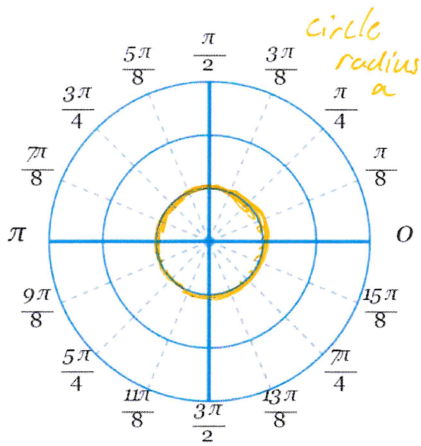
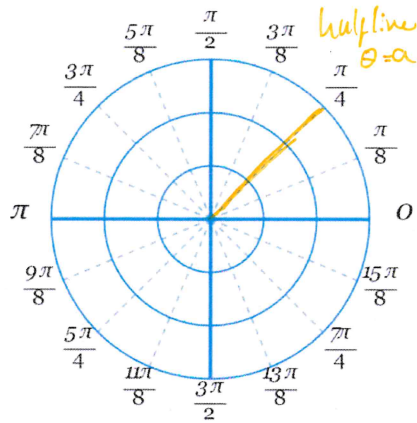


# Polar Sketches



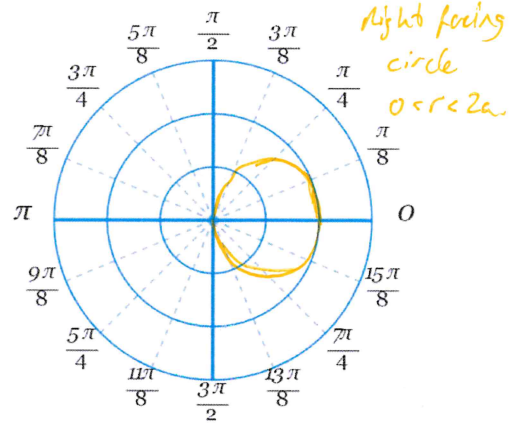
$r = a$

circle  
radius  
 $a$



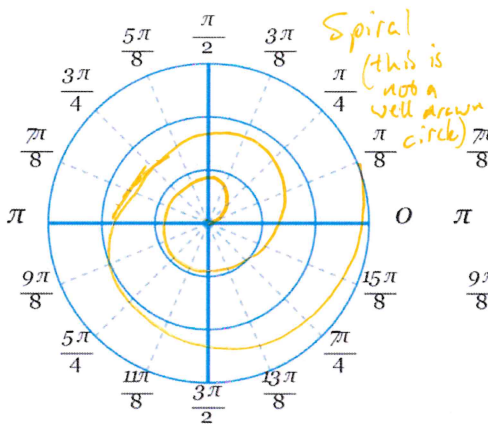
$\theta = a$

halfline  
 $\theta = a$



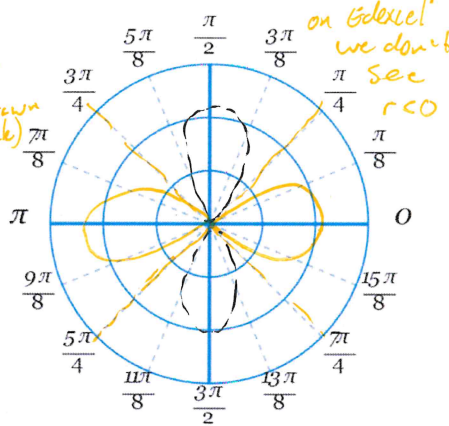
$r = 2a \cos \theta$

right facing  
circle  
 $0 < r < 2a$



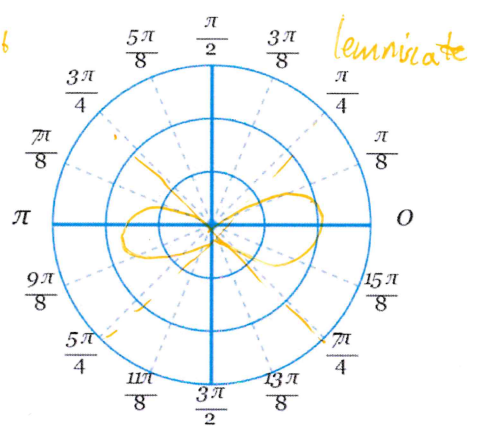
$r = k\theta$

Spiral  
(this is  
not a  
well drawn  
circle)



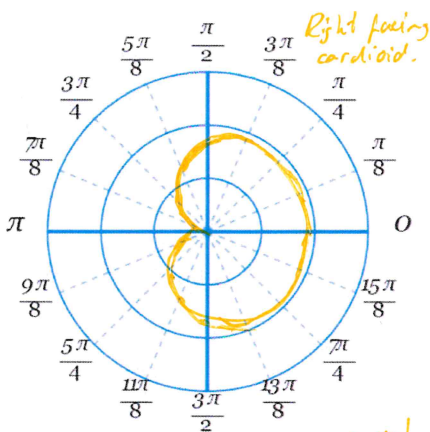
$r = a \cos 2\theta$

on Excel!  
we don't  
see  
 $r < 0$



$r^2 = a^2 \cos 2\theta$

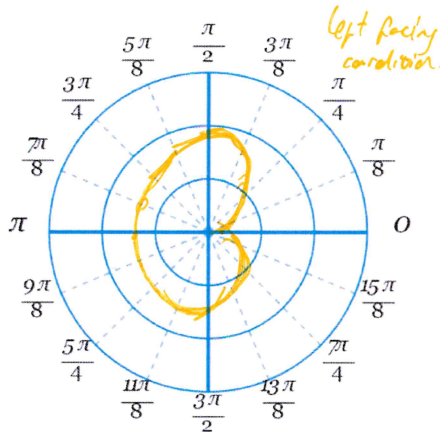
lemniscate



$r = a(1 + \cos \theta)$

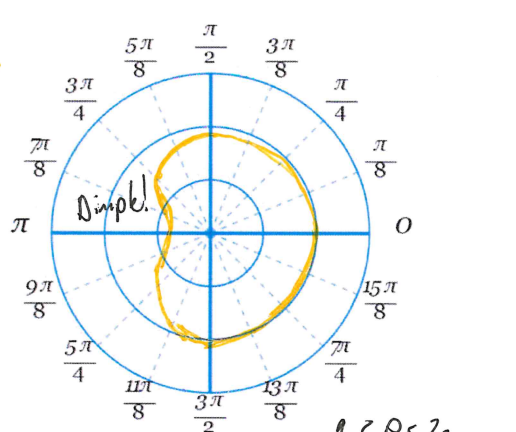
Right facing  
cardioid.

min val  
 $0$



$r = a(1 - \cos \theta)$

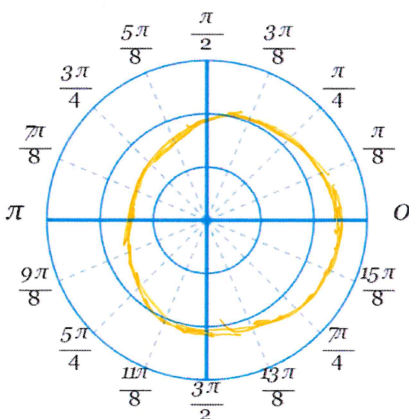
Left facing  
cardioid.



$r = a(3 + 2 \cos \theta)$

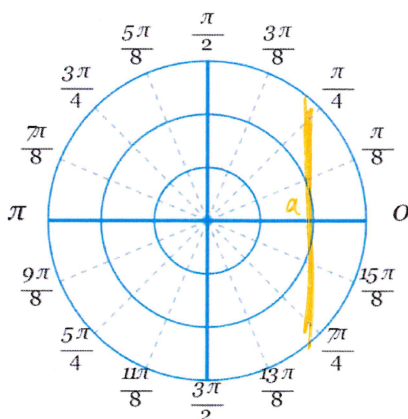
Dimpl.

$\rho < 2a$   
so dimple.



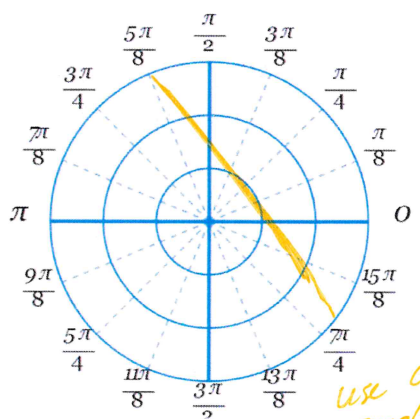
$r = a(12 + 3 \cos \theta)$

$\rho > 2a$   
no dimple



$r = a \sec \theta$

$\Rightarrow r \cos \theta = a$   
 $x = a$



$r = p \sec(\alpha - \theta)$

use compound  
angle formula  
 $y = p \cos \alpha - (\cot \alpha)x$