AP Calculus AB | Homework 0401 | Name:
Dr. Paul L. Bailey | Tuesday, April 1, 2025

Due Wednesday, April 2, 2025.

Problem 1. Find all $x \in \mathbb{R}$ such that $7^{x^2-4x+1} = 49^{x-2}$.

Problem 2. Find all $x \in \mathbb{R}$ such that $\ln(x+1) + \ln(x+2) = \ln(x+3)$.

Problem 3. Compute $\displaystyle\int \frac{\sec^2 y \, dy}{\sqrt{1-\tan^2 y}}$.

Problem 4 (Thomas Problem §8.1 # 21)**.** Integrate $\displaystyle\int 3^{x+1} \, dx$.

Problem 5 (APCalBC.1988.MC.40)**.** Let f and g be functions that are differentiable everywhere, such that g is the inverse function of f. Suppose that $g(-2) = 5$ and $f'(5) = -\dfrac{1}{2}$. Find $g'(-2)$.

Problem 6 (Thomas Problem §8.1 # 77)**.** Integrate $\displaystyle\int \frac{6\,dy}{\sqrt{y}(1+y)}$.

Problem 7 (Thomas Problem §8.2 # 27)**.** Integrate $\displaystyle\int_0^{\pi/3} x\tan^2 x\,dx$.

Problem 8. Compute $\displaystyle\int_1^e \frac{x^2+1}{x}\,dx$.

Problem 9. Compute $\displaystyle\int_0^1 \frac{1}{x^2+1}\,dx$.

Problem 10. Solve the initial value problem

$$\frac{dy}{dx} = 3x^2 - 4 \quad \text{where} \quad y(2) = 5.$$