Homework 21.

7.1 $f(x) = 1/2 + \sum_{n=-\infty,odd}^{\infty} e^{inx} i/\pi n$

7.12 Done in lectures.

7.13 $a_n = c_n + c_{-n}$, $b_n = (c_n - c_{-n})/i$, $c_n = a_n/2 + b_n/2i$, $c_{-n} = a_n/2 - b_n/2i$ $(n \geq 0)$, $c_0 = a_0/2$.

8.11

(a) $f(x) = \pi^2/3 + 4\sum_{n=1}^{\infty}(-1)^n \cos(nx)/n^2$

(b) $f(x) = 4\pi^2/3 + 2\sum_n = -\infty, n \neq 0^{\infty} e^{inx}(1/n^2 + i\pi/n)$

9.1

(a) $\cos(x) + i\sin(x)$

(b) $x\sinh(x) + x\cosh(x)$.

9.6 Odd. $f(x) = (4/\pi)(\sin(\pi x/l) + \sin(3\pi x/l)/3 + \sin(5\pi x/l)/5 + \cdots)$.

9.9 Even. $f(x) = 1/12 - (1/\pi^2)(\cos(2\pi x)/1^2 - \cos(4\pi x)/2^2 + \cos(3\pi x)/3^2 - \cdots)$.

11.5 $\pi^2/8$

11.6 $\pi^4/90$

11.10 Calculate the average value of $f(x)g(x)$ using the fact that $\cos(nx)$ $(n \geq 0)$ and $\sin(nx)$ $(n > 0)$ are pairwise orthogonal.

12.8 (a) 1/2 (b) 1

12.14

(a) $f(x) = 1/3 + \sum_{n=1}^{\infty} 4\cos(n\pi x)/\pi^2 n^2$

(b) $\pi^4/90$.