

9. 234°

8. 63°

7. 9.6

6. 19.6

5. 19.6

4. 10

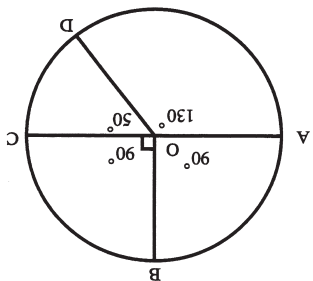
4-9

3. 230°

2. 90°

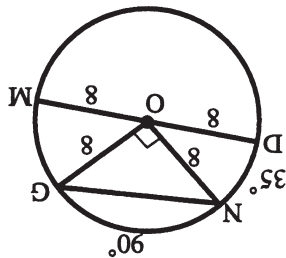
1. 130°

$\underline{OC \perp CY, OR \perp RY}$ (T23-1)
 $OC = OP = OR = 10$ (All radii of a circle are equal)
 $\tan 27^\circ = \frac{CY}{10}$
 $CY = 19.6$
 $CY = RY = 19.6$ (T23-3)
 $\angle COP = 180^\circ - 90^\circ - 27^\circ = 63^\circ = m\widehat{CP}$
 $\angle ROP = 180^\circ - 90^\circ - 27^\circ = 63^\circ$
 $m\widehat{CR} = 360^\circ - m\widehat{CP} - m\widehat{PR} = 234^\circ$



$$\begin{aligned} 8^2 + 8^2 &= (NG)^2 \\ 64 + 64 &= \\ 128 &= (NG)^2 \\ 8\sqrt{2} &= NG \end{aligned}$$

Therefore, $DM = 16$
 Therefore, $DO = OM = 8$
 Therefore, $NO = OG = 8$ (All radii of a circle are equal)



12-13

11. $IN = NE + EI = 5 + 3 = 8$

10. $GA = GR + RA = 4 + 7 = 11$

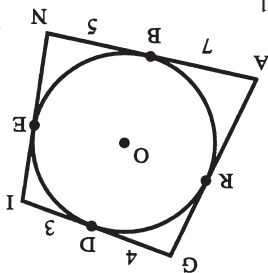
$NE = BN = 5$

$AR = AB = 7$

$DI = IE = 3$

$GR = GD = 4$

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Lesson Twenty Three

Tangents, Arcs And Chords Of A Circle

KA8423

Worksheet

I. VIDEOTAPE FOLLOW-UP QUESTIONS

I. Introduction.

- A. Definition of a circle: In a plane, the locus of points at a given distance r from a given point P is a circle with center P and with r the length of a radius. (P23-1)
- B. Circles found in various places
1. Clocks
 2. Tires
 3. Pulleys
 4. Gears
 5. Games
 6. Amusement parks
 7. Architecture
 8. Others

II. Basic Terms and Their Definitions.

- A. Center
- B. Radius
- C. Chord
- D. Diameter
1. Twice the radius
 2. Longest chord
- E. Secant
- F. Tangent
- G. Point of tangency
- H. Congruent circles (spheres)
- I. Concentric circles (spheres)
- J. Inscribed circle
- K. Circumscribed circle

III. Properties of Tangents and Related Concepts.

- A. Inscribed circles
- B. Common tangent
1. Internal
 2. External
- C. Tangent circles
1. Internal
 2. External
- D. Tangents and Related Theorems.
1. If a line is tangent to a circle, then the line is perpendicular to the radius at the point of tangency. (T23 -1)
 2. If a line in the plane of a circle is perpendicular to a radius at its endpoint on the circle, then the line is tangent to the circle. (T23 -2)
 3. Two segments drawn tangent to a circle from an

exterior point are congruent. (T23 -3)

4. The angle between two tangents to a circle from an exterior point is bisected by the segment joining its vertex and the center of the circle. (T23-4)

E. Applied examples

IV. Arcs and Central Angles.

A. Related terms and their definitions

1. Central angle
2. Minor arc
3. Major arc
4. Semicircles
5. Adjacent arcs
6. Congruent arcs

B. Arc Addition Postulate: If P is a point on APB , then $m\widehat{AP} + m\widehat{PB} = m\widehat{APB}$. (P23-2)

C. In the same circle, or in congruent circles, two minor arcs are congruent if and only if their central angles are congruent. (T23-5)

D. Applied examples

V. Arcs and Chords.

A. Related Theorems.

1. In the same circle, or in congruent circles, two minor arcs are congruent if and only if their chords are congruent. (T23-6)
2. If a diameter is perpendicular to a chord, then it bisects the chord and its arcs. (T23-7)
3. In the same circle, or in congruent circles, two chords are equidistant from the center(s) if and only if they are congruent. (T23-8)
4. If two chords of a circle are unequal in length, then the longer chord is nearer to the center of the circle. (T23-9)
5. If two chords of a circle are not equidistant from the center, then the longer chord is nearer to the center of the circle. (T23-10)

B. Applied examples

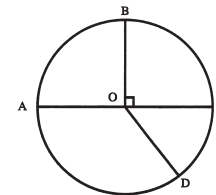
II. SUPPLEMENTARY EXERCISES

1-3 Given circle O with diameter \overline{AC} and $\angle COD = 50^\circ$, $\overline{BO} \perp \overline{AC}$.

1. $m\widehat{AD} = \underline{\hspace{2cm}}$

2. $m\widehat{AB} = \underline{\hspace{2cm}}$

3. $m\widehat{ACD} = \underline{\hspace{2cm}}$



4-9 Given circle O with tangents \overline{YC} and \overline{YR} , $OC = 10$, $\angle CYR = 54^\circ$

4. $OP = \underline{\hspace{2cm}}$

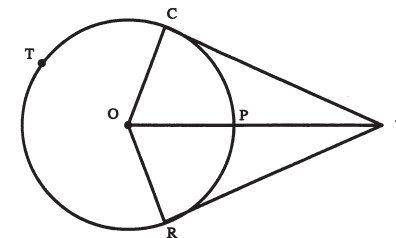
5. $CY = \underline{\hspace{2cm}}$

6. $RY = \underline{\hspace{2cm}}$

7. $PY = \underline{\hspace{2cm}}$

8. $m\widehat{CP} = \underline{\hspace{2cm}}$

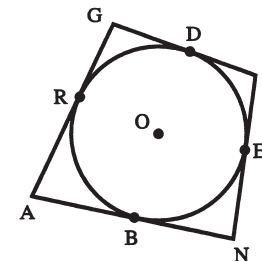
9. $m\widehat{CTR} = \underline{\hspace{2cm}}$



10-11 Given quadrilateral $GINA$ with inscribed circle O , $GD = 4$, $DI = 3$, $AB = 7$, $BN = 5$

10. $GA = \underline{\hspace{2cm}}$

11. $IN = \underline{\hspace{2cm}}$



Given circle O with $m\widehat{DN} = 35^\circ$, $DM = 16$, $\overline{NO} \perp \overline{OG}$.

12. $NG = \underline{\hspace{2cm}}$

13. $m\widehat{GM} = \underline{\hspace{2cm}}$

