

MATH 583A

Principles and Methods of Applied Mathematics

Section 001, Fall 2018 (instructor: Misha Stepanov)

due September 20, 2018

Homework 2

1. Evaluate $\int_{-\infty}^{\infty} \frac{dx}{1+x^4}$.

2. Evaluate $\int_{-\infty}^{\infty} dx \left(\frac{\sin x}{x}\right)^2$.

3. Evaluate $\int_0^{2\pi} \frac{d\theta}{a-b\cos\theta}$, where $0 \leq b < a$.

4. Evaluate $\int_0^{\infty} dx \frac{\ln^2 x}{(x+1)(x+2)}$.

5. Assume a is real. Evaluate $\int_0^1 dx x^a(1-x)^{1-a}$. For which values of a does the integral converge?