Compulsory problem:

(1) **[40 pts.]** Solve the steady-state heat conduction problem on a disk of radius 2.

$$\frac{\partial^2 u}{\partial r^2} + \frac{1}{r}\frac{\partial u}{\partial r} + \frac{1}{r^2}\frac{\partial^2 u}{\partial \theta^2} = 0; \qquad u(r=2,\theta) = 3 + 4\cos(2\theta) + 4\sin(3\theta) \tag{1}$$