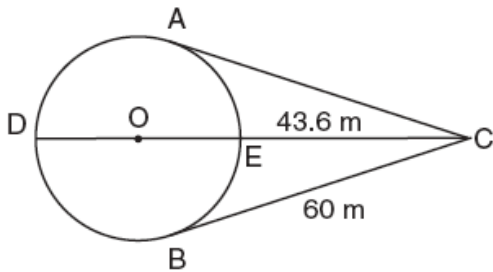


1. An architect is designing a park with an entrance represented by point C and a circular garden with center O , as shown in the accompanying diagram. The architect plans to connect three points on the circumference of the garden, A , B , and D , to the park entrance, C , with walkways so that walkways \overline{CA} and \overline{CB} are tangent to the garden, walkway \overline{DOEC} is a path through the center of the garden, $m\widehat{ADB} : m\widehat{AEB} = 3 : 2$, $BC = 60$ meters, and $EC = 43.6$ meters.

Find the measure of the angle between walkways \overline{CA} and \overline{CB} .
 Find the diameter of the circular garden, to the *nearest meter*.



1.

2. A rectangle is said to have a golden ratio when $\frac{w}{h} = \frac{h}{w-h}$, where w represents width and h represents height. When $w = 3$, between which two consecutive integers will h lie?

2.

3. What is the *last* term in the expansion of $(7z - 2x^3y^2)^5$?

4. The mass of a radioactive sample decreased by 2.7% per year. If the mass was originally 300 g, *to the nearest tenth*, what would be the mass 10 years later?
 (1) 228.1 g (3) 291.9 g
 (2) 229.8 g (4) 292.1 g

3.

4.

5. Find, to the *nearest degree*, all values of x in the interval $0^\circ \leq x < 360^\circ$ that satisfy the equation $3 + \tan^2 x = 5 \tan x$

5.

6. In $\triangle ABC$, the lengths of sides a , b , and c are in the ratio $4 : 6 : 8$. Find the ratio of the cosine of $\angle C$ to the cosine of $\angle A$.

6.

7. The coordinates of quadrilateral $ABCD$ are $A(-1, -5)$, $B(8, 2)$, $C(11, 13)$, and $D(2, 6)$. Using coordinate geometry, prove that quadrilateral $ABCD$ is a rhombus. [The use of the grid is optional.]

