Module 6 self assessment

Question 1

Find the flux of $\mathbf{f}(x,y) = xy\hat{\mathbf{i}} + 5y\hat{\mathbf{j}}$ through the arc of the unit circle centred at the origin between the lines $y = x$ and $y = -x$ with anticlockwise direction. The arc is above the x axis. Use polar coordinates.

Question 2

Find the flux of $\mathbf{f}(x,y) = y\hat{\mathbf{i}} + y\hat{\mathbf{j}}$ through the ellipse

$$\frac{x^2}{4} + y^2 = 1$$

with anticlockwise direction, using polar coordinates.