

Equations for Conic Sections in Polar Coordinates.

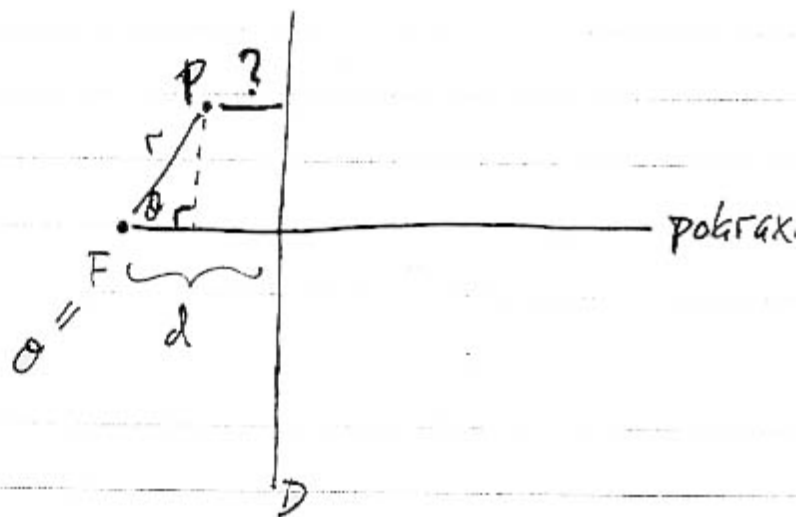
Choose F (one of the foci) to be O , the origin.

First consider the case where D (the directrix) is \perp to

the polar axis and let d

be the (\perp) distance between

F and D .



$$? = d - r \cos \theta$$

So the conic section has equation

$$\frac{r}{d - r \cos \theta} = k \iff r = \frac{dk}{1 + k \cos \theta}$$

To get the general form, replace $\theta \rightarrow \theta - \phi$, where ϕ is a

fixed rotation angle. This gives $r = \frac{dk}{1 + k \cos(\theta - \phi)}$

Now D is \perp to the ray $r = \phi$.