

POLAR COORDINATES - INTERESTING GRAPHS

COSMIN ROMAN

Start with graphs of functions of the form $r = \sin(ax)$, where $a = 1, 2, 3$ 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)

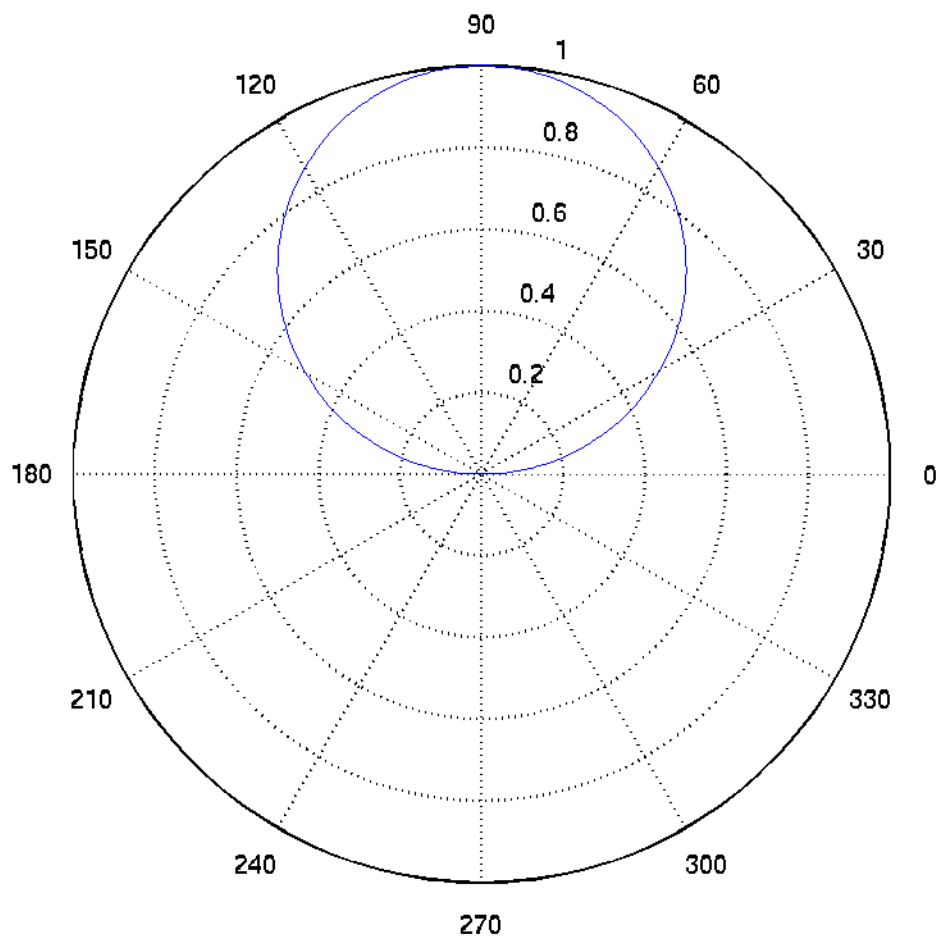


FIGURE 1. $r = \sin(x)$ - it's, in fact a circle

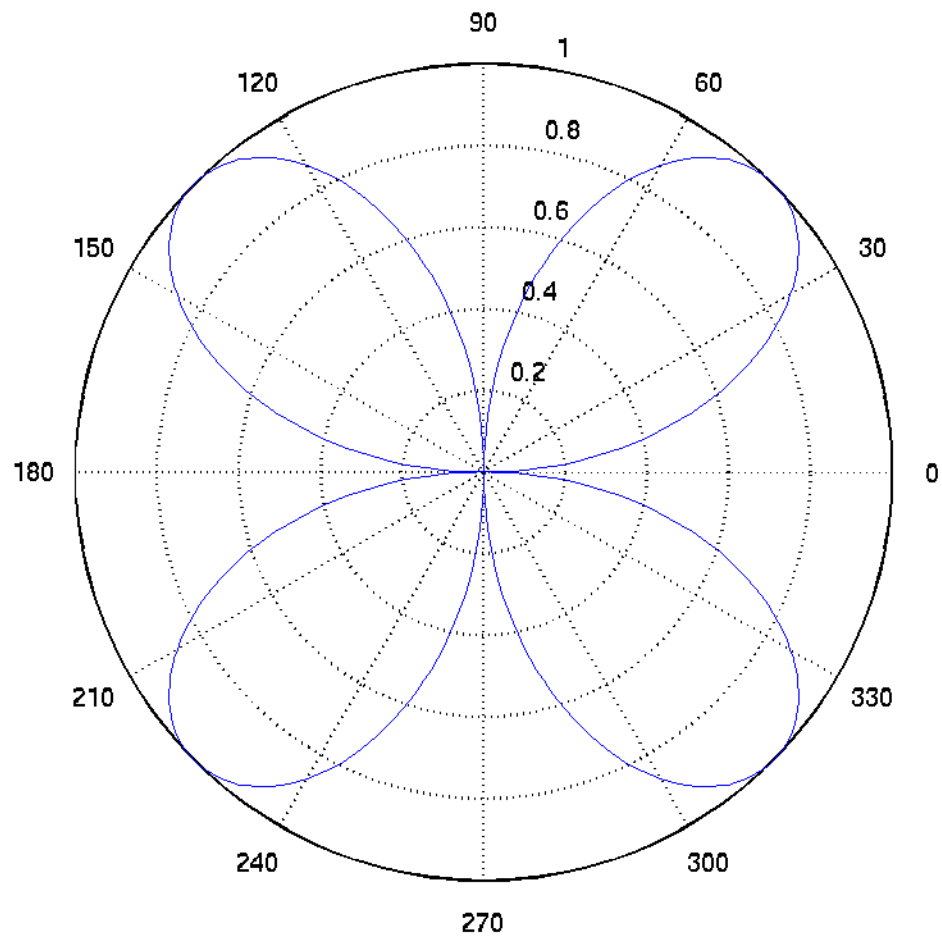


FIGURE 2. $r = \sin(2a)$ - notice the four leaves

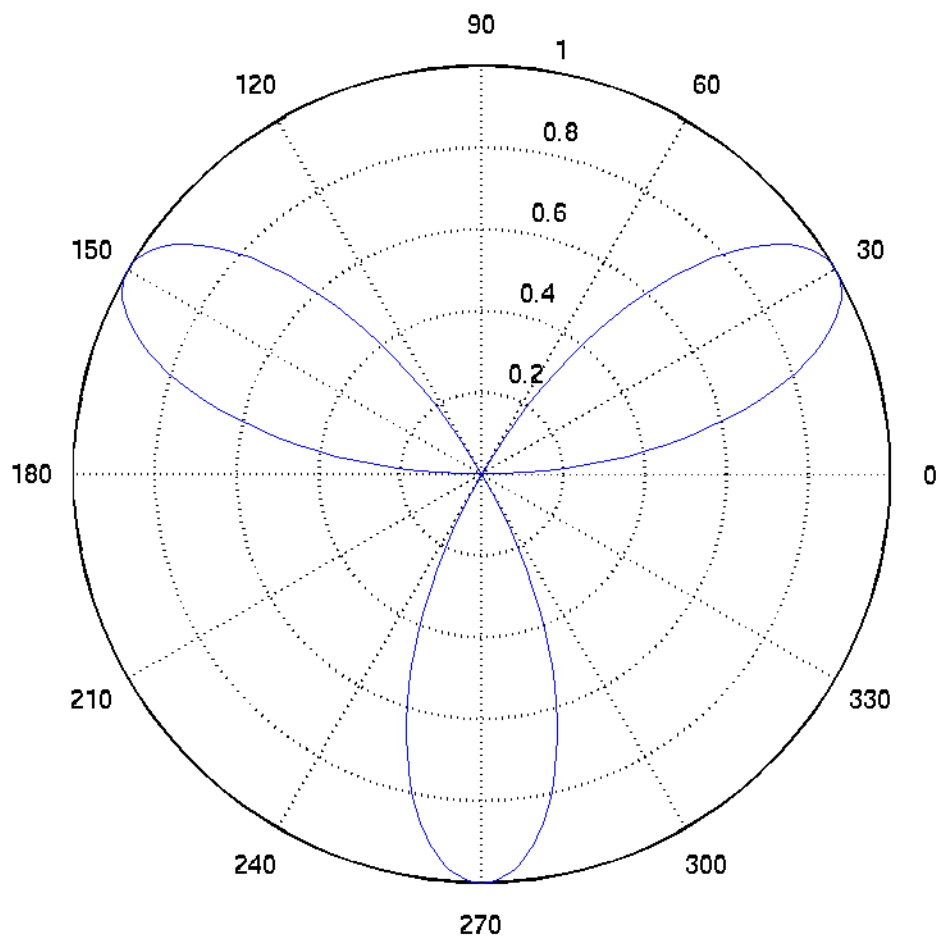


FIGURE 3. $r = \sin(3x)$ - three leaves, but one goes TWICE along it

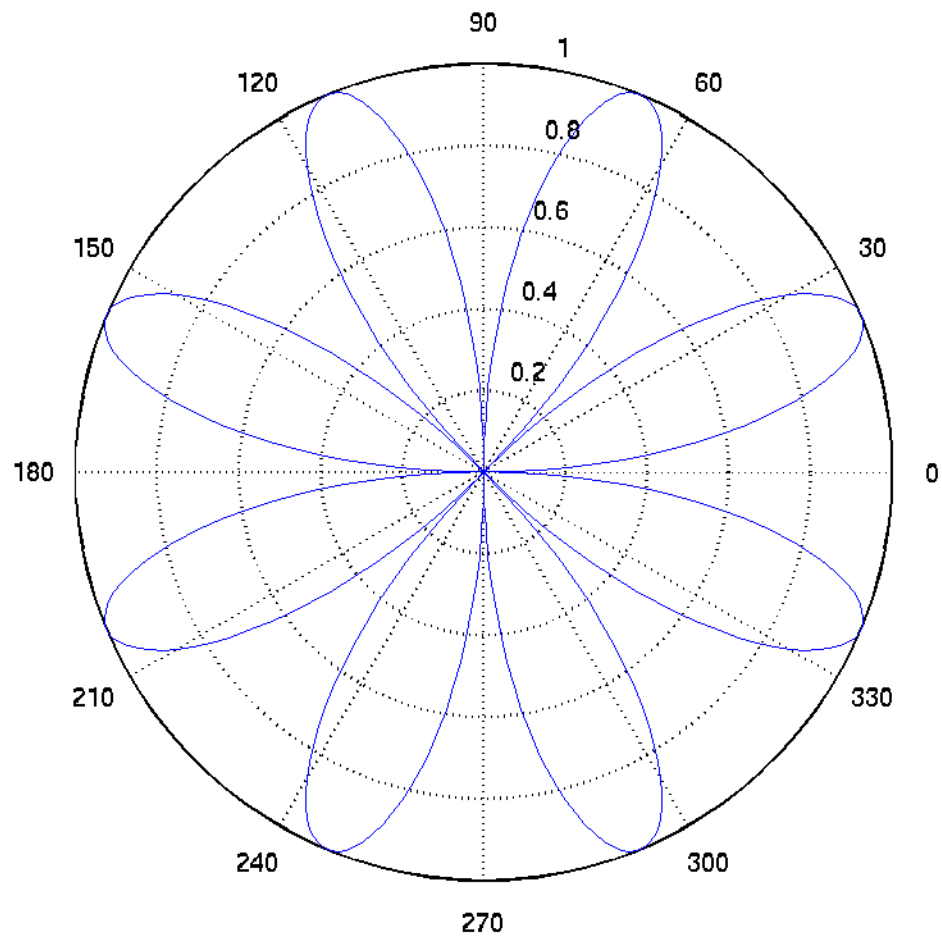


FIGURE 4. $r = \sin(4x)$ - eight leaves! do you start to see a pattern?

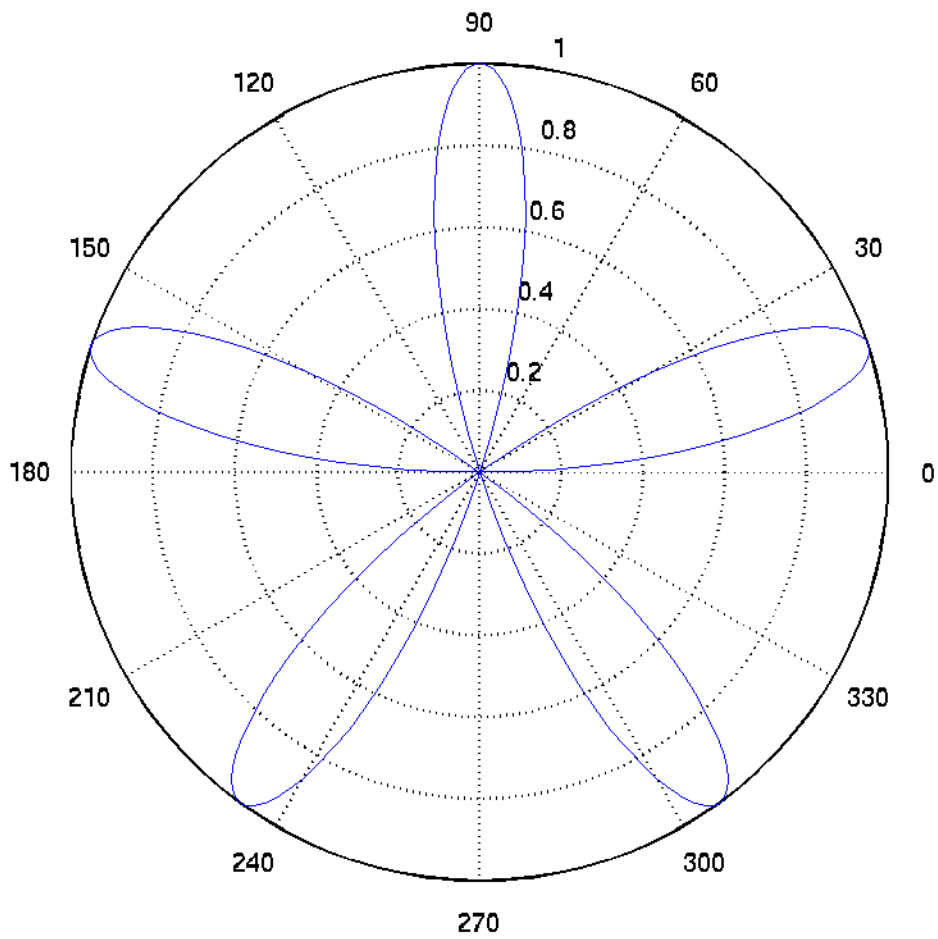


FIGURE 5. $r = \sin(5x)$ - back to 5 leaves; how many times do we go along this graph from 0 to 2π ?

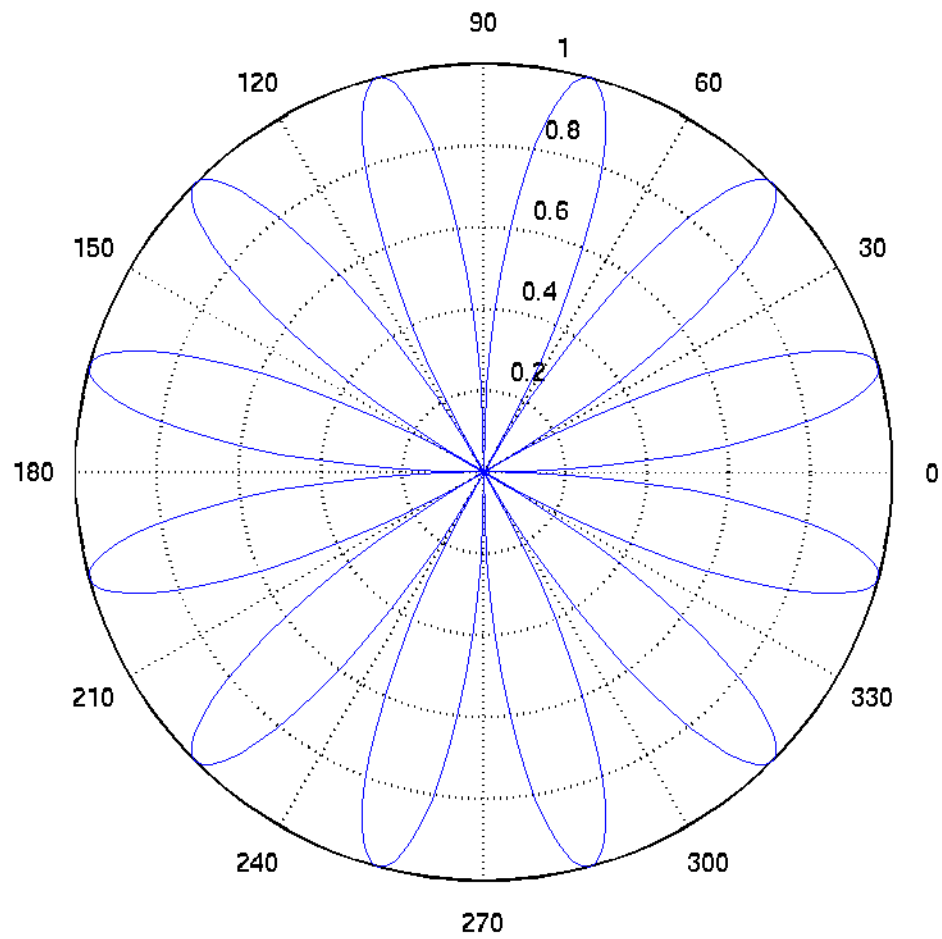


FIGURE 6. $r = \sin(6x)$ - it gets interesting; $6 = 3 \cdot 2$, and so we should have $3 \cdot (2 \cdot 2) = 12 \dots$ yes, we have 12!

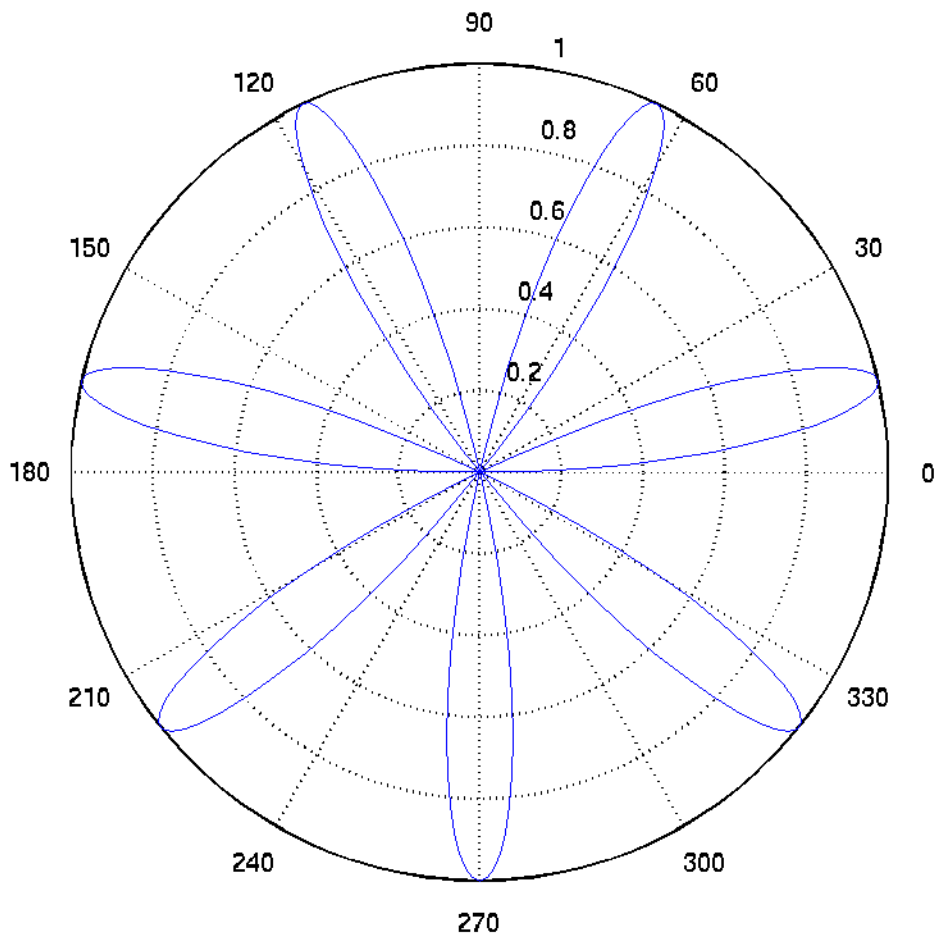


FIGURE 7. $r = \sin(7x)$ - of course, seven leaves

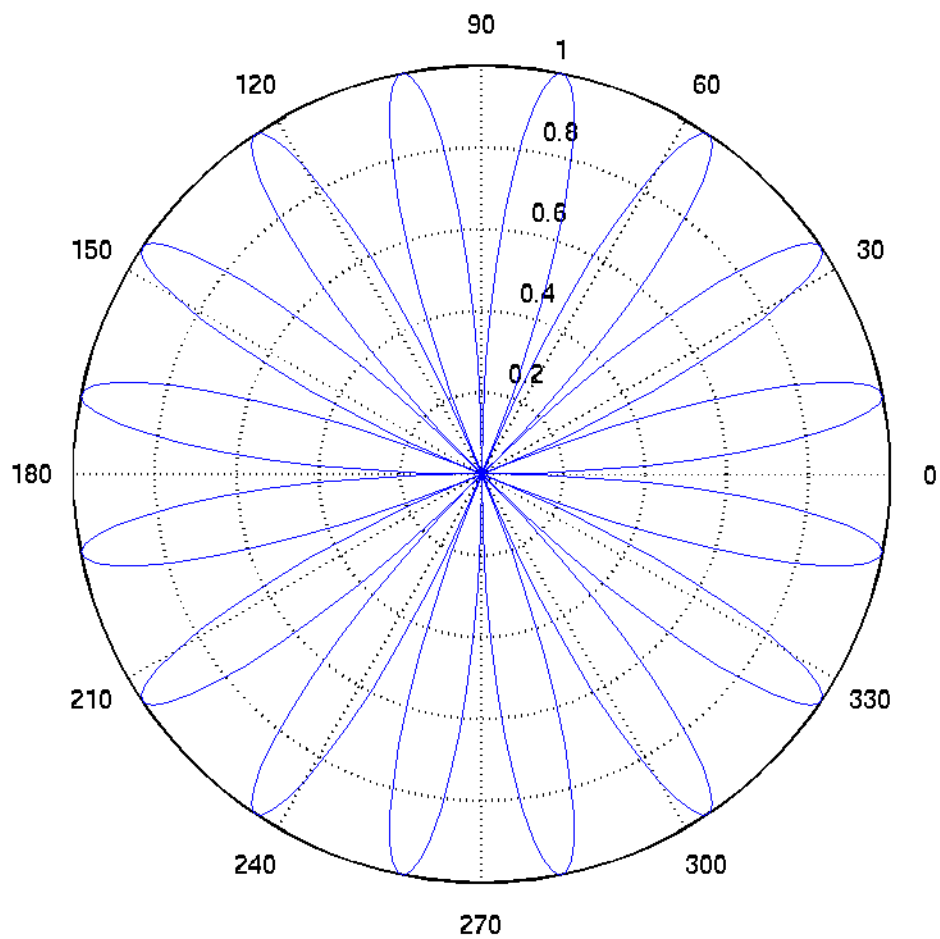


FIGURE 8. $r = \sin(8x)$ - $8 \cdot 2 = 16$ so 16 leaves

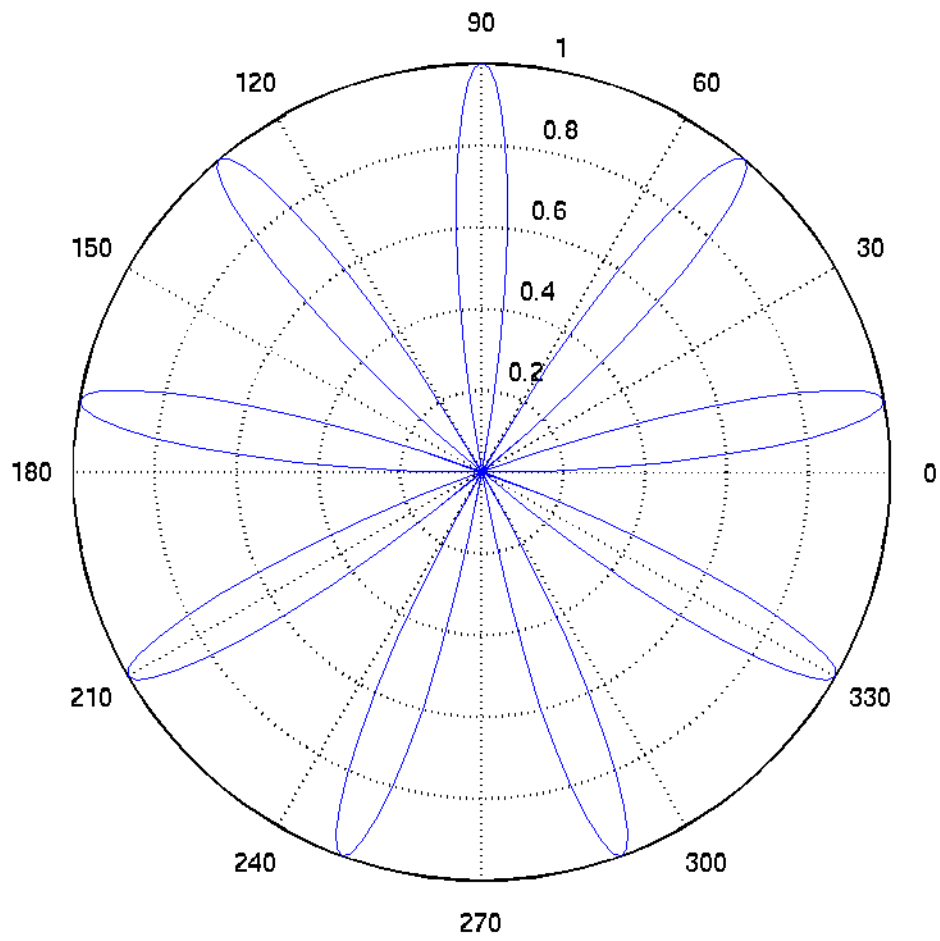


FIGURE 9. $r = \sin(9x)$ - a bit tamer