Problem 2.5.1.(b)

$$u(x,y) = \sum A_n \sin\frac{n\pi y}{H}\cosh\frac{n\pi(x-L)}{H} \text{ where } A_n = \frac{2}{H\sinh\frac{n\pi(-L)}{H}}\int_0^H g(y)\sin\frac{n\pi y}{H}dy.$$

Problem 2.5.3.(a) $u(r,\theta) = \sum_{n=0}^{\infty} A_n r^{-n}\cos(n\theta) + B_n r^{-n}\sin(n\theta)$ and the BC give $A_0 = \ln 2$, $A_3 = 4a^3$, the rest of the constants are zero.

Problem 2.5.5.(a)

$$u(r,\theta) = \sum_{n=1}^{\infty} A_n r^{2n-1}\cos(2n-1)\theta \text{ where } A_n = \frac{4}{\pi}\int_0^{\frac{\pi}{2}} f(\theta)\cos(2n-1)\theta d\theta.$$

Problem 2.5.7.(a)

$$u(r,\theta) = \sum_{n=1}^{\infty} A_n r^{3n}\sin(3n\theta) \text{ where } A_n = \frac{6}{\pi}\int_0^{\frac{\pi}{3}} f(\theta)\sin(3n\theta)d\theta.$$

Problem 2.5.15.(d) Assume that when $x = L$ and L goes to infinity there is no flux coming through infinity: $\lim_{L\to\infty} u_x(L,y) = 0$.