

## 408L CLASS PROBLEMS

MARCH 4TH, 2020

*Problem 1.* Find  $\int_{-\infty}^{\infty} \frac{dx}{1+x^2}$ .

*Problem 2.* Find  $\int_0^{\infty} \frac{dx}{\sqrt{x(x+1)}}$ .

*Problem 3.* Find  $\int_0^{\frac{\pi}{2}} \frac{\cos(x)}{\sqrt{\sin(x)}} dx$ .

*Problem 4.* Determine whether the following integrals converge or diverge.

(1)  $\int_1^{\infty} \frac{dx}{x^3}$ .

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

(3)  $\int_{-1}^1 \frac{dx}{x^2}$ .

(4)  $\int_{-1}^1 \frac{dx}{\sqrt{1-x^2}}$ .

(5)  $\int_1^{\infty} \frac{dx}{\log(x)}$ .

(6)  $\int_1^{\infty} \frac{dx}{x \log(x)}$ .