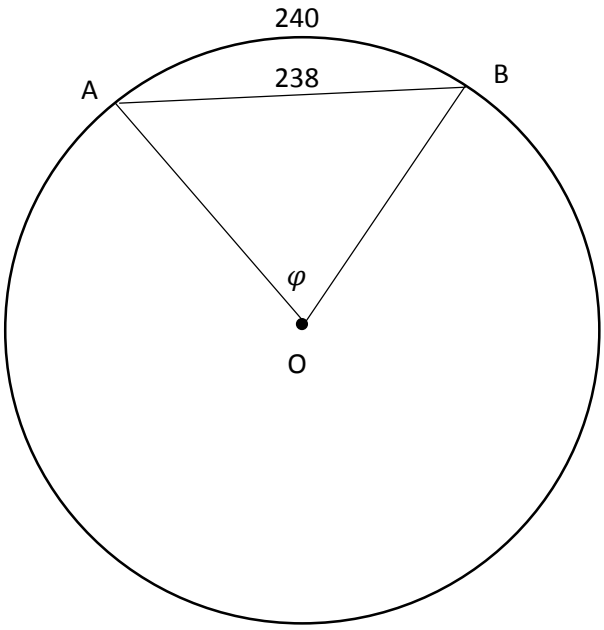
Answer on question 40457 – Math – Geometry

if I have a board exactly 240 inches, how much is the rise in arc bowing the board to bring linear length to 238 inches?

Solution



The length of the arc AB L is 240, the length of the chord l is 238. We know that

$$L = R\varphi, \qquad l = 2R\sin\frac{\varphi}{2},$$

Where R is the radius of the circle and φ is measured in radians. We get the system of equations

$$\begin{cases} R\varphi = 240 \\ 2R\sin\dfrac{\varphi}{2} = 238 \end{cases} \qquad \varphi \approx 2.02\sin\frac{\varphi}{2}$$

$$\varphi \approx 0.488 \approx 29°.$$

Answer: $\approx 0.488 \approx 29°$.