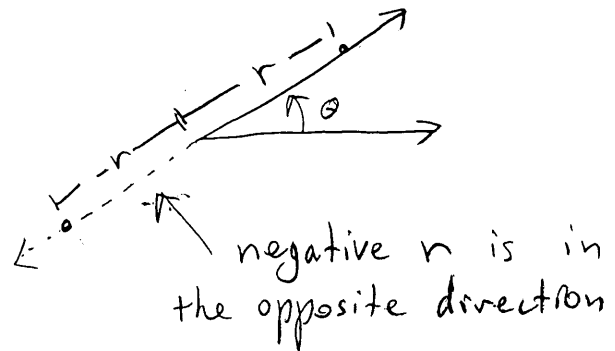
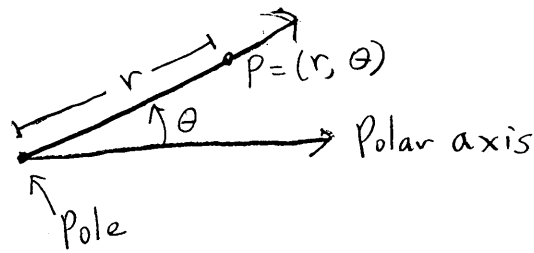


# Polar Coordinates



$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$x^2 + y^2 = r^2$$

$$\tan \theta = \frac{y}{x}$$

## Symmetry

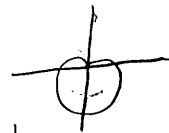
Symmetry with respect to the polar axis (x-axis)

replace  $\theta$  by  $-\theta$



Symmetry with respect to the line  $\theta = \frac{\pi}{2}$  (y-axis)

replace  $\theta$  by  $\pi - \theta$



Symmetry with respect to the pole

replace  $r$  by  $-r$

