

You will not get any points if your answer is wrong, that is no points to your explanations if your answer is wrong. And of course no points to a correct answer if your explanation or proof is not correct or clear.

YOU must write GOOD Mathematics

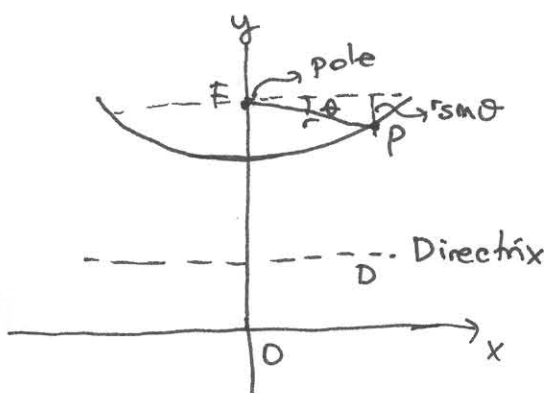
1. Find polar equation of the conic

$$\frac{y^2}{16} - \frac{x^2}{9} = 1.$$

SOLUTION: The easiest way to find the polar form of a conic is to place the pole at one focus of the conic.

and use $|PF| = e|PD|$.

The conic is a hyperbola with the focal axis vertical.



and $a=4$, vertex-center distance

and $c = \sqrt{16+9} = 5$, focus-center distance,

directrix is $y = \pm \frac{a^2}{c} = \frac{16}{5}$.

The eccentricity is $e = \frac{c}{a} = \frac{5}{4}$ and

$$d = c - \frac{a^2}{c} = 5 - \frac{16}{5} = \frac{9}{5}. \quad \text{Then}$$

$$r = \frac{ed}{1 - e \sin \theta} = \frac{9/4}{1 - \frac{5}{4} \sin \theta} \quad \text{or} \quad r = \frac{9}{4 - 5 \sin \theta}.$$

This equation is for $\frac{(y'-4)^2}{16} - \frac{x'^2}{9} = 1.$