POLAR COORDINATES - INTERESTING GRAPHS

COSMIN ROMAN

Start with graphs of functions of the form $r = \sin(k \cdot x)$, where $k = 1, 2, 3$ etc (keep in mind that the corresponding graphs for cosine are the very same ones, only rotated 90 degrees counterclockwise - for example, the first circle will be on a side on the right for the $r = \cos(x)$ function)

(go to next page - the pictures are pretty big, they are one per page)

Date: 12/03/2001.

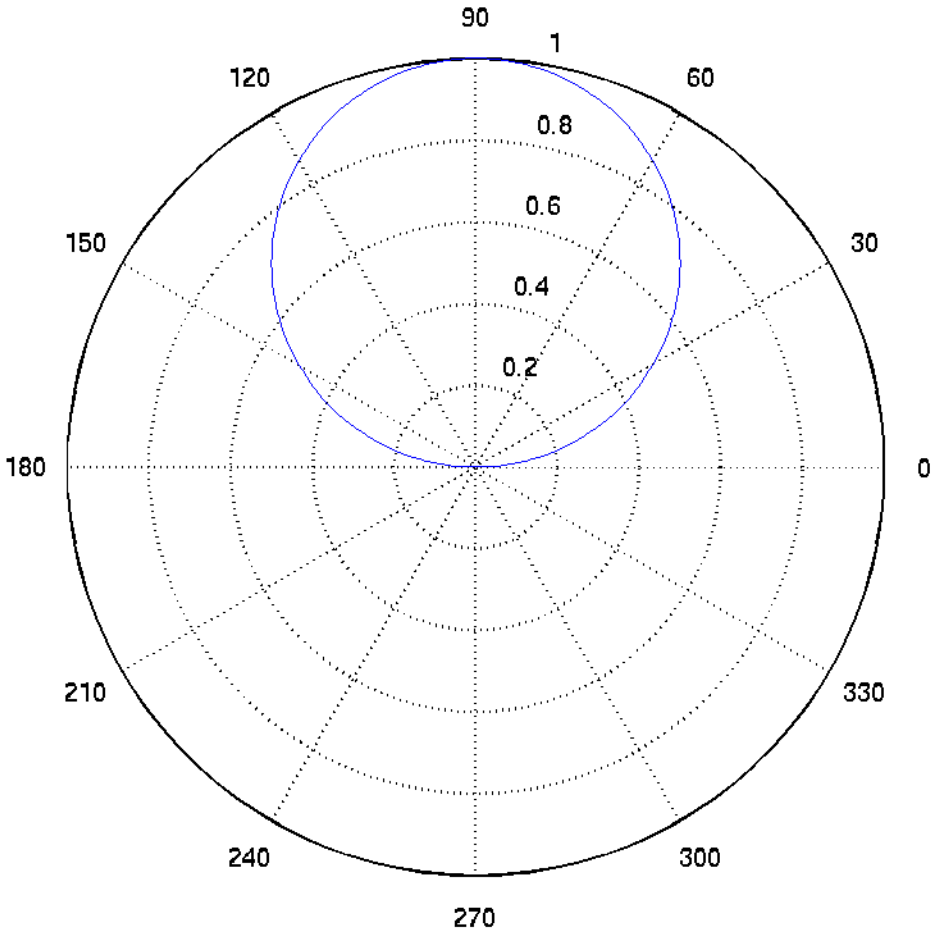

FIGURE 1. $r = \sin(a)$ - it's, in fact a circle

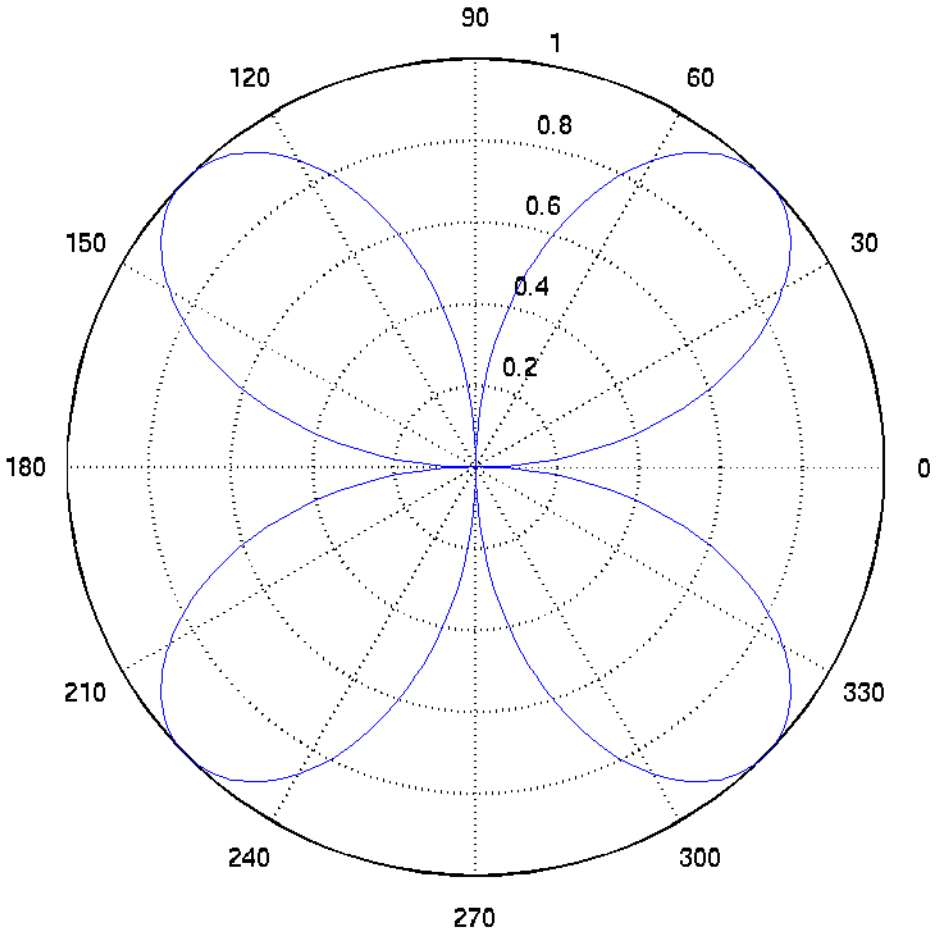

FIGURE 2. $r = \sin(2a)$ - notice the four leaves

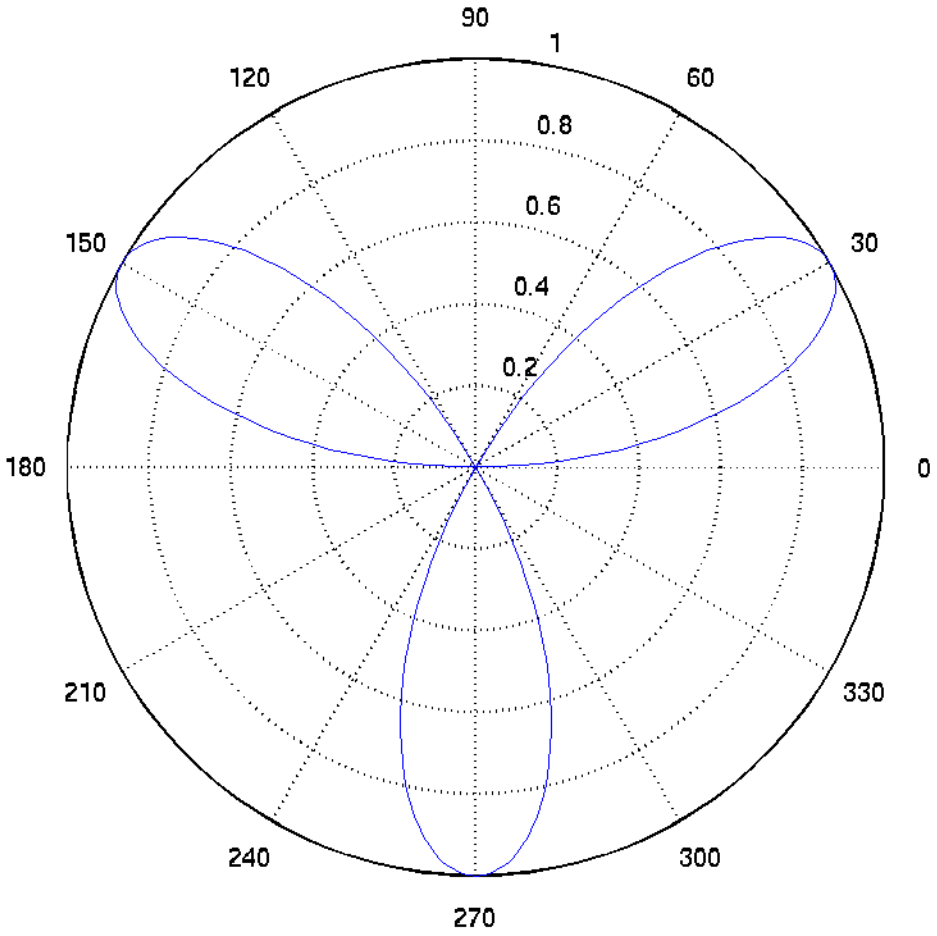

FIGURE 3. $r = \sin(3a)$ - three leaves, but one goes TWICE along it

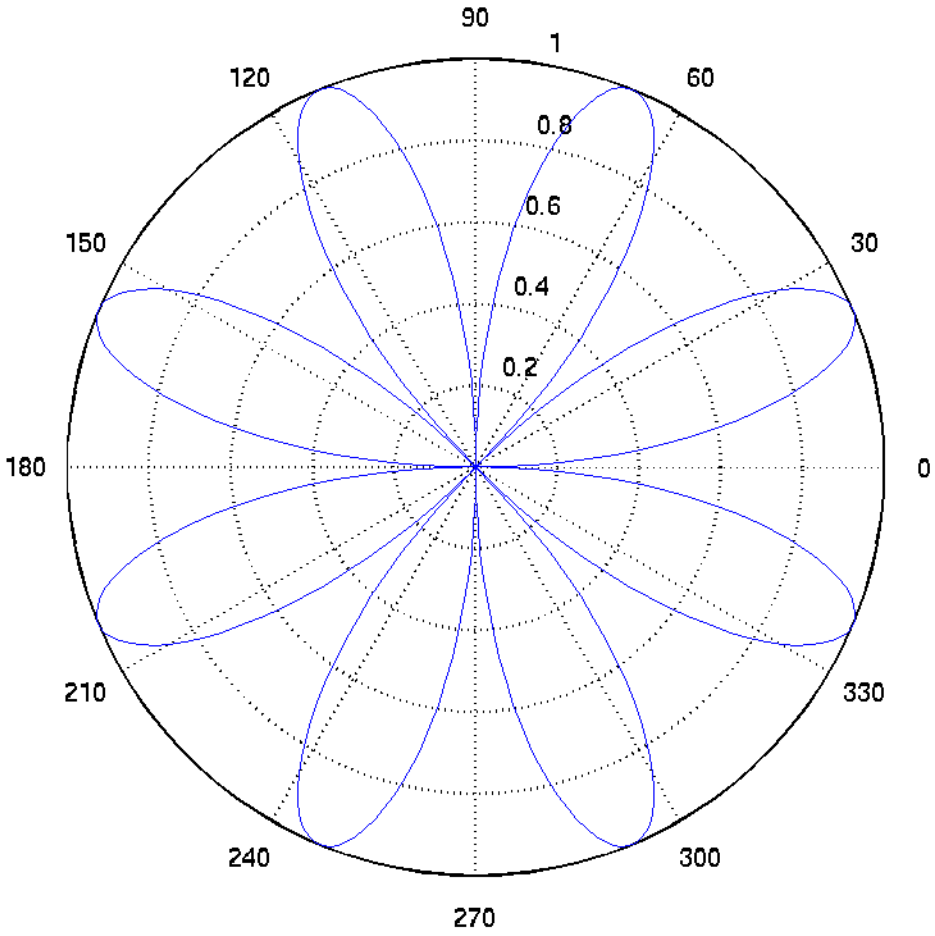

FIGURE 4. $r = \sin(4a)$ - eight leaves! do you start to see a pattern?

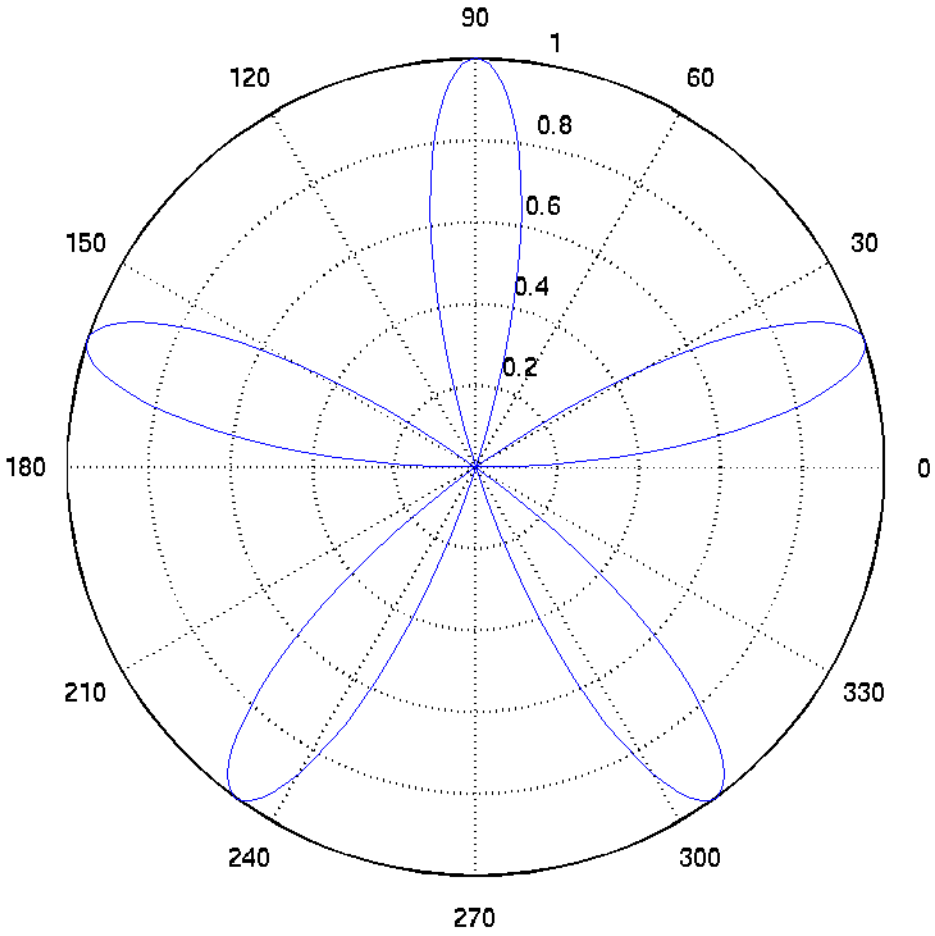

FIGURE 5. $r = \sin(5a)$ - back to 5 leaves; how many times do we go along this graph from 0 to 2π?

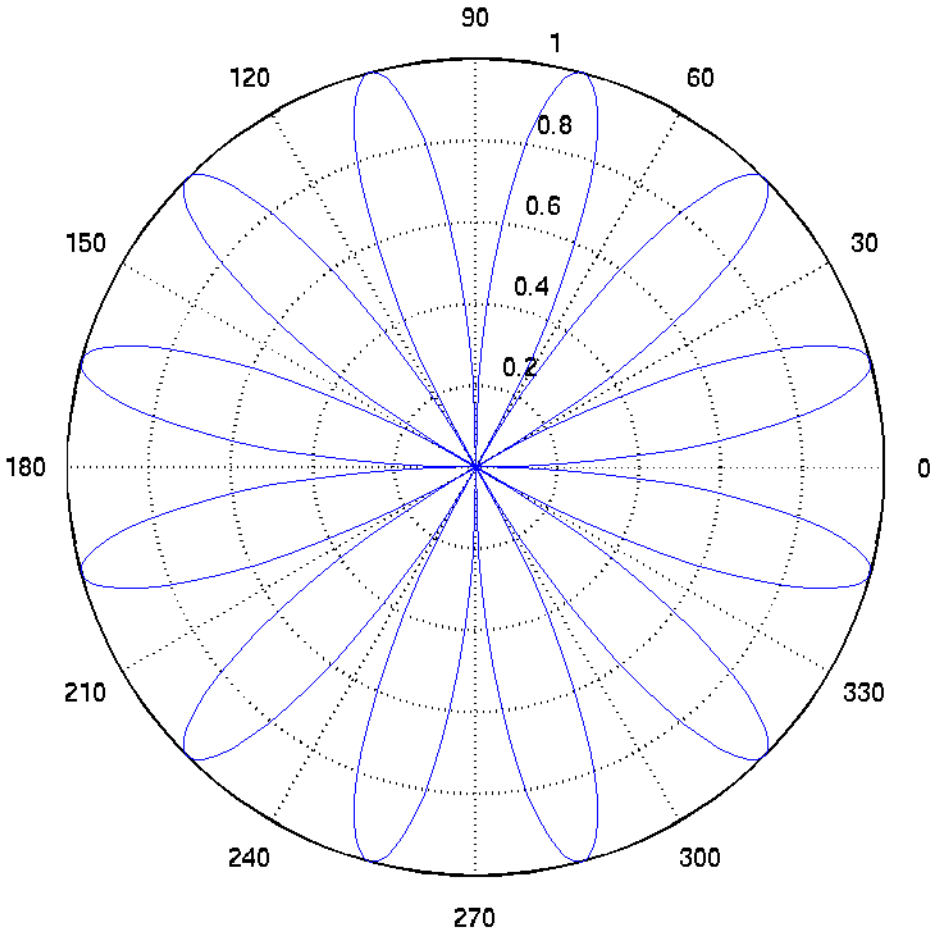

FIGURE 6. $r = \sin(6a)$ - it gets interesting; $6 = 3 \cdot 2$, and so we should have $3 \cdot (2 \cdot 2) = 12$ ... yes, we have 12!

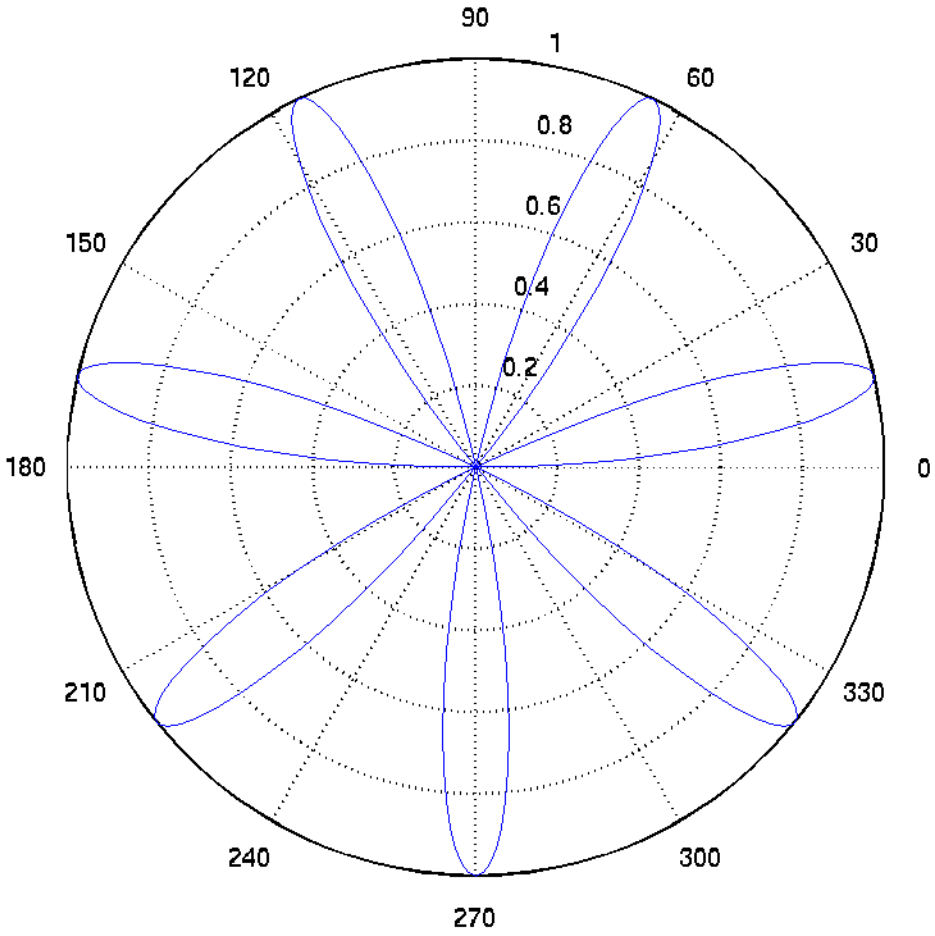

FIGURE 7. $r = \sin(7a)$ - of course, seven leaves

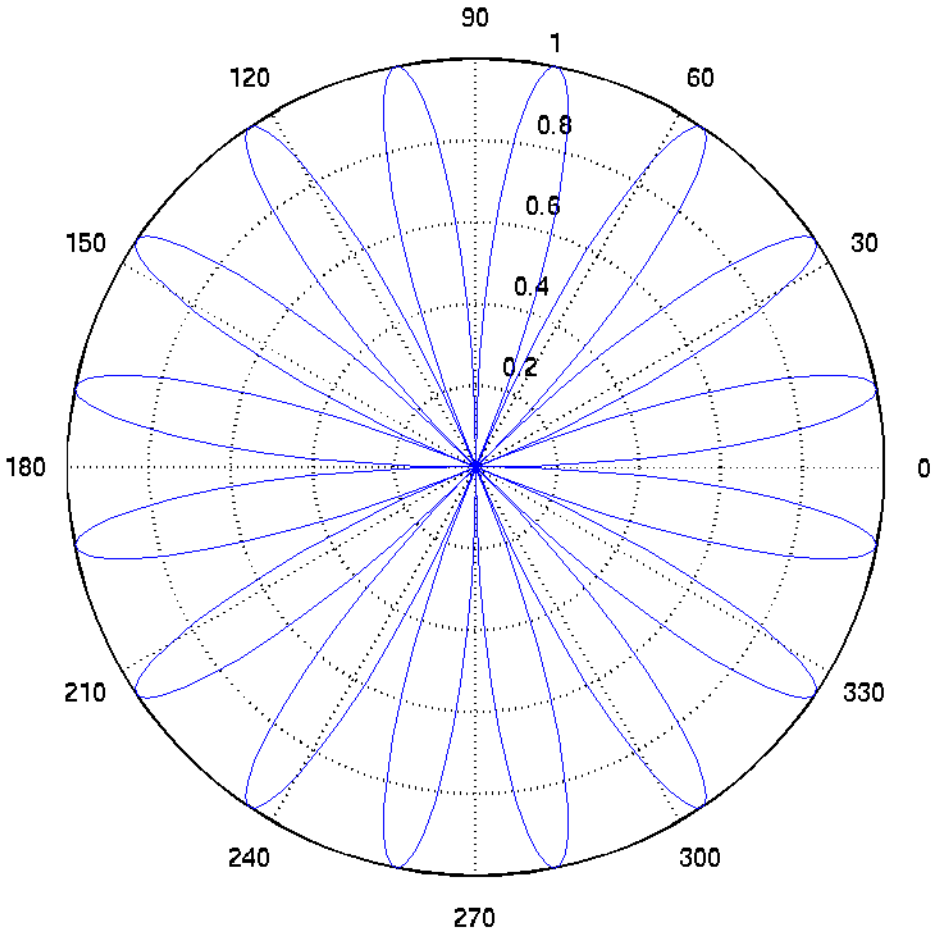

FIGURE 8. $r = \sin(8a)$ - $8 \cdot 2 = 16$ so 16 leaves

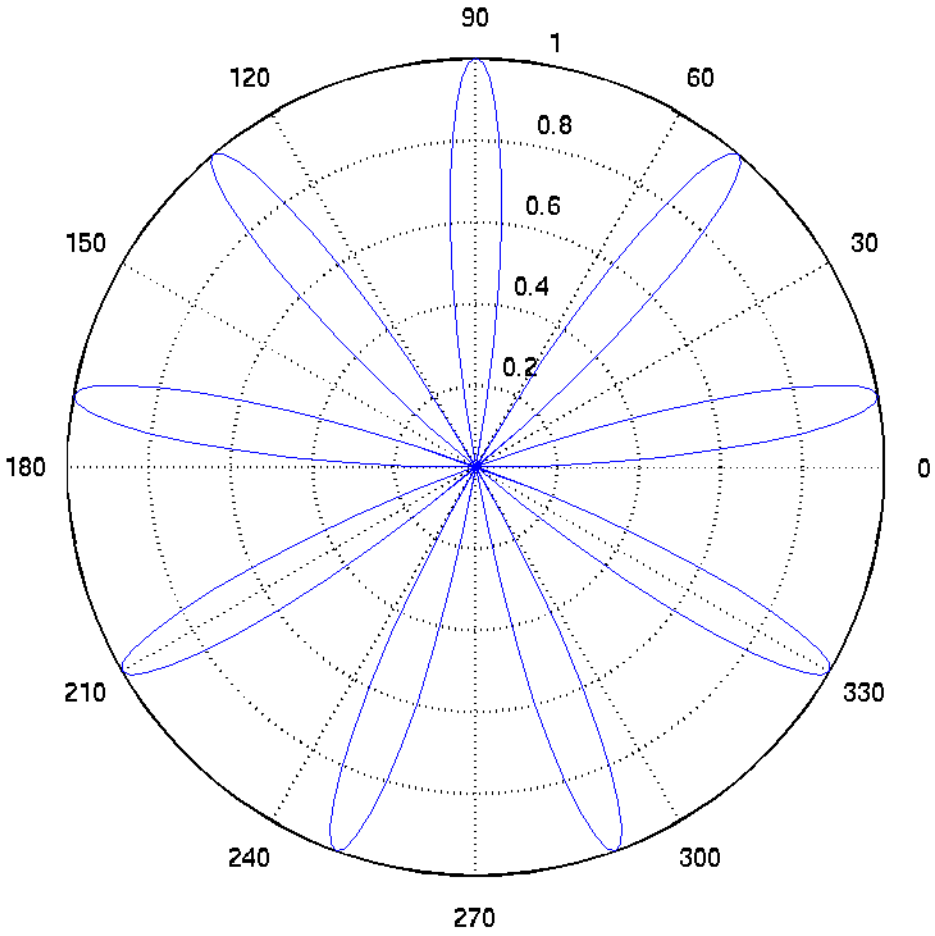

FIGURE 9. $r = \sin(9a)$ - a bit tamer