P360 18-23

WS inscribed angles

& Other angles

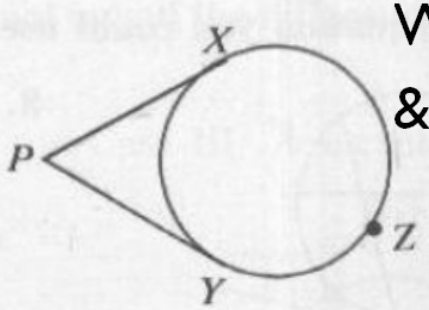
In Exercises 18–21 $\overline{PX}$ and $\overline{PY}$ are tangents.

18. If $m\overset{\frown}{XZY} = 250$, then $m\angle P =$ ___?___.

19. If $m\overset{\frown}{XY} = 90$, then $m\angle P =$ ___?___.

20. If $m\overset{\frown}{XY} = t$, then $m\overset{\frown}{XZY} =$ ___?___ and $m\angle P =$ ___?___ in terms of t.

21. If $m\angle P = 65$, then $m\overset{\frown}{XY} =$ ___?___.

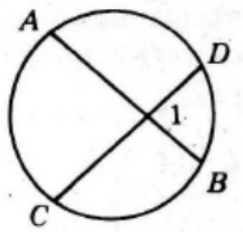


22. A secant and a tangent to a circle intersect in a 42° angle. The two arcs of the circle intercepted by the secant and tangent have measures in a 7:3 ratio. Find the measure of the third arc.

23. A quadrilateral circumscribed about a circle has angles of 80°, 90°, 94°, and 96°. Find the measures of the four nonoverlapping arcs determined by the points of tangency.

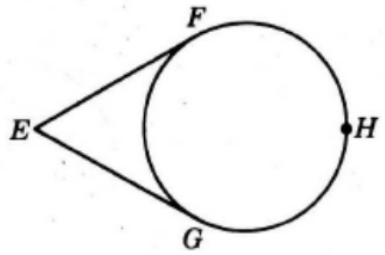
Other Angles

In Exercises 1–4 $\overline{AB}$ and $\overline{CD}$ are chords.

1) 

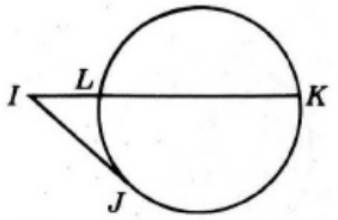
1. If $m\widehat{AC} = 85$ and $m\widehat{DB} = 73$, then $m\angle 1 =$ _____.
2. If $m\widehat{AD} = 136$ and $m\widehat{CB} = 96$, then $m\angle 1 =$ _____.
3. If $m\angle 1 = 54$ and $m\widehat{AC} = 78$, then $m\widehat{DB} =$ _____.
4. If $m\angle 1 = 48$ and $m\widehat{DB} = 42$, then $m\widehat{AC} =$ _____.

In Exercises 5–7 $\overline{EF}$ and $\overline{EG}$ are tangents.

5) 

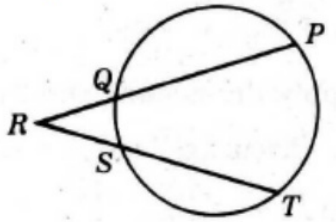
5. If $m\widehat{FHG} = 280$, then $m\angle E =$ _____.
6. If $m\widehat{FG} = 96$, then $m\angle E =$ _____.
7. If $m\angle E = 90$, then $m\widehat{FHG} =$ _____.

In Exercises 8–10 $\overline{IJ}$ is a tangent.

8) 

8. If $m\widehat{JK} = 120$ and $m\widehat{JL} = 40$, then $m\angle I =$ _____
9. If $m\angle I = 45$ and $m\widehat{JL} = 55$, then $m\widehat{JK} =$ _____
10. If $m\angle I = 50$ and $m\widehat{JK} = 110$, then $m\widehat{JL} =$ _____

In Exercises 11–15 $\overline{RP}$ and $\overline{RT}$ are secants.

11) 

11. If $m\widehat{PT} = 100$ and $m\widehat{QS} = 20$, then $m\angle R =$ _____.

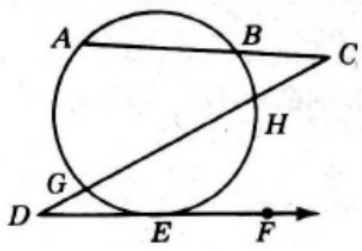
12. If $m\widehat{PT} = 130$ and $m\widehat{QS} = 40$, then $m\angle R =$ _____.

13. If $m\angle R = 25$ and $m\widehat{QS} = 25$, then $m\widehat{PT} =$ _____.

14. If $m\angle R = 40$ and $m\widehat{PT} = 130$, then $m\widehat{QS} =$ _____.

15. If $m\widehat{ST} = 90$, $m\widehat{QS} = 60$, and $m\widehat{QP} = 80$, then $m\angle R =$ _____.

In Exercises 16–19 $\overrightarrow{DF}$ is tangent to the circle at point E.

16) 

16. If $m\widehat{AG} = 100$ and $m\widehat{BH} = 20$, then $m\angle C =$ _____.

17. If $m\angle C = 25$ and $m\widehat{BH} = 25$, then $m\widehat{AG} =$ _____.

18. If $m\widehat{EH} = 95$ and $m\widehat{GE} = 25$, then $m\angle D =$ _____.

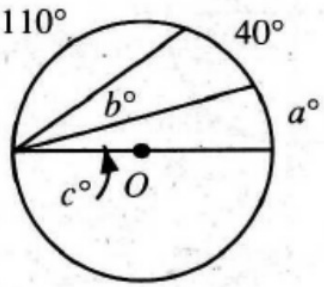
19. If $m\angle D = 40$ and $m\widehat{EH} = 138$, then $m\widehat{GE} =$ _____.

Inscribed Angles

For use after Section 9–5

In Exercises 1–6 find the values of *a*, *b*, and *c*. In Exercises 1, 3, and 6, *O* is the center of the circle.

1.

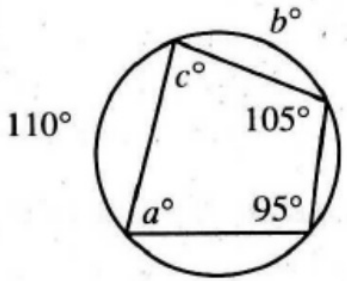


$a =$ _____

$b =$ _____

$c =$ _____

2.

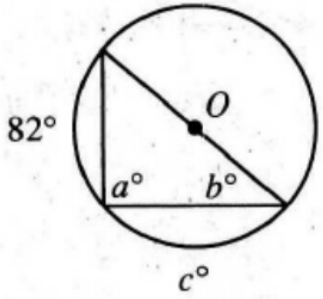


$a =$ _____

$b =$ _____

$c =$ _____

3.

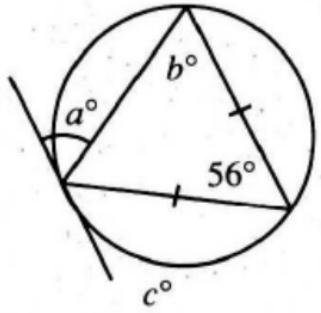


$a =$ _____

$b =$ _____

$c =$ _____

4.

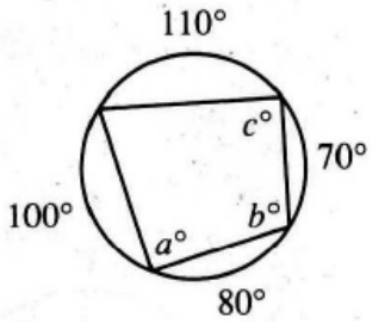


$a =$ _____

$b =$ _____

$c =$ _____

5.

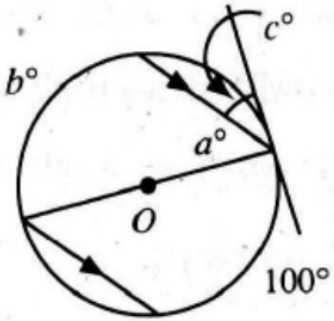


$a =$ _____

$b =$ _____

$c =$ _____

6.



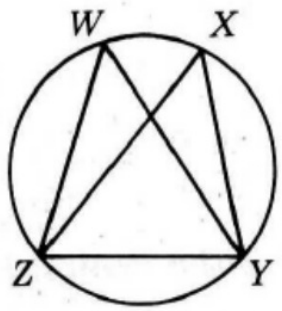
$a =$ _____

$b =$ _____

$c =$ _____

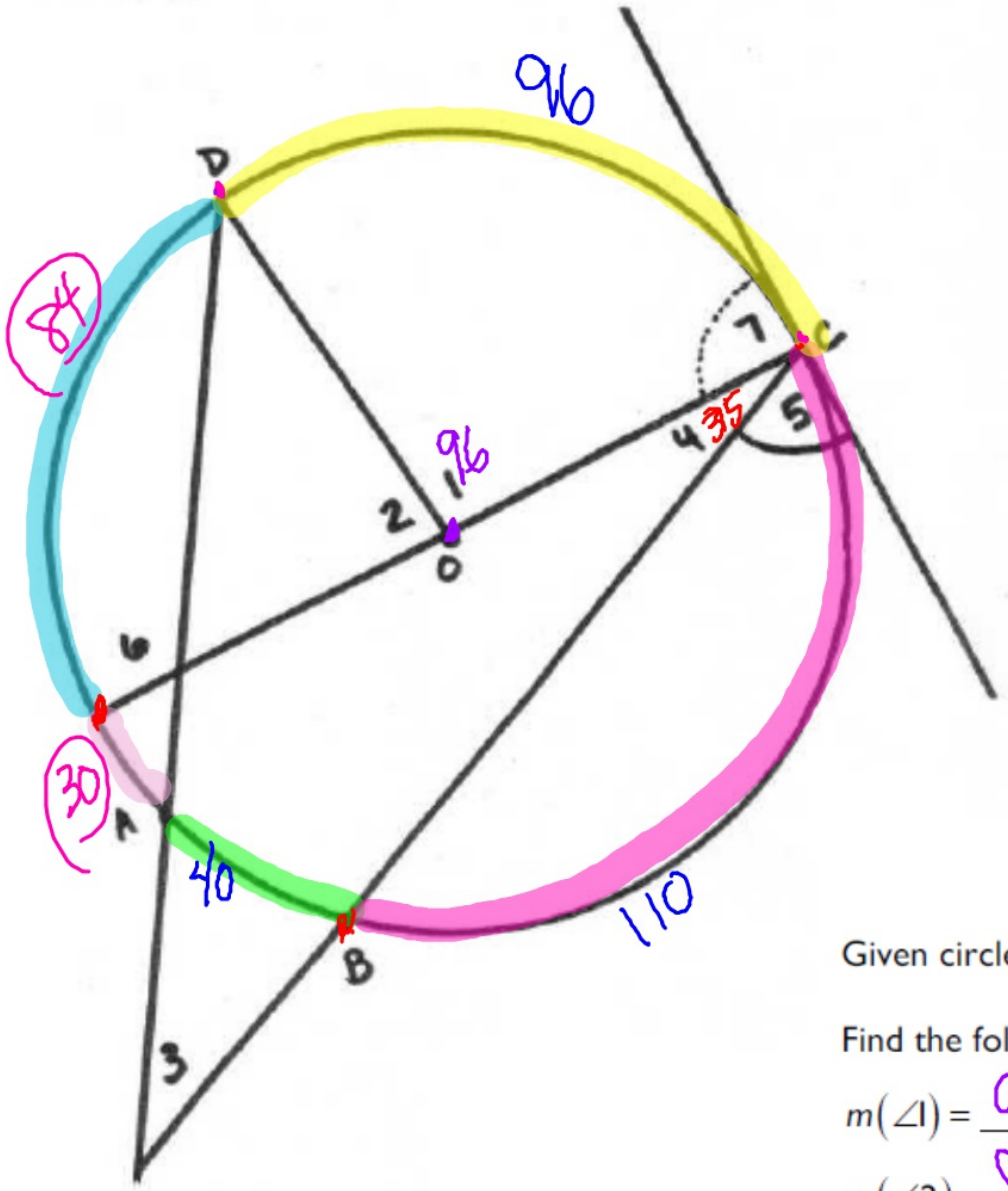
Supply the missing statements and reasons.

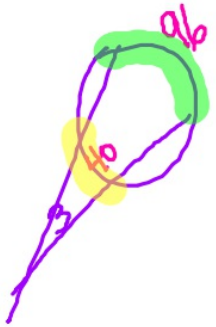
7. Given: $m\overset{\frown}{ZW} = m\overset{\frown}{XY}$
Prove: $m\angle ZYX = m\angle YZW$



Proof:

Statements	Reasons
1. _____	1. Given
2. $m\overset{\frown}{ZW} + m\overset{\frown}{WX} = m\overset{\frown}{WX} + m\overset{\frown}{XY}$	2. _____
3. $m\overset{\frown}{ZW} + m\overset{\frown}{WX} = m\overset{\frown}{ZX}$; $m\overset{\frown}{WX} + m\overset{\frown}{XY} = m\overset{\frown}{WY}$	3. _____
4. _____	4. Substitution Property
5. $\frac{1}{2}m\overset{\frown}{ZX} = \frac{1}{2}m\overset{\frown}{WY}$	5. _____
6. $m\angle ZYX = \frac{1}{2}m\overset{\frown}{ZX}$; $m\angle YZW = \frac{1}{2}m\overset{\frown}{WY}$	6. _____
7. $m\angle ZYX = m\angle YZW$	7. _____





96
−40
56÷2

110
+40
84
÷2

9.6b WARMUP

Given circle O, $m(\overset{\frown}{AB}) = 40$, $m(\overset{\frown}{CB}) = 110$, and $m(\overset{\frown}{CD}) = 96$.

Find the following:

DC

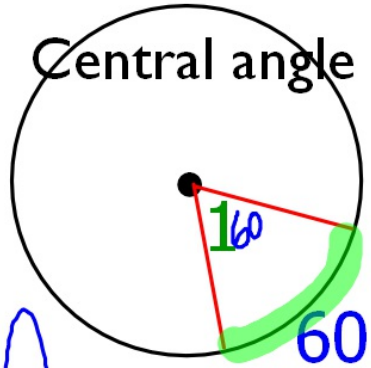
inscr. 70÷2

$m(\angle 1) =$ 96 $\quad m(\angle 4) =$ 35 $\quad m(\angle 7) =$ 90

$m(\angle 2) =$ 84 $\quad m(\angle 5) =$ 55

$m(\angle 3) =$ 28 $\quad m(\angle 6) =$ 117

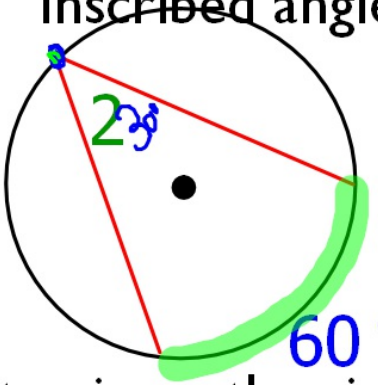
Central angle



∠ = ∩

angle = the arc

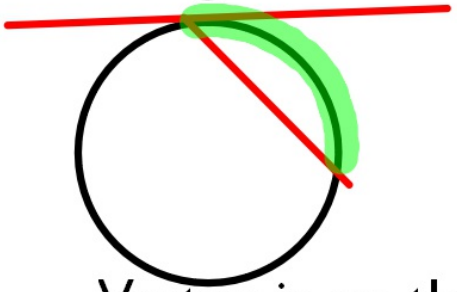
Inscribed angle



Vertex is on the circle

angle = half the arc

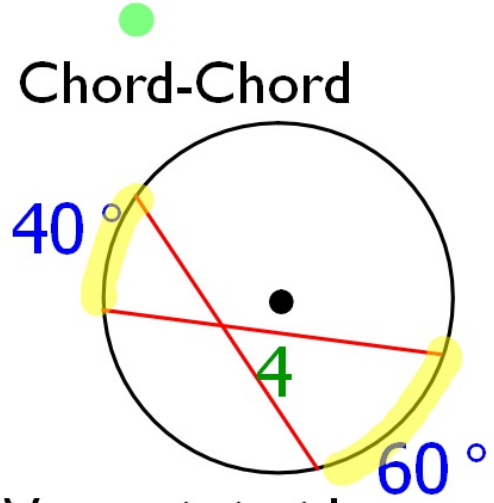
Tangent-Chord angle



Vertex is on the circle

angle = half the arc

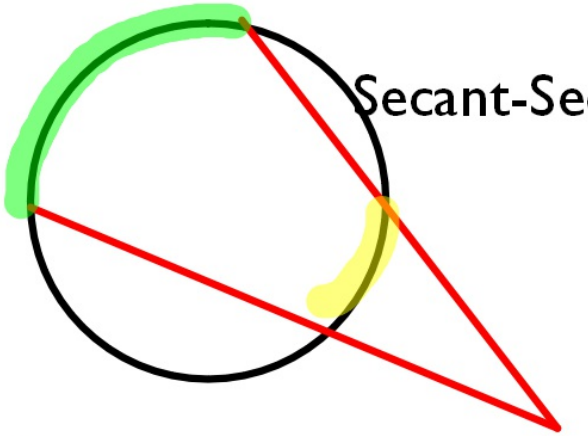
Chord-Chord



Vertex is inside

add and divide by 2

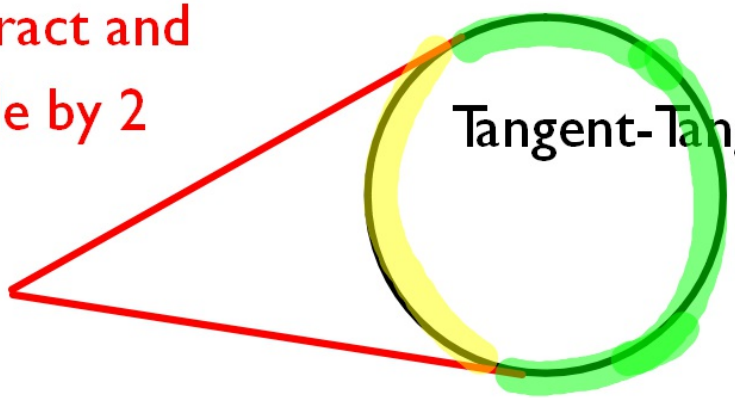
Secant-Secant



Vertex is outside

subtract and divide by 2

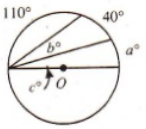
Tangent-Tangent



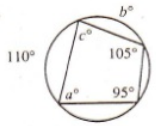
Inscribed Angles

For use after Section 9-5

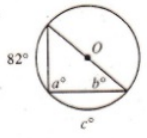
In Exercises 1–6 find the values of *a*, *b*, and *c*. In Exercises 1, 3, and 6, *O* is the center of the circle.

1. 

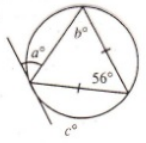
$a =$ 30
$b =$ 20
$c =$ 15

2. 

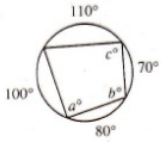
$a =$ 75
$b =$ 80
$c =$ 85

3. 

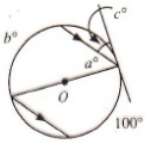
$a =$ 90
$b =$ 41
$c =$ 98

4. 

$a =$ 56
$b =$ 62
$c =$ 124

5. 

$a =$ 90
$b =$ 105
$c =$ 90

6. 

$a =$ 50
$b =$ 100
$c =$ 40

Supply the missing statements and reasons.

7. Given: $m\overset{\frown}{ZW} = m\overset{\frown}{XY}$
Prove: $m\angle ZYX = m\angle YZW$

Proof:

Statements	Reasons
1. $m(\overset{\frown}{ZW}) = m(\overset{\frown}{XY})$	1. Given
2. $m\overset{\frown}{ZW} + m\overset{\frown}{WX} = m\overset{\frown}{WX} + m\overset{\frown}{XY}$	2. Add prop of =
3. $m\overset{\frown}{ZW} + m\overset{\frown}{WX} = m\overset{\frown}{ZX}$; $m\overset{\frown}{WX} + m\overset{\frown}{XY} = m\overset{\frown}{WY}$	3. arc addition post
4. $m(\overset{\frown}{ZX}) = m(\overset{\frown}{WY})$	4. Substitution Property
5. $\frac{1}{2}m\overset{\frown}{ZX} = \frac{1}{2}m\overset{\frown}{WY}$	5. Mult or Div Prop of =
6. $m\angle ZYX = \frac{1}{2}m\overset{\frown}{ZX}$; $m\angle YZW = \frac{1}{2}m\overset{\frown}{WY}$	6. measure of inscribed ∠ is ½ measure of intercepted arc
7. $m\angle ZYX = m\angle YZW$	7. substitution prop

In Exercises 1–4 $\overline{AB}$ and $\overline{CD}$ are chords.

1. If $m\overset{\frown}{AC} = 85$ and $m\overset{\frown}{DB} = 73$, then $m\angle 1 =$ 79.
2. If $m\overset{\frown}{AD} = 136$ and $m\overset{\frown}{CB} = 96$, then $m\angle 1 =$ 64.
3. If $m\angle 1 = 54$ and $m\overset{\frown}{AC} = 78$, then $m\overset{\frown}{DB} =$ 30.
4. If $m\angle 1 = 48$ and $m\overset{\frown}{DB} = 42$, then $m\overset{\frown}{AC} =$ 54.

In Exercises 5–7 $\overline{EF}$ and $\overline{EG}$ are tangents.

5. If $m\overset{\frown}{FHG} = 280$, then $m\angle E =$ 100.
6. If $m\overset{\frown}{FG} = 96$, then $m\angle E =$ 84.
7. If $m\angle E = 90$, then $m\overset{\frown}{FHG} =$ 270.

In Exercises 8–10 $\overline{IJ}$ is a tangent.

8. If $m\overset{\frown}{JK} = 120$ and $m\overset{\frown}{JL} = 40$, then $m\angle I =$ 40.
9. If $m\angle I = 45$ and $m\overset{\frown}{JL} = 55$, then $m\overset{\frown}{JK} =$ 145.
10. If $m\angle I = 50$ and $m\overset{\frown}{JK} = 110$, then $m\overset{\frown}{JL} =$ 10.

In Exercises 11–15 $\overline{RP}$ and $\overline{RT}$ are secants.

11. If $m\overset{\frown}{PT} = 100$ and $m\overset{\frown}{QS} = 20$, then $m\angle R =$ 40.
12. If $m\overset{\frown}{PT} = 130$ and $m\overset{\frown}{QS} = 40$, then $m\angle R =$ 45.
13. If $m\angle R = 25$ and $m\overset{\frown}{QS} = 25$, then $m\overset{\frown}{PT} =$ 75.
14. If $m\angle R = 40$ and $m\overset{\frown}{PT} = 130$, then $m\overset{\frown}{QS} =$ 50.
15. If $m\overset{\frown}{ST} = 90$, $m\overset{\frown}{QS} = 60$, and $m\overset{\frown}{QP} = 80$, then $m\angle R =$ 35

In Exercises 16–19 $\overrightarrow{DF}$ is tangent to the circle at point *E*.

16. If $m\overset{\frown}{AG} = 100$ and $m\overset{\frown}{BH} = 20$, then $m\angle C =$ 40.
17. If $m\angle C = 25$ and $m\overset{\frown}{BH} = 25$, then $m\overset{\frown}{AG} =$ 75.
18. If $m\overset{\frown}{EH} = 95$ and $m\overset{\frown}{GE} = 25$, then $m\angle D =$ 35.
19. If $m\angle D = 40$ and $m\overset{\frown}{EH} = 138$, then $m\overset{\frown}{GE} =$ 58.