

Question

Show that the angle between the tangent and the radial line at any point P on the curve $r = ae^{\theta \cot \alpha}$ (α constant) is equal to α

Answer

$$r = ae^{\theta \cot \alpha}$$
$$\cot \phi = \frac{1}{r} \frac{dr}{d\theta} = \frac{ae^{\theta \cot \alpha} \cot \alpha}{ae^{\theta \cot \alpha}} = \cot \alpha$$

So

$$\theta = \alpha$$

This curve is an equiangular spiral