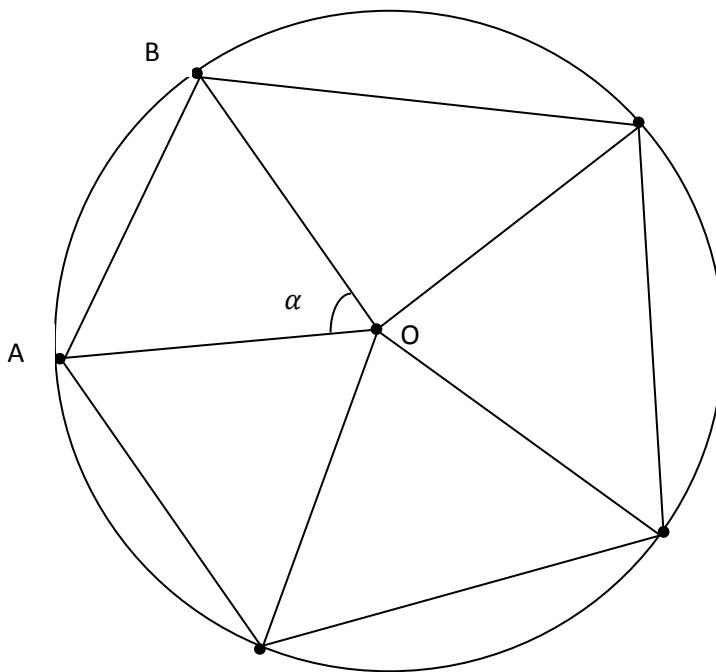


## Answer on Question #34407 – Math – Geometry

### Question

If a circle has a diameter of 44.4 and 5 points are evenly spaced around it, what is the distance between each point?

### Solution



1. Suppose that diameter of the circle is  $b$  (units). Then radius of the circle is  $\frac{b}{2}$  (units).

2. Because 5 points are evenly spaced around a circle then

$$\alpha = \frac{2\pi}{5}.$$

3. Because  $AO = BO = \frac{b}{2}$  then triangle  $\Delta ABO$  is isosceles and  $\angle OAB = \angle OBA$ . So we have

$$\angle OAB + \angle OBA + \alpha = \pi,$$

$$\angle OAB + \angle OAB + \frac{2\pi}{5} = \pi,$$

$$2\angle OAB = \pi - \frac{2\pi}{5},$$

$$\angle OAB = \frac{3\pi}{10}.$$

4. By the Law of Sines we have

$$\frac{AB}{\sin \alpha} = \frac{OB}{\sin \angle OAB},$$

$$AB = \frac{OB}{\sin \angle OAB} \cdot \sin \alpha,$$

$$AB = \frac{\frac{b}{2}}{\sin \left( \frac{3\pi}{10} \right)} \cdot \sin \left( \frac{2\pi}{5} \right).$$

Finally

$$AB = \frac{b}{2} \cdot \frac{\sin \left( \frac{2\pi}{5} \right)}{\sin \left( \frac{3\pi}{10} \right)} \text{ (units)}.$$

5. If  $b = 44.4$  (units) then

$$AB = \frac{44.4}{2} \cdot \frac{\sin \left( \frac{2\pi}{5} \right)}{\sin \left( \frac{3\pi}{10} \right)} = 22.2 \cdot \frac{\sin \left( \frac{2\pi}{5} \right)}{\sin \left( \frac{3\pi}{10} \right)} \text{ (units)}$$

**Answer:**

$$22.2 \cdot \frac{\sin \left( \frac{2\pi}{5} \right)}{\sin \left( \frac{3\pi}{10} \right)} \text{ (units)}$$