

Assignment 3

due: Monday, March 26, in class

Problem 1: Calculate the following integrals

- a) $\int x^n \ln x dx$
- b) $\int \frac{x+1}{x^2+2x+3} dx$
- c) $\int \frac{e^{2x}}{\sqrt{e^x+1}} dx$

Problem 2: Consider $F(x) = \int_x^{x^2} \cos(xt) dt$.

- a) Calculate $F(x)$ and differentiate wrt x .
- b) Apply Leibniz' formula to find the derivative of $F(x)$.

Problem 3: Find the integral $\int_1^a \left(\int_0^b \frac{1}{x^3} e^{y/x} dy \right) dx$ by

- a) integrating over y , evaluating the integral in parentheses, and then integrating over x .
- b) integrating first over x , evaluating, and then over y .
- c) integrating over x and y (in the order you prefer) and then evaluating.

Problem 4: Find the integral $\int_0^1 \int_0^1 |x - y| dx dy$.