards Objectives 14 and 15 (the fundamental theorem of calculus and u-substitution).

Problem 5. Find the area of the shaded region, bounded by $y = 2x$, $y = e^x - 1$, and $x = 1$. (See next page.)



The above problem is primarily directed towards Objectives 14 and 16 (the fundamental theorem of calculus and applications of integrals).

Problem 6. Find the average value of $f(x) = \frac{1}{x}$ between $x = \frac{1}{2}$ and $x = 2$.

The above problem is primarily directed towards Objective 16 (applications of integrals).