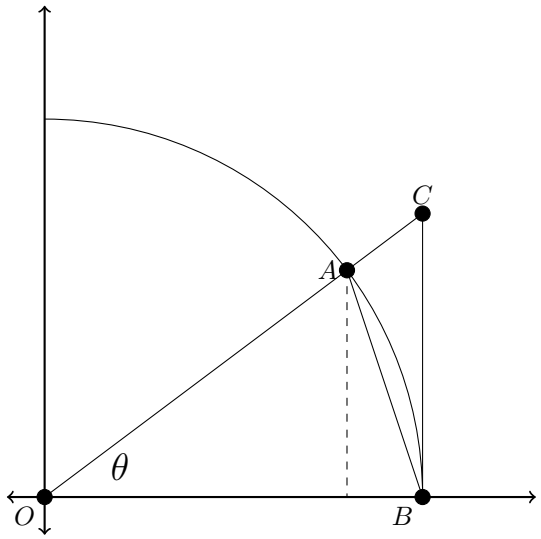
This problem will walk through a proof of the trigonometric limit

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

using the squeeze theorem.

1. Let $\theta$ be any angle between 0 and $\frac{pi}{2}$. The picture below shows the unit circle with a few extra points and triangles drawn in. Find the area of each of the following regions:

   - Triangle $OAB$
   - Sector $OAB$
   - Triangle $OCB$ (Hint: You'll need to use similar triangles for this part)




2. Put these three areas in an order based on the way that the geometric objects contain each other.

3. We want to use the squeeze theorem to say something about

$$\frac{\sin \theta}{\theta}$$

   as $\theta \to 0$. Rearrange the inequalities in (b) to give information about this ratio.

4. Take the limit as $\theta \to 0$ and use the squeeze theorem to get the desired result.