

Math 1B Final Review 2

April 11, 2019

Topics to Review:

- Improper integrals (because of discontinuity)
- Improper integrals (because of limit at infinity)
- Comparison test for improper integrals

Question 1

Determine if the following improper integrals converge or diverge. If convergent, determine the value.

$$\begin{aligned} & \int_{-2}^1 \frac{1}{\sqrt{2x+4}} dx \\ & \int_{-3}^{-1} \frac{1}{\sqrt{2x+4}} dx \\ & \int_2^\infty \frac{2x}{x^4+1} dx \\ & \int_{-\infty}^\infty \frac{2x}{x^4+1} dx \\ & \int_0^1 \ln(x) dx \\ & \int_1^\infty \frac{(\ln(x))^2}{\sqrt{x}} dx \\ & \int_0^\infty \frac{4 \arctan(x)}{1+x^2} dx \\ & \int_{\frac{3\pi}{4}}^{\frac{5\pi}{4}} \frac{1}{\cos^2(x)\sqrt{\tan(x)}} dx \\ & \int_1^\infty x^2 e^{-3x} dx \end{aligned}$$

Question 2

Determine if the following improper integrals converge or diverge. You do not need to compute the value of the improper integral if it converges.

$$\int_0^1 \frac{x - \sqrt{x}}{x\sqrt{x} + 1} dx$$

$$\int_1^\infty \frac{e^{\arctan(x)}}{1+x^2} dx$$

$$\int_0^{\frac{\pi}{4}} \frac{\sec^4(x)}{x^{1/3}} dx$$

$$\int_1^\infty \frac{4 + 2\cos^2(x^2)}{\sqrt{x}} dx$$

$$\int_4^\infty \cos\left(\frac{\pi}{x}\right) \cdot \frac{1}{\sqrt{x+1}} dx$$