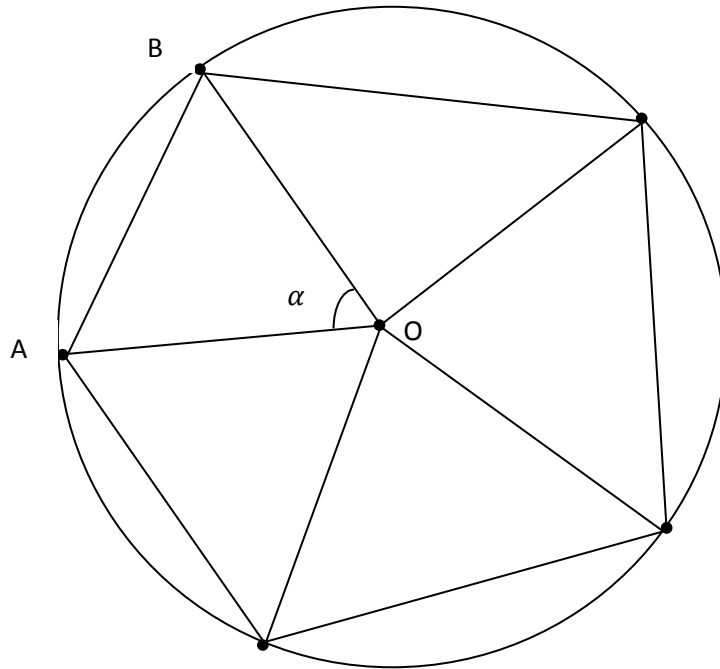


Answer on Question #34407 – Math – Geometry

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 ΔABO is isosceles and $\angle OAB = \angle OBA$. So we have

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

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

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

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

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:

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