Review for Midterm 1

Midterm is postponed until next Tuesday (9/27).
Thursday class I will review some questions asked by students.
Extra office hour: 9-23, 2:00pm-3:30pm.

Complex numbers and functions, Chapter 2.

Complex numbers: Definitions, two forms, algebraic operations.

Exercise 1: Find the modules of following number:
(a). $z = (1+2i)^{-2}$; (b). $z = e^{2+4i}$.

Exercise 2: Find the real and imaginary parts of of following number:
(a). $z = (1+2i)^{-2}$; (b). $z = e^{2+4i}$.

Complex functions: Power series, exponential functions, trigonometric functions, logarithmic functions, powers and roots.

Exercise 3: Find the real and imaginary parts of of following number:
(a). $z = (1+2i)^{-2}$; (b). $z = e^{2+4i}$.

Exercise 4: Find all numbers z satisfies
(a). $z^2 = 1 + \sqrt{3}i$; (b). $e^z = 2i$.

Fourier series, Chapter 7

Harmonic functions, periodic functions: Period, amplitude, "orthogonal" of two harmonic functions.

Exercise 5:
(a).(**Brain teaser?**): If $f(x)$ is a periodic function with period l, show that $f(x)$ is also a $2l$ periodic function.
(b). Computer

$$\int_{-\pi}^{\pi} e^{2x} \cdot e^{-3x} dx = ?$$

Fourier series: How to find Fourier coefficients. Parseval's theorem and applications.

Exercise 6:
(a). Find Fourier series for

$$f(x) = \begin{cases} -1, & -l \le x < 0, \\ 1, & 0 \le x < l. \end{cases}$$

(b). Using above Fourier series and Parseval's theorem to computer

$$1 + \frac{1}{3^2} + \frac{1}{5^2} + \cdots.$$