



Clearly the area of sector  $OAC$  is less than the area of triangle  $OAB$ , which is less than the area of sector  $ODB$ . The radius of the large circle is 1, so the coordinates of point  $B$  are  $(\cos \theta, \sin \theta)$ , and point  $D$  has coordinates  $(1, 0)$ .

The area of sector  $OAC$  is  $\frac{1}{2}(\cos \theta)^2\theta$ , the area of triangle  $OAB$  is  $\frac{1}{2} \cos \theta \sin \theta$ , and the area of sector  $ODB$  is  $\frac{1}{2}\theta$ . Therefore

$$\frac{1}{2}(\cos \theta)^2\theta < \frac{1}{2} \cos \theta \sin \theta < \frac{1}{2}\theta \Rightarrow \cos \theta < \frac{\sin \theta}{\theta} < \frac{1}{\cos \theta}.$$

Because  $\lim_{\theta \rightarrow 0} \cos \theta = 1$ ,  $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$  by the Squeeze Theorem.