$135 < \theta < 180$ (k = 2 and m = 4)

$$f := r^3 \cdot \cos(3 \cdot \text{theta}) + r^4 \cdot \cos(4 \cdot \text{theta}) + \frac{r^5 \cdot \cos(3\ \text{theta}) + r^6 \cdot \cos(4\ \text{theta}) - r^3 \cdot \cos(\text{theta}) - r^4 \cdot \cos(2\ \text{theta})}{1 - r^2}$$

$$r^3 \cos(3\,\theta) + r^4 \cos(4\,\theta) + \frac{r^5 \cos(3\,\theta) + r^6 \cos(4\,\theta) - r^3 \cos(\theta) - r^4 \cos(2\,\theta)}{-r^2 + 1} \quad \textbf{(1)}$$

$fs := simplify(f, trig)$

$$\frac{2\,r^3 \sin(\theta)^2 \left(4\,r \cos(\theta)^2 + 2\cos(\theta) - r\right)}{r^2 - 1} \quad \textbf{(2)}$$

$solve(fs = 0, r)$

$$0,\ -\frac{2\cos(\theta)}{4\cos(\theta)^2 - 1} \quad \textbf{(3)}$$