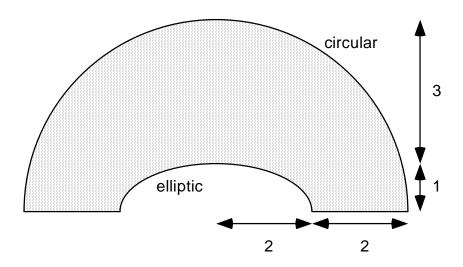Solve the following boundary value problem

$$-\Delta u = 2 \quad \text{in} \quad \Omega$$
$$u = 0 \quad \text{on} \quad \Gamma$$

by the finite difference method by applying a coordinate transformation method, where Ω is a domain in the two-dimensional space, shown in the figure, and Γ is its boundary. To do this, you may use MATLAB or MATHEMATICA.

Hint   Examine the coordinate transformation

$$a = (1-\eta) + 2(1+\eta)$$
$$b = \frac{1}{2}(1-\eta) + 2(1+\eta)$$
$$\theta = \frac{\pi}{2}(1-\xi)$$

from the square domain $-1 \le \xi, \eta \le +1$, and also

$$x = a\cos\theta = (3+\eta)\cos\left(\frac{\pi}{2}(1-\xi)\right)$$
$$y = b\sin\theta = \frac{1}{2}(5+3\eta)\sin\left(\frac{\pi}{2}(1-\xi)\right)$$