

## Homework Set 5

DUE: FEB 28 - MAR 2, 2018 (AT THE BEGINNING OF RECITATION)

1. Estimate the area under the graph of  $f(x) = \frac{\sin^2 x}{x^2}$  over  $0 \leq x \leq \pi$  using:
  - (a) Trapezoidal rule with four sub-intervals;
  - (b) Simpson's rule with four sub-intervals.
  
2. Find the area of the region enclosed by the graphs of  $y = \frac{1}{x+2}$  and  $y = \frac{1}{x+8}$  on the interval  $[0, \infty)$ .

3. Compute the following integrals if they converge, or justify why they diverge:

(a)  $\int_1^{\infty} x^{-3} e^{4x} dx$

(b)  $\int_1^{\infty} x e^{-4x} dx$

(c)  $\int_0^2 \frac{dx}{(4x-1)^{1/3}}$

(d)  $\int_0^{\infty} \frac{4x+3}{x^2+2} dx$

(e)  $\int_0^2 \frac{2x dx}{(x+1)(x^2+1)}$

(f)  $\int_4^{\infty} \frac{dx}{x^2-6x+10}$

(g)  $\int_0^{\pi/2} \tan \theta d\theta$