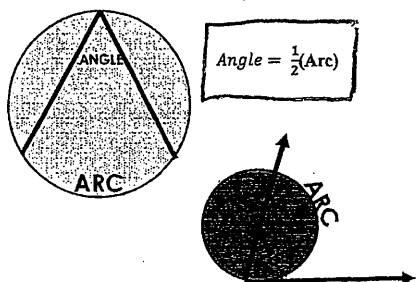


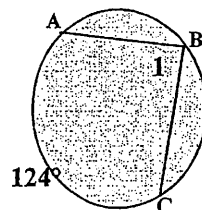
# 10.6 Other Angle Relationships

Key

## ① Case I: Vertex is ON the circle

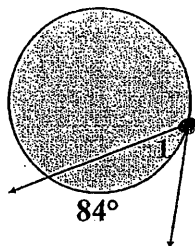


## ② Ex. 1 Find $m\angle 1$ .



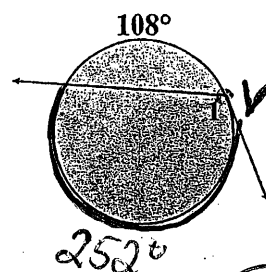
$$m\angle 1 = \frac{1}{2}(124) = 62^\circ$$

## ③ Ex. 2 Find $m\angle 1$ .



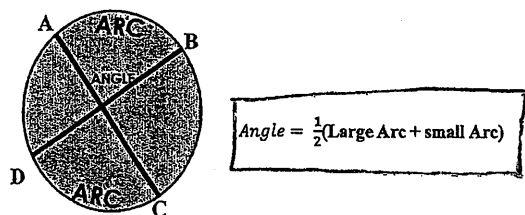
$$m\angle 1 = \frac{1}{2}(84) = 42^\circ$$

## ④ Ex. 3 Find $m\angle 1$ .



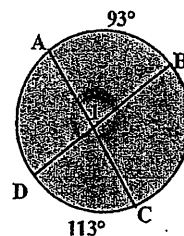
$$m\angle 1 = \frac{1}{2}(252) = 126^\circ$$

## ⑤ Case II: Vertex is inside the circle



Looks like a PLUS sign!

## ⑥ Ex. 4 Find $m\angle 1$ .



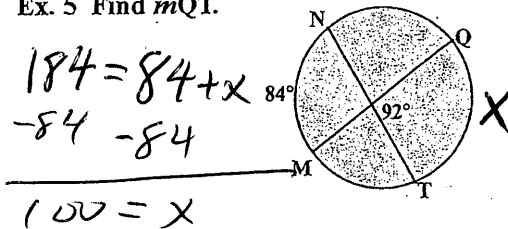
$$\begin{aligned} m\angle 1 &= \frac{1}{2}(93 + 113) \\ &= \frac{1}{2}(206) \\ &= 103^\circ \end{aligned}$$

$$2 \cdot 92 = \frac{1}{2}(84 + x) \quad \text{8}$$

7

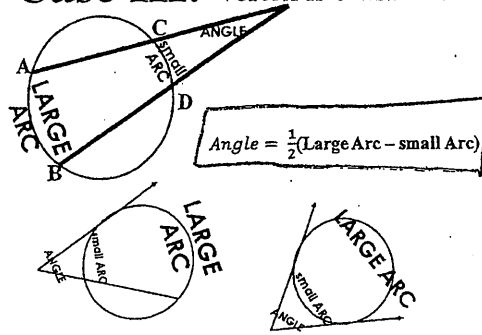
Ex. 5 Find  $m\widehat{QT}$ .

$$\begin{array}{r} 184 = 84 + x \\ -84 \quad -84 \\ \hline 100 = x \end{array}$$



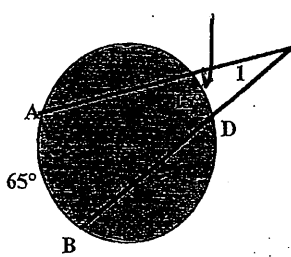
$$\boxed{m\widehat{QT} = 100^\circ}$$

Case III: Vertex is outside the circle



9

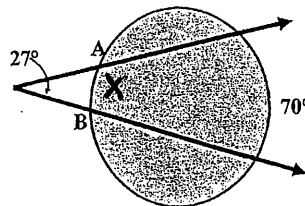
Ex. 6 Find  $m\angle 1$ .  $15^\circ$



$$\begin{aligned} m\angle 1 &= \frac{1}{2}(65 - 15) \\ &= \frac{1}{2}(50) \\ &= \boxed{25^\circ} \end{aligned}$$

10

Ex. 7 Find  $m\widehat{AB}$ .



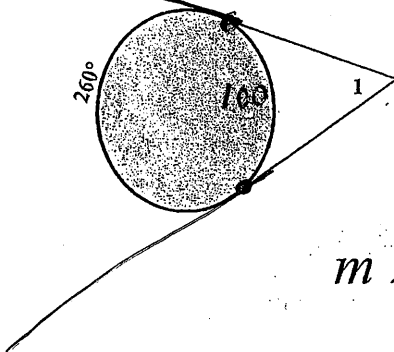
$$m\widehat{QT} =$$

$$\begin{aligned} 2 \cdot 27 &= \frac{1}{2}(70 - x) \quad \text{2} \\ 54 &= 70 - x \\ -70 \quad -70 \\ \hline -16 &= -x \end{aligned}$$

$$\boxed{16^\circ = x}$$

11

Ex. 8 Find  $m\angle 1$ .



$$\begin{aligned} m\angle 1 &= \frac{1}{2}(260 - 100) \\ &= \frac{1}{2}(160) \\ &= \boxed{80^\circ} \end{aligned}$$

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LESSON  
6.5

## Exercise Set A

MM2G3D

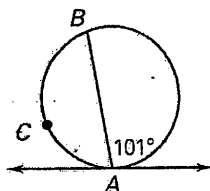
Understand and use properties of central, inscribed, and related angles.

MM2G3d

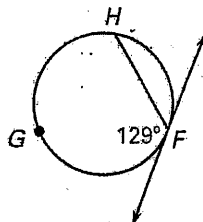
Justify measurements and relationships in circles using geometric and algebraic properties.

Find the indicated arc measure.

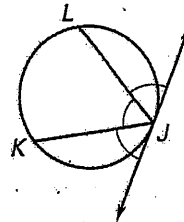
1.  $m\widehat{AB}$



2.  $m\widehat{FH}$

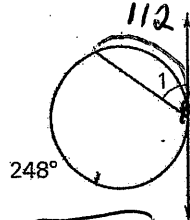


3.  $m\widehat{JKL}$



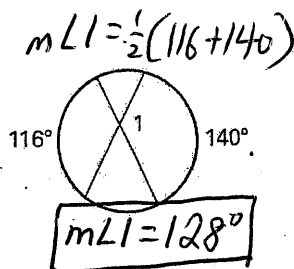
Find  $m\angle 1$ .

$$\begin{array}{r} 360 \\ - 248 \\ \hline 112 \end{array}$$



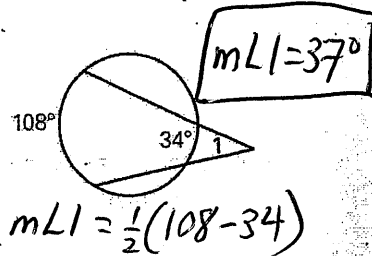
$$m\angle 1 = 56^\circ$$

5.



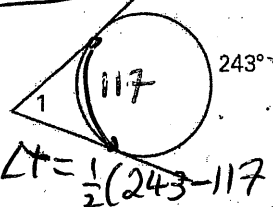
$$m\angle 1 = 128^\circ$$

6.



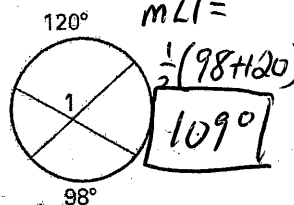
$$m\angle 1 = \frac{1}{2}(108 - 34)$$

$$m\angle 1 = 63^\circ$$



$$m\angle 1 = \frac{1}{2}(243 - 117)$$

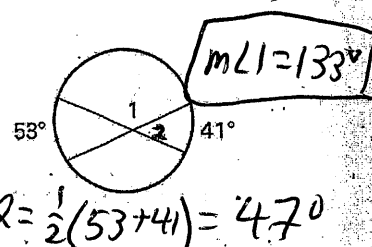
8.



$$m\angle 1 = \frac{1}{2}(98 + 120)$$

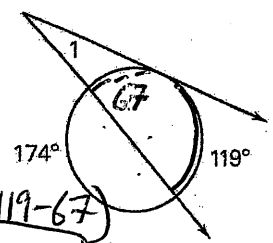
$$109^\circ$$

9.



$$m\angle 2 = \frac{1}{2}(53 + 41) = 47^\circ$$

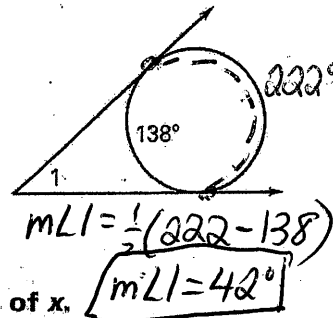
10.



$$m\angle 1 = \frac{1}{2}(174 - 119)$$

$$m\angle 1 = 26^\circ$$

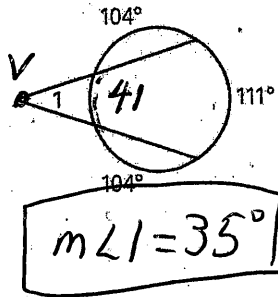
11.



$$m\angle 1 = \frac{1}{2}(222 - 138)$$

$$m\angle 1 = 42^\circ$$

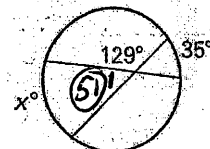
12.



$$m\angle 1 = 35^\circ$$

In Exercises 13-15, find the value of  $x$ .

13.



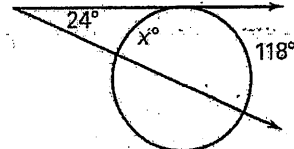
$$2 \cdot 51 = \frac{1}{2}(35 + x)$$

$$102 = 35 + x$$

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14.



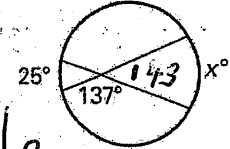
$$2 \cdot 24 = \frac{1}{2}(118 - x)$$

$$48 = 118 - x$$

$$-70 = -x$$

$$x = 70^\circ$$

15.



$$43 = \frac{1}{2}(x + 25)$$

$$86 = x + 25$$

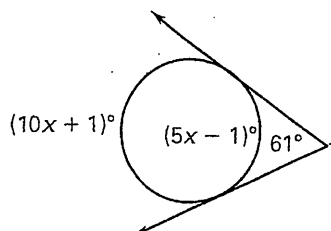
$$61 = x$$

$$67^\circ = x$$

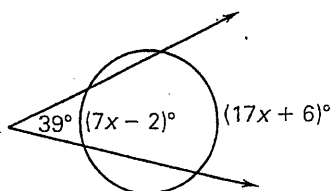
# Exercise Set A *(continued)*

In Exercises 16–18, find the value of  $x$ .

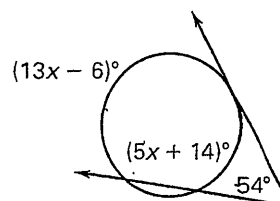
16.



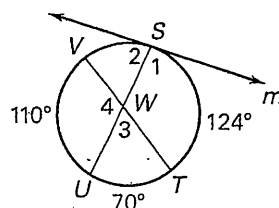
17.



18.



19. **Angle Measures** In the diagram shown,  $m$  is tangent to the circle at the point  $S$ . Find the measures of all the numbered angles.



Use the diagram shown to find the measure of the angle.

20.  $m\angle CAF$

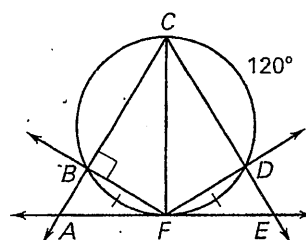
21.  $m\angle AFB$

22.  $m\angle CEF$

23.  $m\angle CFB$

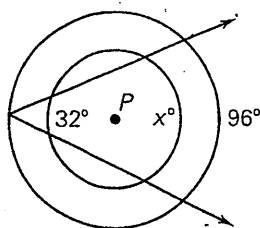
24.  $m\angle DCF$

25.  $m\angle BCD$

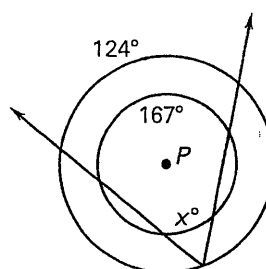


In Exercises 26 and 27, the circles have center  $P$ . Find the value of  $x$ .

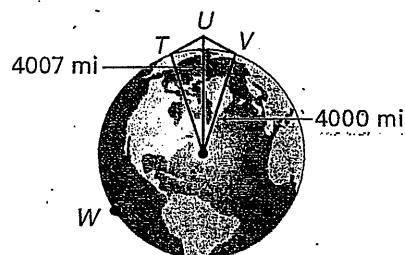
26.



27.



28. **Transportation** A plane is flying at an altitude of about 7 miles above Earth as shown in the diagram. What is the measure of arc  $TV$  that represents the part of Earth you can see? The radius of Earth is about 4000 miles.



*Not drawn to scale*

29. **Mountain Climbing** A mountain climber is standing on top of a mountain that is about 4.75 miles above sea level. Use the information from Exercise 28 to find the measure of the arc that represents the part of Earth the mountain climber can see.