QUIZ 4

Problem 1. Solve the boundary value problem

$$\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial v}{\partial r}\right)+\frac{1}{r^2}\frac{\partial^2 v}{\partial \theta^2}=0 \quad 0<r<c, -\pi\leq\theta\leq\pi,$$

$$v(c,\theta)=cos^2(\theta).$$

Problem 2. Solve the boundary value problem

$$\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial v}{\partial r}\right)+\frac{1}{r^2}\frac{\partial^2 v}{\partial \theta^2}=0 \quad 0<r<c, -\pi\leq\theta\leq\pi,$$

$$v_r(c,\theta)=sin^2(\theta).$$

Problem 3. Solve the boundary value problem

$$\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial v}{\partial r}\right)+\frac{1}{r^2}\frac{\partial^2 v}{\partial \theta^2}=0 \quad 1<r<2, -\pi\leq\theta\leq\pi,$$

$$v(1,\theta)=cos^2(\theta), \quad v(2,\theta)=\frac{1}{8}(cos^2\theta+1).$$

Problem 4. Solve the boundary value problem

$$\frac{1}{r}\frac{\partial}{\partial r}\left(r\frac{\partial v}{\partial r}\right)+\frac{1}{r^2}\frac{\partial^2 v}{\partial \theta^2}=0 \quad 0<r<c, -\pi\leq\theta\leq\pi,$$

$$v(c,\theta)=\begin{cases} 1 \text{ if } 0\leq\theta<\pi, \\ 0 \text{ if } -\pi<\theta\leq 0. \end{cases}$$