

Math 1a
Fall 2009

HOMWORK SET 8
DUE AT 10AM ON MONDAY, NOVEMBER 23

- (1) (40 points) Apostol, page 295, problems 1, 4, 8, 11.
(2) (30 points) Apostol, page 303, problems 4,18,19.
(3) (30 points)
(a) Assuming the value of the Gaussian integral

$$\int_{-\infty}^{\infty} e^{-\frac{x^2}{2}} dx = \sqrt{2\pi}$$

find

$$\int_0^{\infty} \sqrt{x} e^{-x} dx$$

- (b) Prove that

$$\int_0^{\infty} x^{n+\frac{1}{2}} e^{-x} dx = \frac{(2n+1)!}{n! 2^{2n+1}} \sqrt{\pi}$$

for $n = 0, 1, 2, \dots$