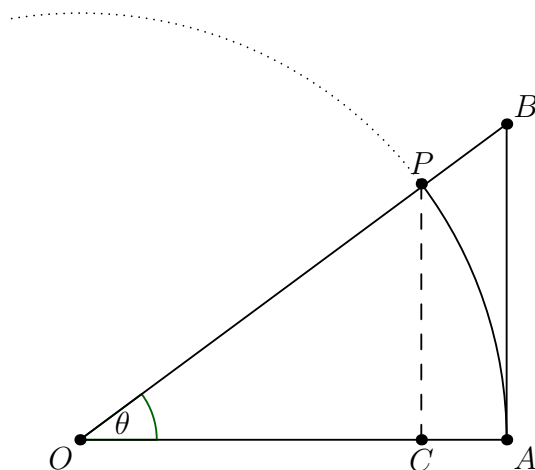


1. If $m \leq x \leq M$ and $m = M$, what else can you say about x ?



2. Goal: Evaluate $\lim_{\theta \rightarrow 0^+} \frac{\sin \theta}{\theta}$

Approach: Use geometry on a unit circle to develop two inequalities involving the areas of two triangles and a sector of a unit circle.

Let's use the symbol $\alpha()$ to mean *the area of*. Observe that:

$$\alpha(\triangle COP) \leq \alpha(\text{sector } AOP) \leq \alpha(\triangle AOB)$$

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- Assume the measure (in radians) of $\angle AOP$ is θ . Find the follow lengths in terms of θ :
 OP, PC, OC, AB .
- Find the length of \widehat{AP} . Explain.
- Find $\alpha(\triangle COP)$, the area of $\triangle COP$
- Explain how to use a proportion to find the area of a sector of a circle with a radius of r where the central angle, θ , is measured in radians.
- Find the area of sector AOP .
- Find the area of $\triangle AOB$.
- Put your results of parts (c), (d), and (e) into the observed inequality.
- Use your trig and algebra skills to get $\frac{\sin \theta}{\theta}$ into the middle of the inequality.
- Evaluate $\lim_{\theta \rightarrow 0^+} \frac{\sin \theta}{\theta}$ and explain why your answer is correct.