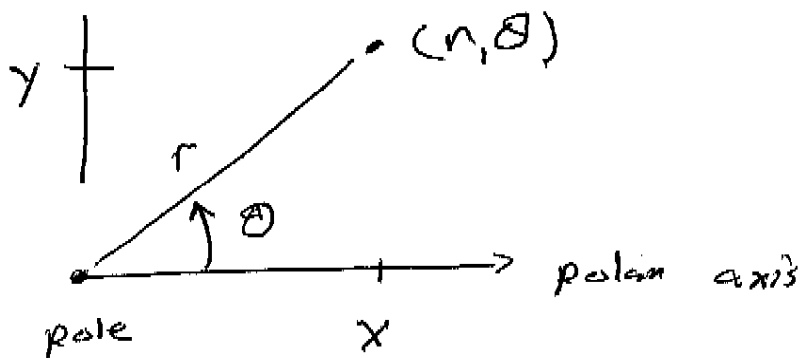


10.3  
1/2

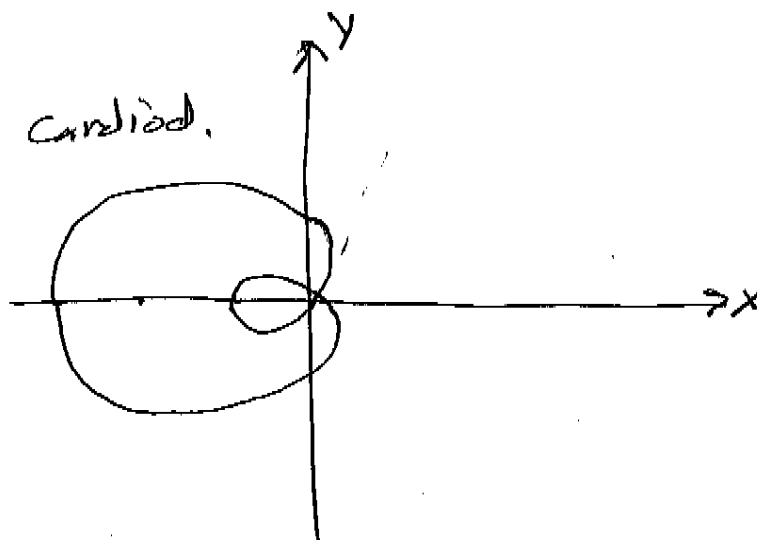
### 10.3 Polar coords



$$x = r \cos \theta, \quad y = r \sin \theta, \quad x^2 + y^2 = r^2, \quad \tan \theta = \frac{y}{x}$$

ex1: sketch  $r = 1 - 2 \cos \theta$

$\theta$	$r$
$0 \rightarrow \frac{\pi}{3}$	$-1 \rightarrow 0$
$\frac{\pi}{3} \rightarrow \frac{\pi}{2}$	$0 \rightarrow 1$
$\frac{\pi}{2} \rightarrow \frac{2\pi}{3}$	$1 \rightarrow 0$
$\frac{2\pi}{3} \rightarrow \pi$	$0 \rightarrow 3$



10.3
2/2

## Tangents to polar curves

Think of polar curves as parametric  
w/ parameter  $\theta$ . (in a fact).

$$\theta \mapsto (r \cos \theta, r \sin \theta)$$

$$\Rightarrow \frac{dy}{dx} = \frac{\frac{dx}{d\theta}}{\frac{dy}{d\theta}} = \frac{\frac{dr}{d\theta} \cos \theta - r \sin \theta}{\frac{dr}{d\theta} \sin \theta + r \cos \theta}$$

upside  
down.