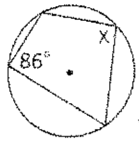
Review Problems

Problem Set A

1 Find x in each case.

a

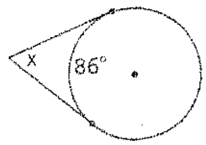


cyclic quad.

$\rightarrow x = 180 - 86$

$\underline{x = 94°}$

b

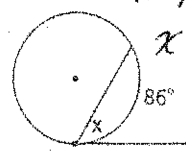


x sup. 86°

$\underline{x = 94°}$

c

tan/chord thm



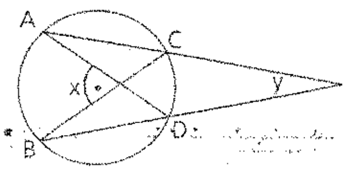
$x = \frac{86}{2}$

$\underline{x = 43°}$

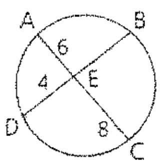
2 If $\widehat{AB} = 98°$ and $\widehat{CD} = 34°$, find x and y.

$x = \frac{98+34}{2}$ $\qquad y = \frac{98-34}{2}$

$\underline{x = 66°}$ $\qquad \underline{y = 32°}$



3 **a** Find BD.



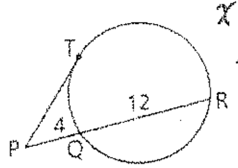
$6 \cdot 8 = 4 \cdot x$

$\underline{12 = x}$

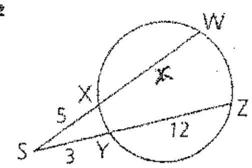
b Find PT.

$x^2 = 4 \cdot 16$

$\underline{x = 8.}$



c Find WX.

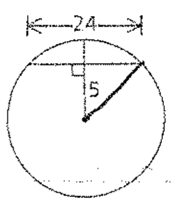


$5(5+x) = (3)(15)$

$\underline{x = 4}$

4 Find the radius of each circle.

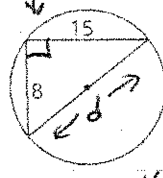
a



$\underline{r = 13}$

b

∢ on diam. = ⊾



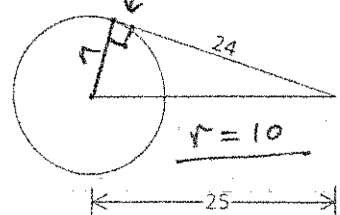
$d = 17$

$\underline{r = 8.5}$

← pyth. thm →

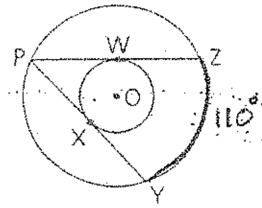
c

tan ⊥ radius



$\underline{r = 10}$

5 The circles shown are concentric at O. $\overline{PZ}$ and $\overline{PY}$ are tangent to the inner circle at W and X. If $\widehat{YZ} = 110°$, find the measure of $\widehat{WX}$.



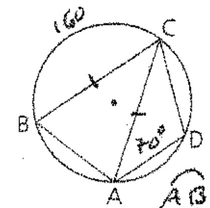
$\angle P = \frac{1}{2}\, \widehat{YZ} = 55°$ (inscribed ∢)

$\angle P$ sup $\widehat{WX}$ (common tangent)

$\rightarrow \underline{\widehat{WX} = 125°}$

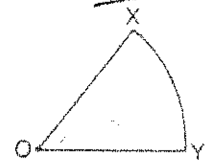
Review Problem Set A, *continued*

6 Given: $\triangle ABC$ is isosceles, with base $\overline{AB}$.
$\angle DAC = 70°$, $\widehat{BC} = 160°$
Find: $\widehat{AB}$ and $\widehat{AD}$



$\widehat{CD} = 140°$
$\widehat{AC} = 160°$
$\underline{\widehat{AD} = 20°}$
$\widehat{AB} = 360 - 2(160)$
$\underline{\widehat{AB} = 40°}$

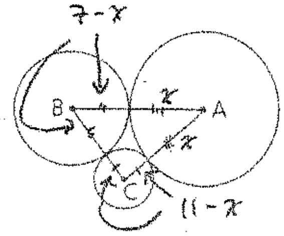
7 XOY is a sector of $\odot O$.
Radius OY = 6 cm and central $\angle$ XOY = 45°.
Find: **a** The length of $\widehat{XY}$
b The perimeter of sector XOY



length $\widehat{XY} = 2\pi r\left(\frac{\theta}{360}\right)$
$= 2\pi(6)\left(\frac{1}{8}\right)$
$= \boxed{\frac{3\pi}{2}}$

perim $=$
$6 + 6 + \frac{3\pi}{2}$
$\boxed{12 + \frac{3\pi}{2}}$

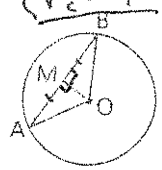
8 Circles A, B, and C are tangent as shown.
AB = 7, BC = 10, and CA = 11.
a Find the radius of $\odot A$.
b Which circle is the largest?



$(7-x)+(11-x)=10$
$\underline{x = 4}$

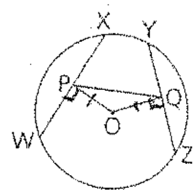
$r_A = 4$
$r_B = 3$
$\underline{r_C = 7}$

9 Given: $\odot O$, $\overline{OM} \perp \overline{AB}$
Prove: $\overrightarrow{OM}$ bisects $\angle AOB$.

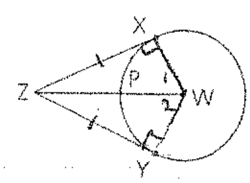


9)	
$\overline{OM} \perp \overline{AB}$	G
$\angle OMB, \angle OMA$ are rt. $\angle$'s	def. $\perp$
$\overline{OM} \cong \overline{OM}$	refl
$\overline{AM} \cong \overline{BM}$	radius $\perp$ → bis chord
$\triangle OMA \cong \triangle OMB$	H/L
$\angle BOM \cong AOM$	CPCTC
$\overrightarrow{OM}$ bis $\angle AOB$	def. $\angle$ bis

10 Given: $\odot O$, $\overline{OP} \perp \overline{WX}$, $\overline{OQ} \perp \overline{YZ}$;
$\triangle OPQ$ is isosceles, with base $\overline{PQ}$.
Conclusion: $\widehat{WX} \cong \widehat{YZ}$



11 Given: $\overline{ZX}$ and $\overline{ZY}$ are tangent at X and Y.
Prove: $\overline{WZ}$ bisects $\widehat{XY}$.

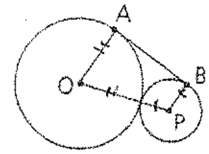


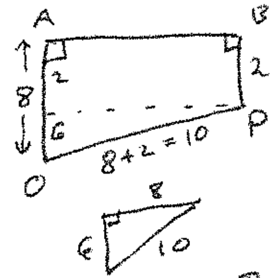
10)	
$\triangle OPQ$ isos w/ $\overline{OP} \cong \overline{OQ}$	G
$\overline{OP} \perp \overline{WX}$, $\overline{OQ} \perp \overline{YZ}$	G
$\overline{WX} \cong \overline{YZ}$	$\cong$ chord ⟺ equidistant from center
$\widehat{WX} \cong \widehat{YZ}$	$\cong$ chords ⟺ $\cong$ arcs

11)	
$\overline{ZX}, \overline{ZY}$ tan.	G
$\angle X, \angle Y$ rt. $\angle$'s	tan → $\perp$
$\overline{ZX} \cong \overline{ZY}$	common endpt → $\cong$
$\overline{ZW} \cong \overline{ZW}$	refl
$\triangle WXZ \cong \triangle WYZ$	H/L
$\angle 1 \cong \angle 2$	CPCTC
$\overline{WZ}$ bis $\angle XWY$	def $\angle$ bis

14 Given: ⊙ O and P are externally tangent.
$OA = 8$, $PB = 2$

Find: The length of common external tangent $\overline{AB}$





$\underline{AB = 8}$

Problem Set B

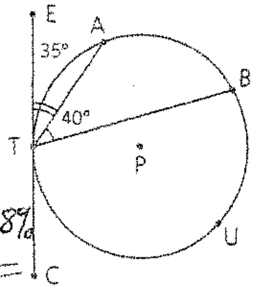
15 If a point is chosen at random on ⊙P, what is the probability that it lies on

a $\widehat{BA}$ b $\widehat{TUB} = 210°$

$\widehat{BA} = 80°$

$\widehat{AT} = 70°$

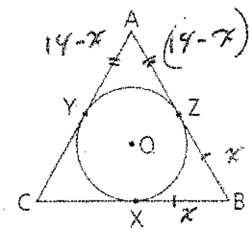
$\frac{80}{360} = \frac{2}{9} \approx 22\%$, $\frac{210}{360} = \frac{7}{12} \approx 58\%$



16. Jim knows that ⊙O is inscribed in isosceles △ ABC. He forgets which sides of △ABC are congruent but remembers that $AB = 14$ and the perimeter is 38.

a Find XC.

b What are the three possible lengths of $\overline{BX}$?



sides:
$\{14, 14, 10\}$
or
$\{14, 12, 12\}$

50 ·

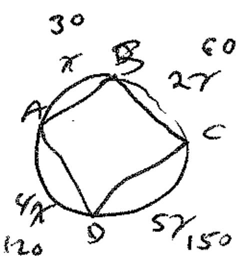
1) $(14-x) + (14-x) = 10$
$\rightarrow x = 9$

2) $(14-x) + (10-x) = 14$
$\rightarrow x = 5$

3) $(14-x) + (12-x) = 12$
$\rightarrow x = 7$

17 A quadrilateral is inscribed in a circle. Its vertices divide the circle into four arcs in the ratio 1:2:5:4. Find the angles of the quadrilateral. ~~$x + 2x + 5x + 4x = 360$~~

~~$x = 30° \rightarrow \{30°, 60°, 150°, 120°\}$~~



$x = 30$

$A = \frac{60 + 150}{2}$

$A = 105°$

$B = 135°$

$C = 75°$

$D = 45°$

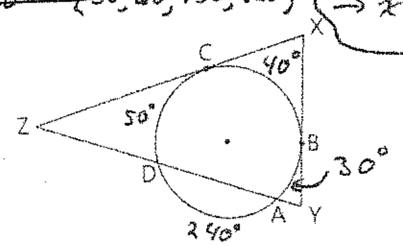
18 Given: $\widehat{AB} = 30°$, $\widehat{BC} = 40°$, $\widehat{CD} = 50°$

Find: a $\angle X = 140°$ (tan → sup)

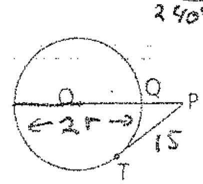
b $\angle Y$

c $\angle Z \rightarrow \triangle \text{ sum} \rightarrow 10°$

$\frac{\widehat{BD} - \widehat{AB}}{2} = \frac{90 - 30}{2} = 30°$



19 $\overline{TP}$ is a tangent segment, $TP = 15$, and $PQ = 5$. Find the radius of ⊙O.



$5(5 + 2r) = 15^2$

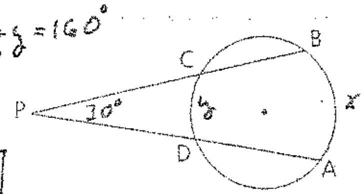
$\underline{r = 20}$

20 Given: $m\widehat{AD} + m\widehat{BC} = 200$, $\rightarrow x + y = 160°$
$m\angle P = 30 \rightarrow x - y = 60°$

Find: $m\widehat{AB}$ and $m\widehat{CD}$

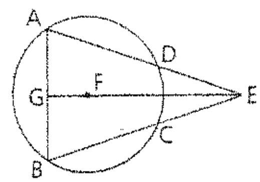
add two eqtns $\rightarrow$ $2x = 220°$

$\boxed{x = 110° \quad y = 50°}$



21 Given: $\odot F$, $\overline{EG} \perp \overline{AB}$, $\overline{EC} \cong \overline{ED}$

Prove: $\overline{AD}$ and $\overline{BC}$ are equidistant from F.



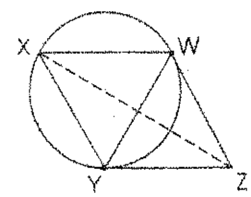
22 WXYZ is a parallelogram. $\overline{WZ}$ and $\overline{YZ}$ are tangent segments.

a Show that WXYZ is a rhombus.

b Find m∠Z.

c If WY = 15, find the perimeter of WXYZ.

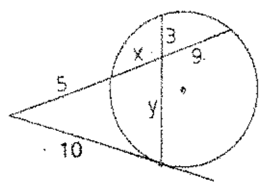
d If WY = 15, find XZ.



23 Find x and y.

$10^2 = 5(5 + x + 9)$

$\rightarrow x = 6$

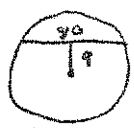


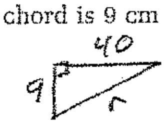
$6 \cdot 9 = 3y$

$\rightarrow y = 18$

24 Find the area of a circle whose diameter joins the points (10, −7) and (−2, 10).

25 Find, to the nearest centimeter, the circumference of a circle in which an 80-cm chord is 9 cm from the center.



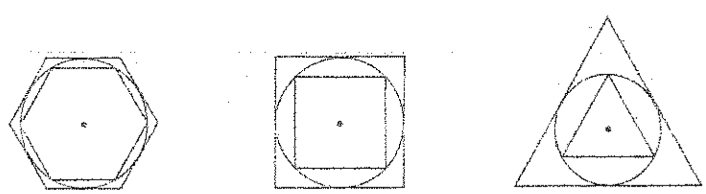


$r = 41$

$2\pi(41) \approx 258\text{ cm}$

Problem Set C

26 Each circle below is inscribed in a regular polygon and is circumscribed about another regular polygon.



a If the length of a side of each outer polygon is 12, find the length of a side of each inner polygon.

b In each case, find the ratio of the sides of the smaller polygon to the sides of the larger polygon.