

Math 102, Fall 2022 — Homework 5

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Due October 21 at 5:00 pm

Instructions. This problem set has material mostly from Week 6 of class.

Problem 1. Find the following indefinite integrals.

a. $\int y^2(y^3 - 3)^{10} dy$

b. $\int (2t - 7)^{73} dt$

c. $\int \frac{1}{x \ln(x^2)} dx$

d. $\int \frac{e^t + 1}{e^t + t} dt$

Problem 2. Find the following definite integrals.

a. $\int_1^3 \frac{1}{x+5} dx$

b. $\int_2^6 x\sqrt{x-2} dx$

c. $\int_{-\pi/2}^{\pi/2} \sin^2 x \cos x dx$

d. $\int_{-2}^{-1} (x+1)e^{x^2+2x+1} dx$

Problem 3. Find the following indefinite integrals using integration by parts.

a. $\int x^3 \ln x dx$

b. $\int x^2 \cos(3x) dx$

c. $\int (x+1)e^{2x} dx$

d. $\int \ln(x^2) dx$

Problem 4. Find the following integrals.

a. $\int e^x \sin x dx$

b. $\int e^{2x} \cos(e^x) dx$ *Hint: do a y-substitution first*

c. $\int_1^2 xe^{-2x} dx$

d. $\int_0^{\sqrt{\ln 2}} xe^{x^2} dx$