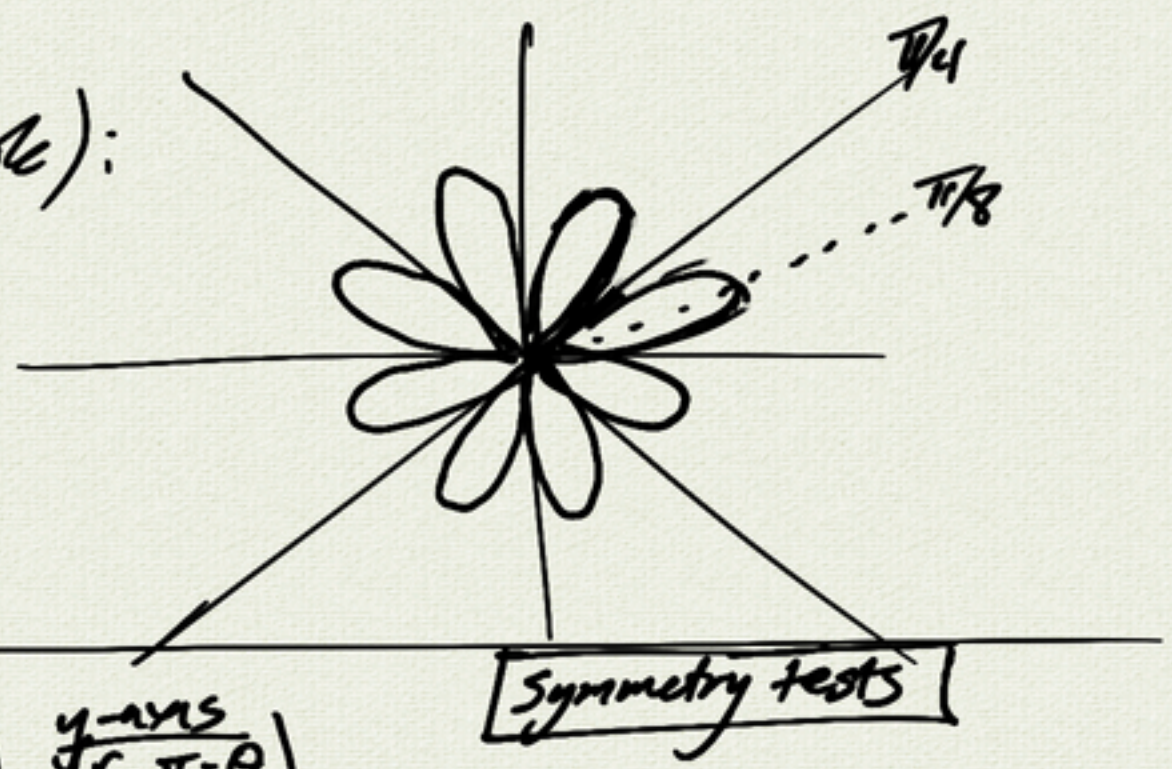
(39) $r = 4\sin 4\theta$

graph (online/calc ok):



① $\max|r| = |4\sin 4\theta| \le 4$

when $\sin 4\theta = \pm 1$

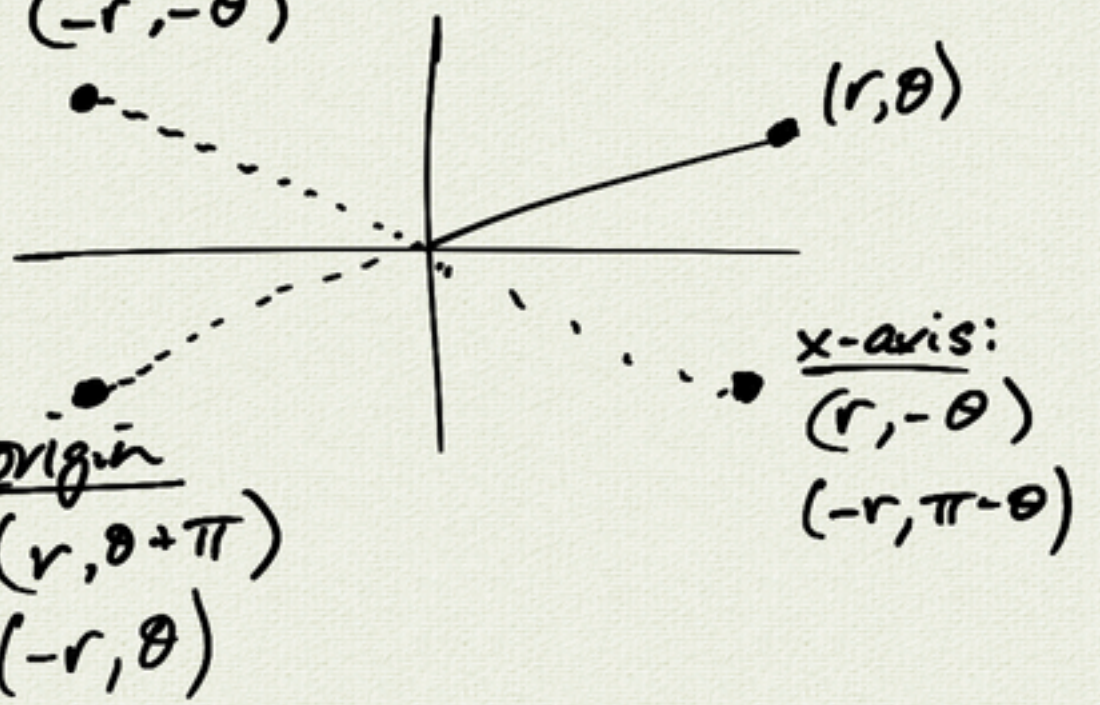
$4\theta = \frac{\pi}{2} + k\pi$

$\theta = \frac{\pi}{8} + k\frac{\pi}{4}$

② Symmetry

Symmetry tests

y-axis
$(r, \pi-\theta)$
$(-r, -\theta)$



x-axis:
$(r, -\theta)$
$(-r, \pi-\theta)$

origin
$(r, \theta+\pi)$
$(-r, \theta)$

x-axis
$(r, -\theta)$:
$r \stackrel{?}{=} 4\sin 4(-\theta)$ NO

$(-r, \pi-\theta)$:
$-r \stackrel{?}{=} 4\sin[4(\pi-\theta)]$
$= 4\sin(4\pi - 4\theta)$
$= 4\sin(-4\theta)$
$-r \stackrel{?}{=} -4\sin 4\theta$
$r = 4\sin 4\theta$ ✓

origin
$(r, \theta+\pi)$
$r \stackrel{?}{=} 4\sin 4(\theta+\pi)$
$= 4\sin(4\theta + 4\pi)$
$= 4\sin 4\theta$ ✓

no need to check $(-r, \pi-\theta)$ since this shows origin symmetry

y-axis
$(r, \pi-\theta)$:
$r \stackrel{?}{=} 4\sin[4(\pi-\theta)]$ NO

$(-r, -\theta)$:
$-r \stackrel{?}{=} 4\sin 4(-\theta)$
$= -4\sin 4\theta$ ✓