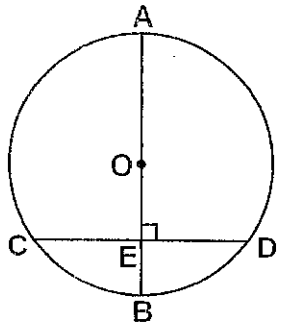
Name: _____

Segments and Angles

1) In the accompanying diagram of circle O, diameter $\overline{AB}$ is perpendicular to chord $\overline{CD}$ at E.

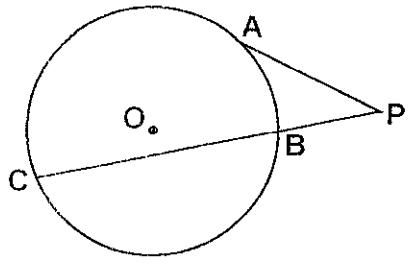


Which of the following three statements is *true*?

I. $\overline{CE} \cong \overline{ED}$
II. $\overline{CB} \cong \overline{BD}$
III. $\overline{AC} \cong \overline{AD}$

2) In a circle whose radius is 13, a chord has a length of 24. Find the distance of this chord from the center of the circle.

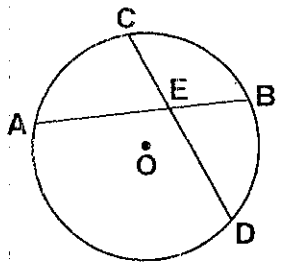
3) In the accompanying diagram, $\overline{AP}$ is a tangent and $\overline{PBC}$ is a secant to circle O.



If PC = 12 and BC = 9, find the length of $\overline{AP}$.

Questions 4 and 5 refer to the following:

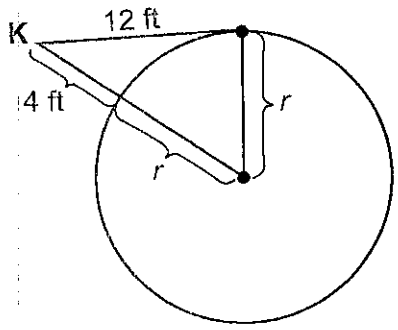
In the above diagram, chords $\overline{AB}$ and $\overline{CD}$ intersect at point E in circle O.



4) If AE = 12, CE = 8, and ED = 6, find EB.

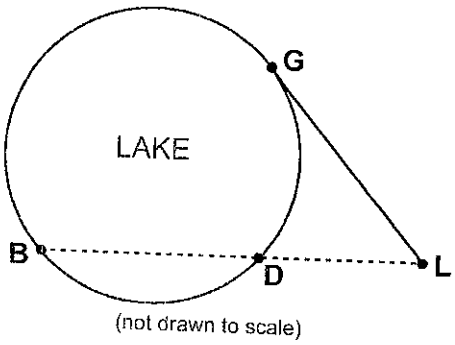
5) If AE = 8, EB = 9, CE = x + 2, and ED = x - 4, find x.

6) Kimi wants to determine the radius of a circular pool without getting wet. She is located at point K, which is 4 feet from the pool and 12 feet from the point of tangency, as shown in the accompanying diagram.



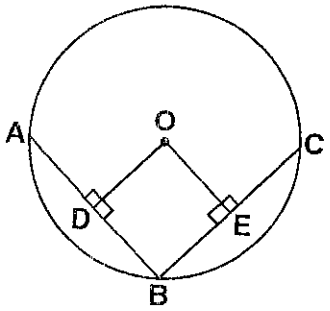
What is the radius of the pool?

7) In the accompanying diagram, cabins B and G are located on the shore of a circular lake, and cabin L is located near the lake. Point D is a dock on the lake shore and is collinear with cabins B and L. The road between cabins G and L is 8 miles long and is tangent to the lake. The path between cabin L and dock D is 4 miles long.



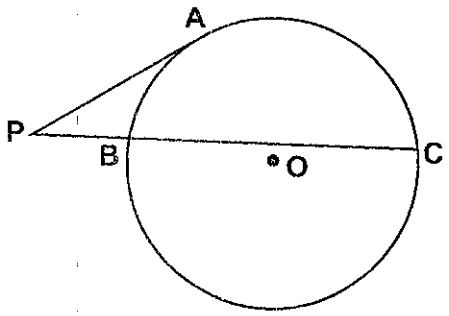
What is the length, in miles, of $\overline{BD}$?

8) In circle O below, $\overline{OD} \perp \overline{AB}$, $\overline{OE} \perp \overline{BC}$, and $\overline{OD} \cong \overline{OE}$.



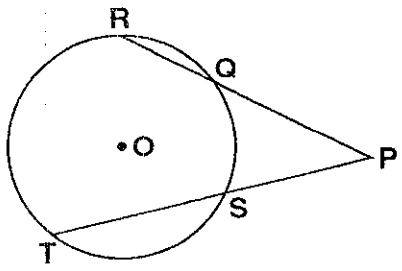
If AB = 14, find EC.

9) In the accompanying diagram, $\overline{PA}$ is tangent to circle O at A, secant $\overline{PBC}$ is drawn, PB = 4, and BC = 12. Find PA. [*Show all work.*]



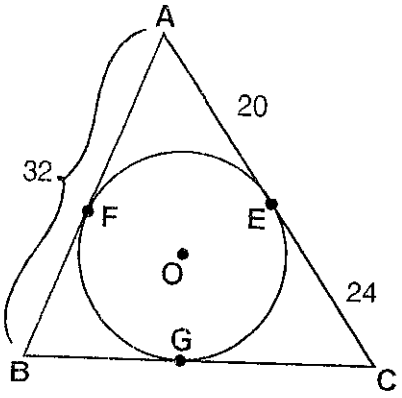
10) Two secant segments are drawn to a circle from an external point. The external segment of the first secant segment is 6 and its internal segment is 8. Find the length of the *second* secant segment if its external segment is 7.

11) In the diagram below, secant segments $\overline{PR}$ and $\overline{PT}$ intersect at P.



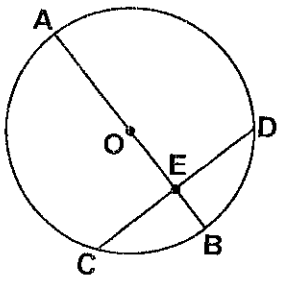
If PR = 24, QR = 16, and PT = 16, find PS.

12) In the accompanying diagram, $\overline{AFB}$, $\overline{AEC}$, and $\overline{BGC}$ are tangent to circle O at F, E, and G, respectively.



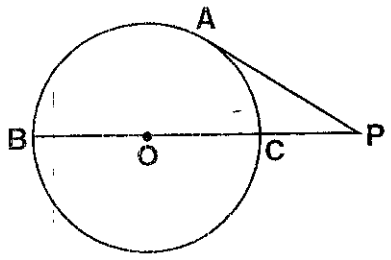
If AB = 32, AE = 20, and EC = 24, find BC.

13) In circle O, diameter $\overline{AB}$ is perpendicular to chord $\overline{CD}$ at E.



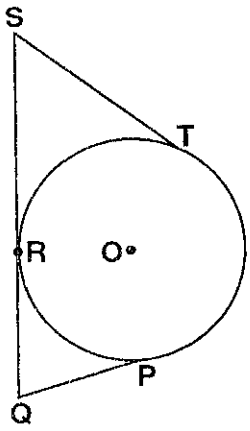
If AE = 16 and EB = 4, what is CD?

14) In the diagram below, diameter $\overline{BC}$ is extended to point P and tangent $\overline{PA}$ is drawn.



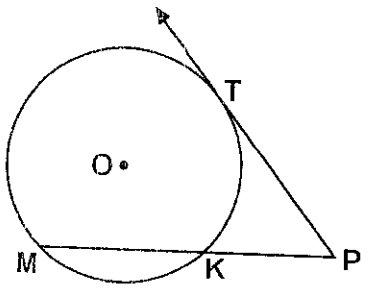
If OC = 12 and AP = 9, find PC.

15) In the diagram below, $\overline{ST}$, $\overline{QP}$, and $\overline{SQ}$ are tangents to circle O.



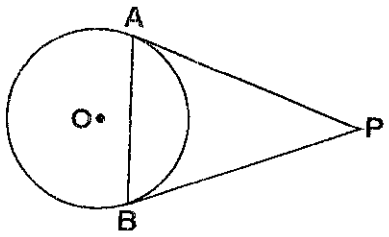
If ST = 5 and QP = 2, find SQ.

16) In the accompanying diagram, $\overline{PT}$ is tangent to circle O at T and $\overline{PKM}$ is a secant.



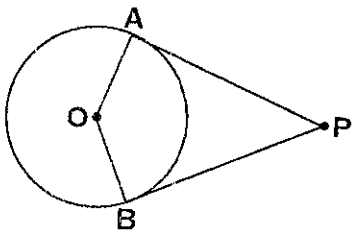
If PK = 4 and PM = 9, find PT.

17) In the diagram below, $\overline{PA}$ and $\overline{PB}$ are tangents to circle O from P and chord $\overline{AB}$ is drawn.



If PA = $4x$ - 5 and PB = 28 - $2x$, find x.

18) In the diagram below, $\overline{PA}$ and $\overline{PB}$ are tangent segments to circle O.

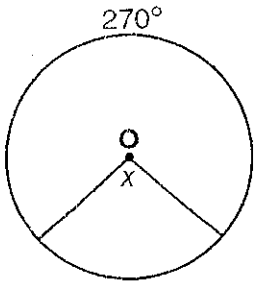


If PA = 10 and OA = 5, find the perimeter of quadrilateral PAOB.

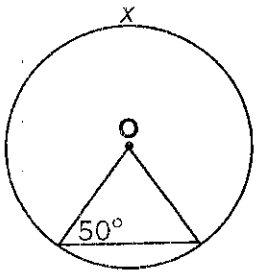
Questions 19 through 22 refer to the following:

For the given circle, find the value of x.

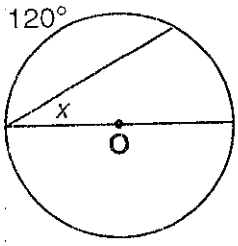
19)



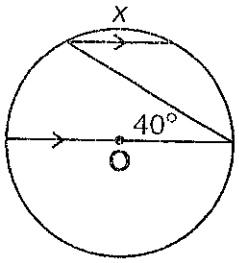
20)



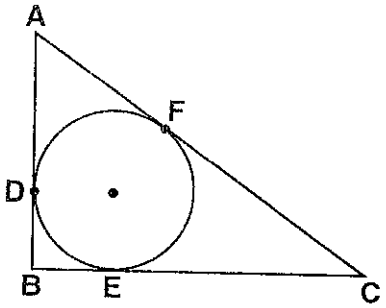
21)



22)

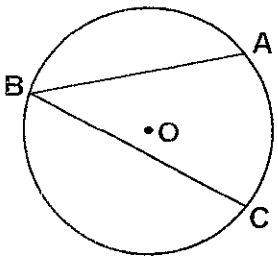


23)



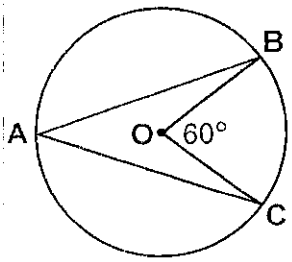
If AD = 5, DB = 3, and BC = 9, find AC.

24) In the accompanying figure of circle O, the measure of $\overset{\frown}{AC}$ is 84°.



What is the measure of ∠ABC?

25) In the accompanying figure, central angle BOC measures 60°.

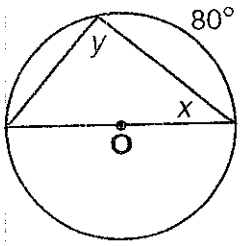


What is the number of degrees in the measure of inscribed angle BAC?

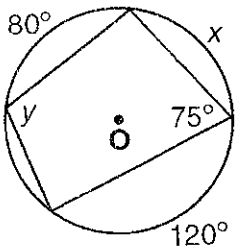
Questions 26 through 28 refer to the following:

For the given circle, find the value of x and y.

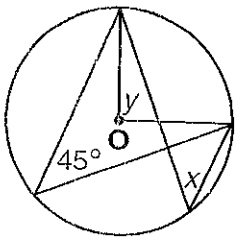
26)



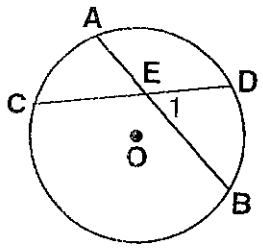
27)



28)

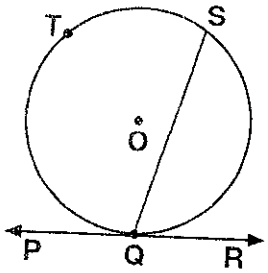


29) In circle O below, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.



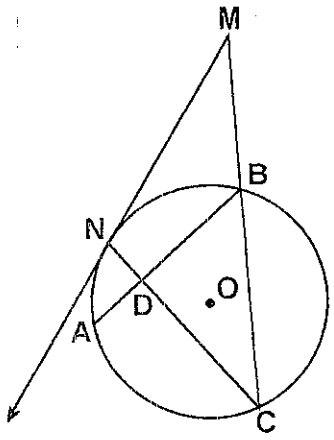
If $m\angle 1 = 50°$ and $m\overset{\frown}{AC} = 40°$, what is $m\overset{\frown}{DB}$?

30)



If $m\angle SQR = 52°$, find $m\overset{\frown}{QTS}$.

33) In the accompanying diagram of circle O, the ratio $m\overset{\frown}{BC}:m\overset{\frown}{CA}:m\overset{\frown}{AN}:m\overset{\frown}{NB}$ is 5:4:1:2. Chord $\overline{CB}$ is extended to external point M, chords $\overline{AB}$ and $\overline{CN}$ intersect at D, and tangent $\overline{MN}$ is drawn.



Find:

(**a**) $m\overset{\frown}{BC}$
(**b**) $m\angle ABC$
(**c**) $m\angle NMC$
(**d**) $m\angle NDA$
(**e**) $m\angle MND$