

Ex Curvature of a circle of radius p .

$$r(t) = \langle p \cos t, p \sin t \rangle$$

$$0 \leq t \leq 2\pi$$

2D-curve

$$r'(t) = \langle -p \sin t, p \cos t \rangle$$

$$|r'(t)| = \sqrt{p^2 \sin^2 t + p^2 \cos^2 t} = p$$

$$\therefore T = \langle -\sin t, \cos t \rangle$$

$$T' = \langle -\cos t, -\sin t \rangle$$

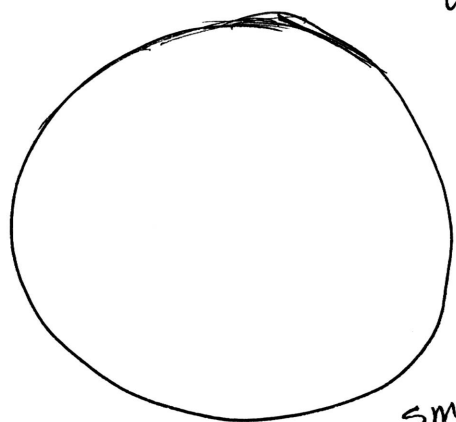
$$|T'(t)| = 1$$

$$\therefore K = \frac{|T'(t)|}{|r'(t)|} = \frac{1}{p}$$

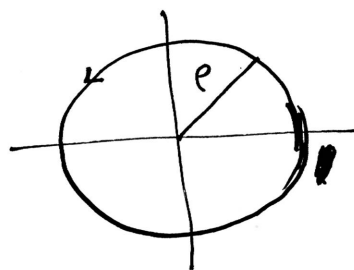
$$K = \frac{1}{p}$$

The curvature is constant and its value is the reciprocal of the radius of the circle.

\therefore if p is big, the curvature is small
and if p is small, the curvature is big



small curvature



big curvature