

Math 102, Fall 2022 — Homework 6

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Due October 28 at 5:00 pm

Instructions. This problem set has material mostly from Week 7 of class.

Problem 1. Find the following indefinite integrals using partial fractions.

a. $\int \frac{20}{25-x^2} dx$

b. $\int \frac{2(1+x)}{x(x^2+3x+2)} dx$

c. $\int \frac{3x+1}{x^2-3x+2} dx$

Problem 2. Find the following indefinite integrals using partial fractions.

a. $\int \frac{x-2}{x^2-x^4} dx$

b. $\int \frac{9x^2+11x+7}{x(x+1)^2} dx$

c. $\int \frac{x^2-5}{x(x^2+1)} dx$

Problem 3. For each of the following improper integrals, give the value that it converges to or show that it diverges.

a. $\int_1^\infty \frac{1}{(x+2)^2} dx$

b. $\int_1^\infty e^{-3x} dx$

c. $\int_0^5 \frac{1}{x^{4/5}} dx$

d. $\int_0^3 \frac{1}{x^{5/4}} dx$

Problem 4. For each of the following improper integrals, give the value it converges to or show that it diverges.

a. $\int_3^5 \frac{1}{(4-x)^2} dx$

b. $\int_0^2 \frac{1}{(x-1)^{1/3}} dx$

c. $\int_0^\infty \frac{x}{1+x^2} dx$

d. $\int_0^\infty \frac{x}{(x^2-1)^2} dx$