6. מצאו את הפונקציות המקיימות :

$$\frac{dr}{d\theta} = 3\cos^2(\frac{\pi}{4} - \theta); \quad r(0) = \frac{\pi}{8}$$

$\cos(2\alpha) = 2\cos^2(\alpha) - 1 \quad => \quad \cos^2(\alpha) = \frac{1}{2}[\cos(2\alpha) + 1]$

$\int \cos^2(x)dx = \frac{1}{2}\int [\cos(2x) + 1]dx$

$dr = 3\cos^2\left(\theta - \frac{\pi}{4}\right)d\theta \quad => \quad \int dr = \int 3\cos^2\left(\theta - \frac{\pi}{4}\right)d\theta$

$r_{(\theta)} = 3\int \cos^2\left(\theta - \frac{\pi}{4}\right)d\theta = \frac{3}{2}\int \left[\cos\left(2\theta - \frac{\pi}{2}\right) + 1\right]d\theta = \frac{3}{2}\left[\frac{\sin\left(2\theta - \frac{\pi}{2}\right)}{2} + \theta\right] + C$

$r_{(0)} = \frac{\pi}{8} \quad => \quad \frac{\pi}{8} = \frac{3}{2}\left[\frac{\sin\left(2\cdot 0 - \frac{\pi}{2}\right)}{2} + 0\right] + C \quad => \quad \frac{\pi}{8} = \frac{3}{2}\cdot\frac{\sin\left(-\frac{\pi}{2}\right)}{2} + C \quad =>$

$=> \quad \frac{\pi}{8} = \frac{3}{2}\cdot\frac{-1}{2} + C \quad => \quad C = \frac{\pi}{8} + \frac{3}{4} = \frac{\pi + 6}{8}$

$r_{(\theta)} = \frac{3}{2}\left[\frac{\sin\left(2\theta - \frac{\pi}{2}\right)}{2} + \theta\right] + \frac{\pi + 6}{8}$