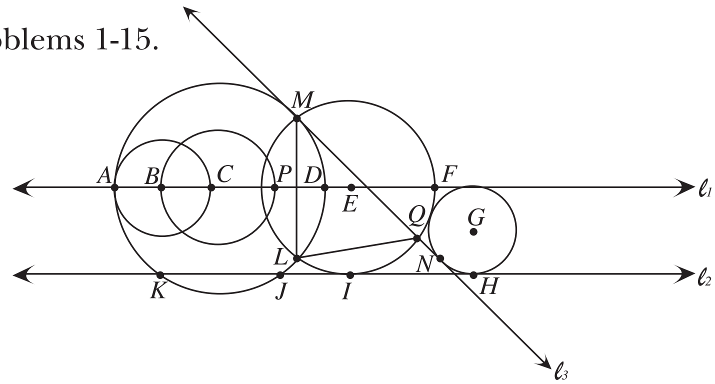
Quiz Form A Name ______________________

Unit VI - Circles
Part A - Fundamental Terms
Lesson 1 - Lines and Segments
Lesson 2 - Arcs and Angles
Lesson 3 - Circle Relationships

Use the given figure for problems 1-15.



1. ℓ_3 is a ___*common*___ ___*internal*___ tangent of ⊙G and ⊙C. (with diameter $\overline{AD}$)

2. $\overset{\frown}{KJ}$ and $\overset{\frown}{LM}$ are ___*minor*___ arcs of ⊙C.

3. $\overline{AD}$ is a ___*diameter*___ of ⊙C.

4. ⊙E and ⊙G are ___*externally*___ tangent circles.

5. ⊙C (with diameter $\overline{BP}$) and ⊙C (with diameter $\overline{AD}$) are ___*concentric*___ circles.

6. $\overline{ML}$ is a ___*common*___ ___*chord*___ of ⊙E and ⊙C (with diameter $\overline{AD}$).

7. ℓ_2 is a common external tangent to ⊙___*G*___ and ⊙___*E*___.

8. △MLQ is ___*inscribed*___ in ⊙E.

9. ℓ_2 is a ___*secant*___ of ⊙C. (with diameter $\overline{AD}$)

10. $\overset{\frown}{ML}$ is a ___*minor*___ arc of ⊙E.

11. ⊙E is ___*circumscribed*___ about △MLQ.

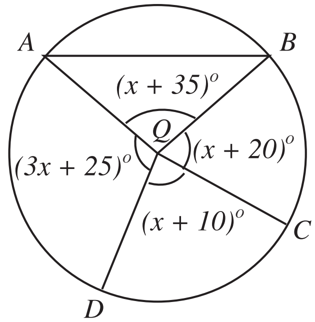
12. $\overline{EF}$ is a ___*radius*___ of ⊙E.

13. ∠MQL is an ___*inscribed*___ angle of ⊙E.

14. $\overset{\frown}{MLQ}$ is a ___*major*___ arc of ⊙E.

15. $\overset{\frown}{AKD}$ is a ___*semicircle*___ of ⊙C (with diameter $\overline{AD}$).

Use the given figure for problems 16 - 20. (Note: the open phrases are the measures of the central angles indicated)



16. x = ___45___

$$(x+35)+(x+20)+(x+10)+(3x+25) = 360$$
$$6x+90 = 360$$
$$6x = 360$$
$$x = 45$$

17. $m\widehat{AD}$ = ___160___

$$m\widehat{AD} = 3x+25$$
$$= 3(45)+25$$
$$= 135+25$$
$$= 160$$

18. $m\widehat{BC}$ = ___65___

$$m\widehat{BC} = x+20$$
$$= 45+20$$
$$= 65$$

19. $m\widehat{ABC}$ = ___145___

$$m\widehat{ABC} = (x+35)+(x+20)$$
$$= 45+35+45+20$$
$$= 145$$

20. $m\widehat{BCA}$ = ___280___

$$m\widehat{BCA} = (x+20)+(x+10)+(3x+25)$$
$$= 5(45)+55$$
$$= 225+55$$
$$= 280$$

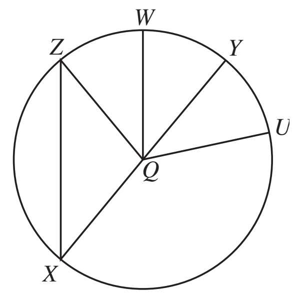
21. $m\angle ABQ$ = ___50___

$m\angle BQA = 80^o$ and
$\triangle BQA$ is Isosceles.
Base angles of an isosceles triangle are congruent.

Quiz Form B Name ____________________

Unit VI - Circles
Part A - Fundamental Terms
Lesson 1 - Lines and Segments
Lesson 2 - Arcs and Angles
Lesson 3 - Circle Relationships

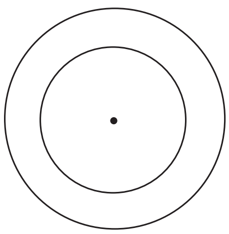
Use the given diagram to complete problems 1-18.
(Note: m∠WQY = 30°, m∠UQY = 30° , m∠XQZ = 100°)



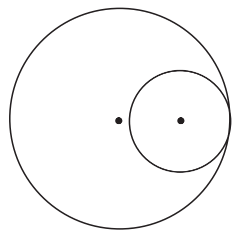
1. Name five central angles which appear to be acute angles. *∠UQY, ∠YQW, ∠WQZ, ∠UQW, ∠YQZ*
2. Name four central angles which appear to be obtuse angles. *∠XQZ, ∠XQW, ∠ZQU, ∠XQU*
3. Name four minor arcs which are not a combination of two arcs. *$\overset{\frown}{UY}$, $\overset{\frown}{YW}$, $\overset{\frown}{WZ}$, $\overset{\frown}{XZ}$ (also $\overset{\frown}{UX}$)*
4. Name the largest major arc which is not a combination of more than two arcs. *$\overset{\frown}{ZXU}$*
5. Name a semicircle of ⊙Q. *$\overset{\frown}{XZY}$ (or $\overset{\frown}{XUY}$)*
6. Name a pair of congruent arcs. *$\overset{\frown}{WY}$ and $\overset{\frown}{UY}$*
7. Name a pair of congruent chords. *$\overline{WY}$ and $\overline{UY}$*
8. What is m$\overset{\frown}{UY}$? *30*
9. What is m$\overset{\frown}{ZW}$? *50*
10. What is m$\overset{\frown}{ZXU}$? *250 (360 – 30 – 30 – 50)*
11. m$\overset{\frown}{WY}$ + m *$\overset{\frown}{WZ}$* = m$\overset{\frown}{YZ}$
12. m$\overset{\frown}{XZ}$ + m *$\overset{\frown}{ZU}$* = m$\overset{\frown}{XWU}$
13. $\overline{XY}$ is a *diameter* of ⊙Q.
14. $\overline{QW}$ is a *radius* of ⊙Q.
15. $\overline{QZ}$ *≅* $\overline{QY}$.
16. Point X is connected to point Z, so $\overline{XZ}$ is a *chord* of ⊙Q.
17. ∠ZXY is an *inscribed* angle.
18. ∠XQZ is a *central* angle.

Unit VI, Part A, Lessons 1,2&3, Quiz Form B Name ____________________
—Continued—

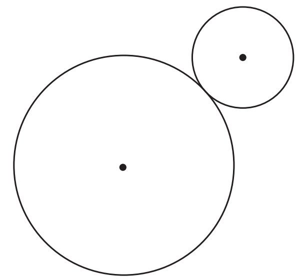
19. Sketch two circles that are:
a) concentric



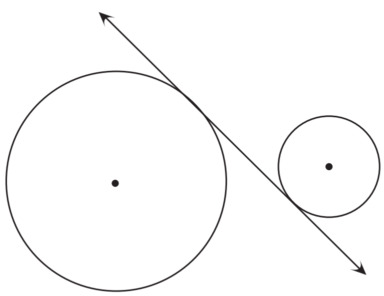
b) internally tangent



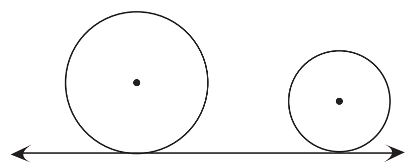
c) externally tangent



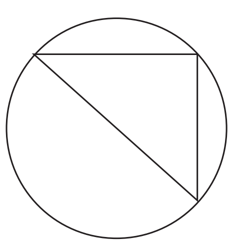
20. Sketch two circles with a:
a) common internal tangent



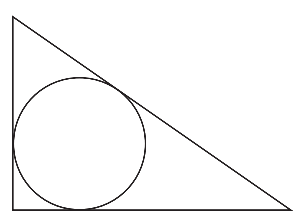
b) common external tangent



21. Sketch a circle:
a) circumscribed about a triangle



b) inscribed in a triangle



Quiz Form A Name ______________________

Unit VI - Circles
Part B - Angle and Arc Relationships

Lesson 1 - Theorem 65 - "If, in the same circle, or in congruent circles, two central angles are congruent, then their intercepted minor arcs are congruent."
Theorem 66 - "If, in the same circle, or in congruent circles, two minor arcs are congruent, then the central angles which intercept those minor arcs are congruent."

Lesson 2 - Theorem 67 - "If you have an inscribed angle of a circle, then the measure of that angle is one-half the measure of its intercepted arc."

Lesson 3 - Theorem 68 - "If, in a circle, you have an angle formed by a secant ray, and a tangent ray, both drawn from a point on the circle, then the measure of that angle, is one-half the measure of the intercepted arc."

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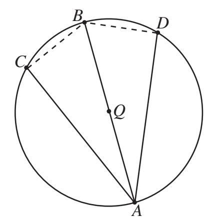
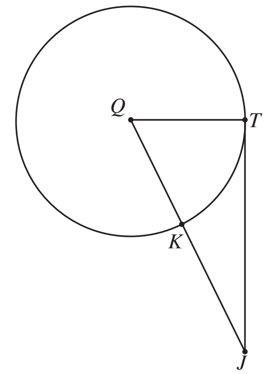
1. Given: $\overline{AB}$ is a diameter of ⊙Q.
$\overline{AC} \cong \overline{AD}$

Prove: $\overset{\frown}{CB} \cong \overset{\frown}{DB}$



STATEMENT	REASON
1. Draw $\overline{CB}$	*1. Postulate 2 - For any two different points, there is exactly one line containing them.*
2. Draw $\overline{DB}$	*2. Postulate 2*
3. $\overline{AB}$ is a diameter of circle Q	*3. Given*
4. $\overset{\frown}{ADB}$ is a semicircle	*4. Definition of Semicircle - An arc of a circle is a semicircle, if and only if, it is an arc whose endpoints are the endpoints of a diameter of the circle.*
5. $\overset{\frown}{ACB}$ is a semicircle	*5. Definition of Semicircle*
6. $\angle ADB$ is a right angle	*6. Corollary 67a - If you have an angle inscribed in a semicircle then it is a right angle.*
7. $\angle ACB$ is a right angle	*7. Corollary 67a*
8. $\triangle ADB$ is a right triangle	*8. Definition of Right Triangle*
9. $\triangle ACB$ is a right triangle	*9. Definition of Right Triangle*
10. $\overline{AC} \cong \overline{AD}$	*10. Given*
11. $\overline{AB} \cong \overline{AB}$	*11. Reflexive Property of Congruence*
12. $\triangle ADB \cong \triangle ACB$	*12. Postulate Corollary 13c - If the hypotenuse and one leg of one right triangle are congruent to the hypotenuse and one leg of another right triangle then the two right triangles are congruent.*
13. $\angle CAB \cong \angle DAB$	*13. C.P.C.T.C.*
14. $m\angle CAB = m\angle DAB$	*14. Definition of Congruent Angles*
15. $m\angle CAB = \frac{1}{2} m\overset{\frown}{CB}$	*15. Theorem 67 - If you have an inscribed angle of a circle, then the measure of the angle is one-half the measure of the intercepted arc.*
16. $m\angle DAB = \frac{1}{2} m\overset{\frown}{DB}$	*16. Theorem 67*
17. $\frac{1}{2} m\overset{\frown}{CB} = \frac{1}{2} m\overset{\frown}{DB}$	*17. Substitution*
18. $m\overset{\frown}{CB} = m\overset{\frown}{DB}$	*18. Multiplication Property of Equality*
19. $\overset{\frown}{CB} \cong \overset{\frown}{DB}$	*19. Definition of Congruent Arcs*



2. Use the figure to the right to complete the following statements. In the figure, $\overline{JT}$ is tangent to ⊙Q at point T.

a) If QT = 6 and JQ = 10, then JT = ___*8*___

Since $\overline{QT} \perp \overline{JT}$ by Corollary 68a, △QTJ is a right triangle.

$$a^2 + b^2 = c^2$$
$$(QT)^2 + (JT)^2 = (JQ)^2$$
$$6^2 + (JT)^2 = 10^2$$
$$36 + (JT)^2 = 100$$
$$(JT)^2 = 64$$
$$JT = 8$$

b) If QT = 8 and JT = 15, then JQ = ___*17*___

Since $\overline{QT} \perp \overline{JT}$ by Corollary 68a, △QTJ is a right triangle.

$$a^2 + b^2 = c^2$$
$$(QT)^2 + (JT)^2 = (JQ)^2$$
$$8^2 + 15^2 = (JQ)^2$$
$$64 + 225 = (JQ)^2$$
$$289 = (JQ)^2$$
$$17 = JQ$$

c) If m∠JQT = 60 and QT = 6, then JQ = ___*12*___

Since $\overline{QT} \perp \overline{JT}$, △QTJ is a right triangle. If m∠JQT = 60, △QTJ is a 30-60-90 triangle, and $\overline{QT}$ is the short leg of the triangle opposite the 30 degree angle. QT = ½ JQ in a 30-60-90 triangle.

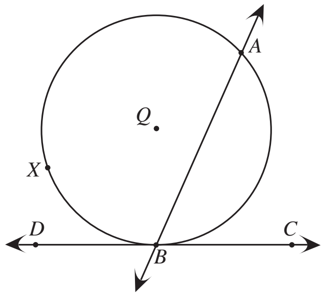
$$QT = \frac{1}{2} JQ$$
$$6 = \frac{1}{2} JQ$$
$$12 = JQ$$

d) If JQ = 9 and KQ = 8, then JT = ___*15*___

Since $\overline{QT} \perp \overline{JT}$, △QTJ is a right triangle.

$$a^2 + b^2 = c^2$$
$$(QT)^2 + (JT)^2 = (JQ)^2$$
$$8^2 + (JT)^2 = (JK + KQ)^2$$
$$64 + (JT)^2 = (9 + 8)^2$$
$$64 + (JT)^2 = (17)^2$$
$$64 + (JT)^2 = 289$$
$$(JT)^2 = 225$$
$$JT = 15$$

3.



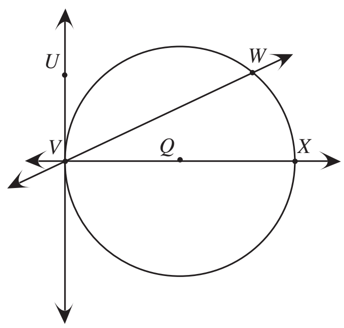
In the figure to the left, if $m\widehat{AXB} = 220$, then $m\angle ABC =$ <u>70</u> and $m\angle DBA =$ <u>110</u>.

$$m\widehat{AB} = 360 - m\widehat{AXB} = 360 - 220 = 140$$

$$m\angle ABC = \frac{1}{2}\cdot m\widehat{AB} = \frac{1}{2}\cdot 140 = \frac{\not{2}\cdot 70}{\not{2}} = 70$$

$$m\angle DBA = \frac{1}{2}\cdot m\widehat{AXB} = \frac{1}{2}\cdot 220 = \frac{\not{2}\cdot 110}{\not{2}} = 110$$

4.



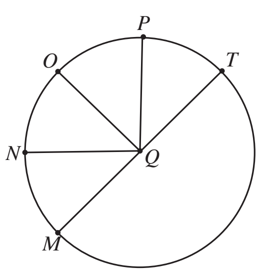
In the figure to the left, if $m\widehat{VW} = 114$, then $m\angle WVX =$ <u>33</u> and $m\angle UVW =$ <u>57</u>.

$$m\widehat{WX} = 180 - m\widehat{VW} = 180 - 114 = 66$$

$$m\angle WVX = \frac{1}{2}\cdot m\widehat{WX} = \frac{1}{2}\cdot 66 = \frac{\not{2}\cdot 33}{\not{2}} = 33$$

$$m\angle UVW = \frac{1}{2}\cdot m\widehat{VW} = \frac{1}{2}\cdot 114 = \frac{\not{2}\cdot 57}{\not{2}} = 57$$

5.



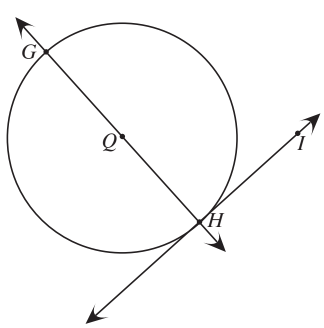
In the figure to the left, if $m\angle MQN = m\angle TQP = 30$, and $m\widehat{NO} = 60$, then $m\angle NQO =$ <u>60</u> and $m\widehat{OP} =$ <u>60</u>.

$$m\angle OQN = m\widehat{NO} = 60$$

$$m\angle PQO = 180 - (m\angle TQP + m\angle OQN + m\angle NQM) = 180 - (30 + 60 + 30) = 180 - 120 = 60$$

$$m\widehat{OP} = m\angle PQO = 60$$

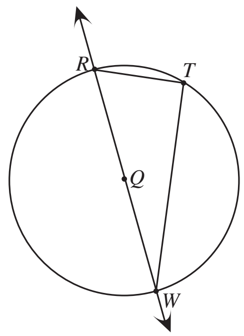
6.



In the figure to the left, if $\overleftrightarrow{HI}$ is tangent to $\odot Q$ at the endpoint H of diameter $\overline{GH}$, then $m\angle GHI =$ <u>90</u>

$m\angle GHI = 90$ *Corollary 68a*

7.



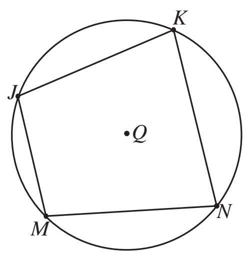
In the figure to the left, if $m\widehat{RT} = 56$, then m∠RTW = *90*, m∠RWT = *28* and m∠TRW = *62*.

$m\angle RTW = 90$ Corollary 68a

$$m\angle RWT = \frac{1}{2}\cdot m\widehat{RT} = \frac{1}{2}\cdot 56 = \frac{\cancel{2}\cdot 28}{\cancel{2}} = 28$$

$$m\angle TRW = 180 - (m\angle RTW + m\angle RWT) = 180 - (90 + 28) = 180 - 118 = 62$$

8.

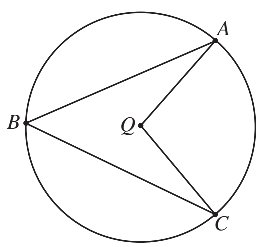


In the figure to the left, if m∠J = 105, and m∠K = 80 then m∠M = *100* and m∠N = *75*.

$$m\angle M = 180 - m\angle K = 180 - 80 = 100$$

$$m\angle N = 180 - m\angle J = 180 - 105 = 75$$

9.

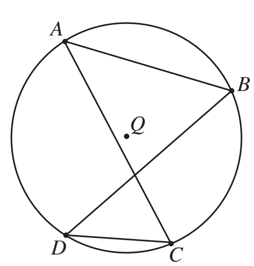


In the figure to the left, if m∠AQC = 94, then m∠ABC = *47* and $m\widehat{AC}$ = *94*.

$$m\angle ABC = \frac{1}{2}\cdot m\widehat{AC} = \frac{1}{2}\cdot 94 = \frac{\cancel{2}\cdot 47}{\cancel{2}} = 47$$

$$m\widehat{AC} = m\angle AQC = 94$$

10.



In the figure to the left, if $m\widehat{AD} = 116$, then m∠ABD = *58* and m∠DCA = *58*.

$$m\angle ABD = m\angle DCA = \frac{1}{2}\cdot m\widehat{AD} = \frac{1}{2}\cdot 116 = \frac{\cancel{2}\cdot 58}{\cancel{2}} = 58$$

Name ______________________________

Unit VI - Circles

Part B - Angle and Arc Relationships

Lesson 1 - ***Theorem 65 - "If, in the same circle, or in congruent circles, two central angles are congruent, then their intercepted minor arcs are congruent."***

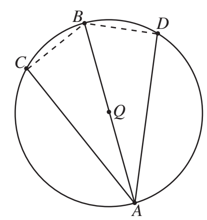
Theorem 66 - "If, in the same circle, or in congruent circles, two minor arcs are congruent, then the central angles which intercept those minor arcs are congruent."

Lesson 2 - ***Theorem 67 - "If you have an inscribed angle of a circle, then the measure of that angle is one-half the measure of its intercepted arc."***

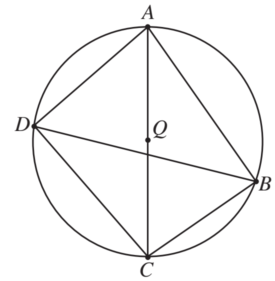
Lesson 3 - ***Theorem 68 - "If, in a circle, you have an angle formed by a secant ray, and a tangent ray, both drawn from a point on the circle, then the measure of that angle, is one-half the measure of the intercepted arc."***

1. Given: $\overline{AB}$ is a diameter of ⊙Q.
$\overline{AB}$ bisects $\overline{CD}$

Prove: $\overline{AC} \cong \overline{AD}$



STATEMENT	REASON
1. Draw $\overline{CB}$	*1. Postulate 2 - For any two different points, there is exactly one line containing them.*
2. Draw $\overline{DB}$	*2. Postulate 2*
3. $\overline{AB}$ is a diameter of circle Q	*3. Given*
4. $\overset{\frown}{ADB}$ is a semicircle	*4. Definition of Semicircle - An arc of a circle is a semicircle, if and only if, it is an arc whose endpoints are the endpoints of a diameter of the circle.*
5. $\overset{\frown}{ACB}$ is a semicircle	*5. Definition of Semicircle*
6. $\angle ADB$ is a right angle	*6. Corollary 67a - If you have an angle inscribed in a semicircle then it is a right angle.*
7. $\angle ACB$ is a right angle	*7. Corollary 67a*
8. $\triangle ADB$ is a right triangle	*8. Definition of Right Triangle*
9. $\triangle ACB$ is a right triangle	*9. Definition of Right Triangle*
10. $\overline{AB}$ bisects $\overset{\frown}{CD}$	*10. Given*
11. $\overset{\frown}{CB} \cong \overset{\frown}{DB}$	*11. Definition of Arc Bisector*
12. $m\overset{\frown}{CB} = m\overset{\frown}{DB}$	*12. Definition of Congruent Arcs*
13. $\frac{1}{2}m\overset{\frown}{CB} = \frac{1}{2}m\overset{\frown}{DB}$	*13. Multiplication Property of Equality*
14. $m\angle BAC = \frac{1}{2}m\overset{\frown}{CB}$	*14. Theorem 67 - If you have an inscribed angle of a circle, then the measure of the angle is one-half the measure of the intercepted arc.*
15. $m\angle BAD = \frac{1}{2}m\overset{\frown}{DB}$	*15. Theorem 67*
16. $m\angle BAC = m\angle BAD$	*16. Substitution*
17. $\angle BAC \cong \angle BAD$	*17. Definition of Angle Congruence*
18. $\overline{AB} \cong \overline{AB}$	*18. Reflexive Property of Congruence*
19. $\triangle ACB \cong \triangle ADB$	*19. Postulate Corollary 13e - If the hypotenuse and an acute angle of one right triangle are congruent to the hypotenuse and an acute angle of another right triangle, then the two right triangles are congruent.*
20. $\overline{AC} \cong \overline{AD}$	*20. C.P.C.T.C.*



2. In the figure to the right, quadrilateral ABCD is inscribed in ⊙Q. Additionally, $\overline{AC}$ is a diameter of ⊙Q, the m∠ABD = 44, and m$\overset{\frown}{AB}$ = 116. Use this information for the following:

a) Find m∠ABC ___*90*___

m∠ABC = 90 since it is an angle inscribed in a semicircle.

b) Find m∠BCA ___*58*___

$$
\begin{aligned}
m\angle BCA &= \frac{1}{2}\cdot m\overset{\frown}{AB}\\
&= \frac{1}{2}\cdot 116\\
&= \frac{\cancel{2}\cdot 58}{\cancel{2}}\\
&= 58
\end{aligned}
$$

c) Find m∠CDB ___*32*___

$$
\begin{aligned}
m\angle BAC &= 180 - (m\angle ABC + m\angle BCA)\\
&= 180 - (90 + 58)\\
&= 180 - 148\\
&= 32
\end{aligned}
$$

$$
\begin{aligned}
m\angle BAC &= \frac{1}{2}\cdot m\overset{\frown}{BC}\\
m\angle CDB &= \frac{1}{2}\cdot m\overset{\frown}{BC}\\
m\angle BAC &= m\angle CDB\\
32 &= m\angle CDB
\end{aligned}
$$

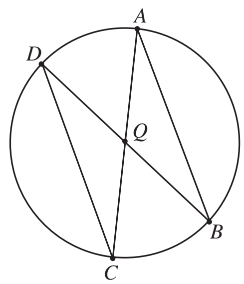
Corollary 67c - If two inscribed angles intercept the same or congruent arcs, then the anlges are congruent.

d) Find m∠BAD ___*78*___

Since m∠CDB = 32
m$\overset{\frown}{BC}$ = 64
Since m∠DBC = 46
m$\overset{\frown}{DC}$ = 92

$$
\begin{aligned}
m\angle BAD &= \frac{1}{2}\left(m\overset{\frown}{BC} + m\overset{\frown}{DC}\right)\\
&= \frac{1}{2}\cdot(64 + 92)\\
&= \frac{1}{2}(156)\\
&= 78
\end{aligned}
$$

3.



In the figure to the left, if $m\widehat{AD} = 68$,
then $m\angle ABD$ = ___*34*___ and $m\angle ACD$ = ___*34*___.

$$m\angle ABD = m\angle ACD$$

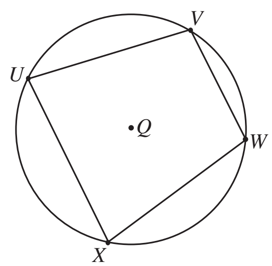
$$m\angle ACD = \frac{1}{2} \cdot m\widehat{AD}$$

$$= \frac{1}{2} \cdot 68$$

$$= \frac{\not{2} \cdot 34}{\not{2}}$$

$$= 34$$

4.



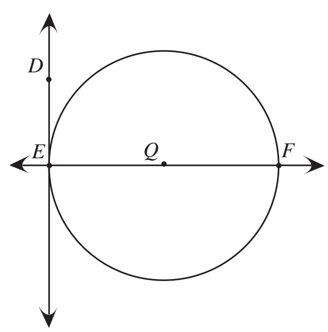
In the figure to the left, if $m\angle V = 94$,
then $m\angle UXW$ = ___*86*___.

$$m\angle UXW = 180 - m\angle UVW$$

$$= 180 - 94$$

$$= 86$$

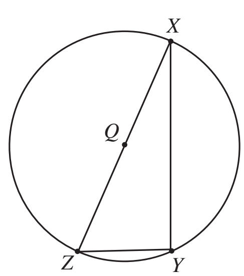
5.



In the figure to the left, if $\overleftrightarrow{DE}$ is tangent to $\odot Q$ at point E of diameter $\overline{EF}$, then $m\angle DEF$ = ___*90*___.

Corollary 68a

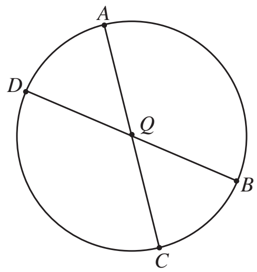
6.



In the figure to the left, if $\overline{XZ}$ is a diameter,
then $m\angle XYZ$ = ___*90*___.

Corollary 67a

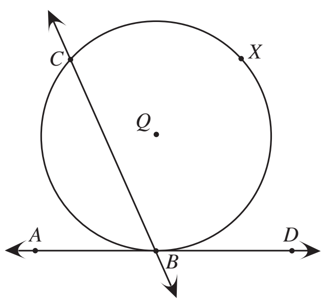
7.



In the figure to the left, if $m\widehat{BC} = 37$,
then $m\widehat{AD} =$ ___37___.

Congruent central angles give congruent intercepted arcs.

8.

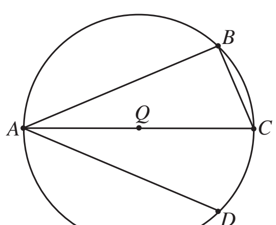


In the figure to the left, if $m\angle ABC = 64$,
then $m\widehat{BXC} =$ ___232___.

$$m\angle ABC = \frac{1}{2}\cdot m\widehat{BC}$$
$$64 = \frac{1}{2}\cdot m\widehat{BC}$$
$$128 = m\widehat{BC}$$

$$m\widehat{BXC} = 360 - m\widehat{BC}$$
$$= 360 - 128$$
$$= 232$$

9.



In the figure to the left, if $m\angle BAC = 22$, and $m\widehat{CD} = 44$,
then $m\angle DAC =$ ___22___, $m\angle ACB =$ ___68___
and $m\widehat{BC} =$ ___44___.

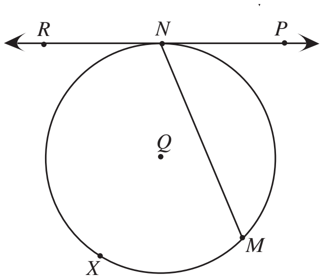
$$m\widehat{AB} = 180 - m\widehat{BC}$$
$$= 180 - 44$$
$$= 136$$

$$m\angle DAC = \frac{1}{2}\cdot m\widehat{DC}$$
$$= \frac{1}{2}\cdot 44$$
$$= \frac{\not{2}\cdot 22}{\not{2}}$$
$$= 22$$

$$m\angle BAC = \frac{1}{2}\cdot m\widehat{BC}$$
$$22 = \frac{1}{2}\cdot m\widehat{BC}$$
$$44 = m\widehat{BC}$$

$$m\angle ACB = \frac{1}{2}\cdot m\widehat{AB}$$
$$= \frac{1}{2}\cdot 136$$
$$= \frac{\not{2}\cdot 68}{\not{2}}$$
$$= 68$$

10.



In the figure to the left, if $m\widehat{MXN} = 200$,
then $m\angle MNP =$ ___80___

$$m\angle RNM = \frac{1}{2}\cdot m\widehat{NXM}$$
$$= \frac{1}{2}\cdot 200$$
$$= \frac{\not{2}\cdot 100}{\not{2}}$$
$$= 100$$

$$m\angle MNP = 180 - m\angle RNM$$
$$= 180 - 100$$
$$= 80$$

Quiz Form A Name ______________________

Unit VI - Circles
Part B - Angle and Arc Relationships

Lesson 4 - ***Theorem 69 - "If, for a circle, two secant lines intersect inside the circle, then the measure of an angle formed by the two secant lines, (or its vertical angle) is equal to one-half the sum of the measures of the arcs intercepted by the angle, and its vertical angle."***

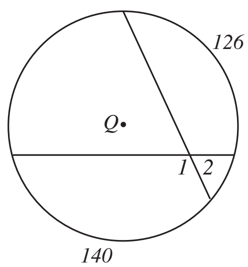
Theorem 70 - "If, for a circle, two secant lines intersect outside the circle, then the measure of an angle formed by the two secant lines, (or its vertical angle), is equal to one-half the difference of the measures of the arcs intercepted by the angle."

Lesson 5 - ***Theorem 71 -"If, for a circle, a secant line and a tangent line intersect outside a circle, then the measure of the angle formed, is equal to one-half the difference of the measures of the arcs intercepted by the angle."***

Theorem 72 - "If, for a circle, two tangent lines intersect outside the circle, then the measure of the angle formed, is equal to one-half the difference of the measures of the arcs intercepted by the angle."

In problems 1-10, find the measure of each numbered angle or lettered arc in ⊙Q.

1.



$m\angle 1 =$ 133

$m\angle 2 =$ 47

$m\angle 1 = \frac{1}{2}(140 + 126)$

$= \frac{1}{2} \cdot 266$

$= \frac{\not{2} \cdot 133}{\not{2}}$

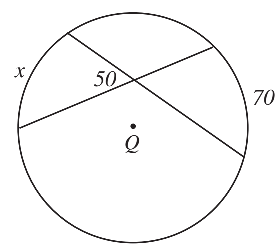
$= 133$

$m\angle 2 = 180 - m\angle 1$

$= 180 - 133$

$= 47$

2.



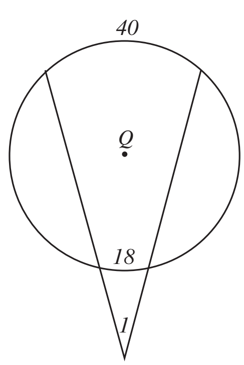
$x =$ 30

$50 = \frac{1}{2}(x + 70)$

$100 = x + 70$

$30 = x$

3.



$m\angle 1 =$ 11

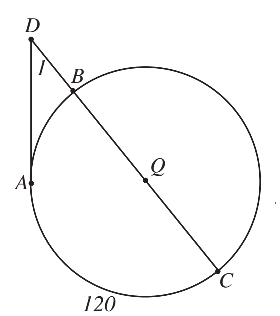
$m\angle 1 = \frac{1}{2}(40 - 18)$

$= \frac{1}{2} \cdot 22$

$= \frac{\not{2} \cdot 11}{\not{2}}$

$= 11$

4.



$m\angle 1 =$ 30

$m\angle 1 = \frac{1}{2}\left(m\overset{\frown}{AC} - m\overset{\frown}{AB}\right)$

$m\overset{\frown}{AB} = 180 - 120$

$= 60$

$m\angle 1 = \frac{1}{2}(120 - 60)$

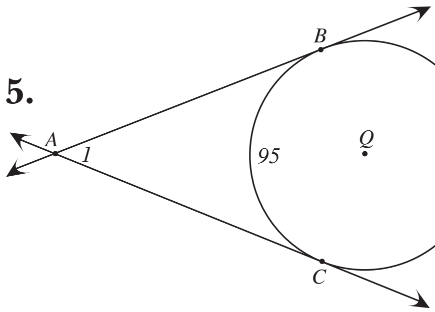
$= \frac{1}{2} \cdot 60$

$= \frac{\not{2} \cdot 30}{\not{2}}$

$= 30$

Name ______________________________

5.



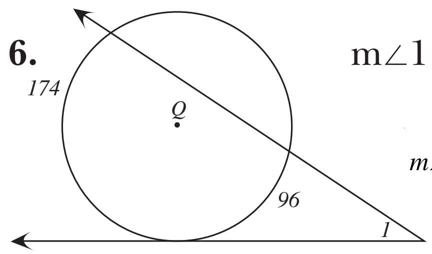
m∠1 = 85

$m\angle 1 = \frac{1}{2}\left(m\widehat{BXC} - m\widehat{BC}\right)$

$m\widehat{BXC} = 360 - m\widehat{BC}$
$= 360 - 95$
$= 265$

$m\angle 1 = \frac{1}{2}(265 - 95)$
$= \frac{1}{2} \cdot 170$
$= \frac{\cancel{2} \cdot 85}{\cancel{2}}$
$= 85$

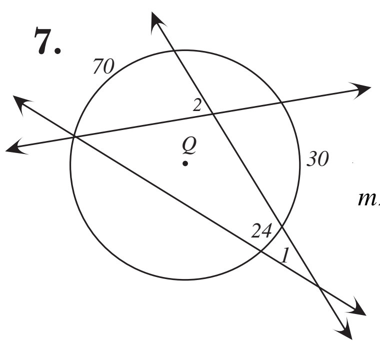
6.



m∠1 = 39

$m\angle 1 = \frac{1}{2}(174 - 96)$
$= \frac{1}{2} \cdot 78$
$= \frac{\cancel{2} \cdot 39}{\cancel{2}}$
$= 39$

7.

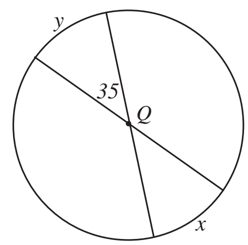


m∠1 = 23
m∠2 = 50

$m\angle 1 = \frac{1}{2}(70 - 24)$
$= \frac{1}{2} \cdot 46$
$= \frac{\cancel{2} \cdot 23}{\cancel{2}}$
$= 23$

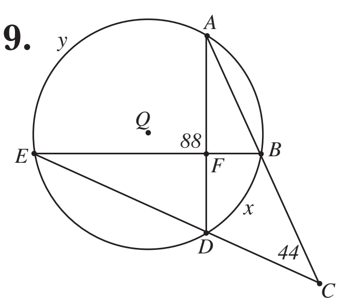
$m\angle 2 = \frac{1}{2}(30 + 70)$
$= \frac{1}{2} \cdot 100$
$= \frac{\cancel{2} \cdot 50}{\cancel{2}}$
$= 50$

8.



y = 35
x = 35

9.



x = 48
y = 112

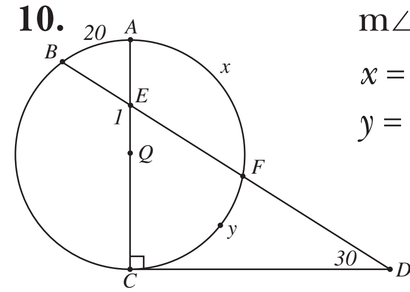
$m\angle AFE = \frac{1}{2}(x + y)$
$88 = \frac{1}{2}(x + y)$
$176 = x + y$

$m\angle ACE = \frac{1}{2}(y - x)$
$24 = \frac{1}{2}(y - x)$
$48 = y - x$

$176 = y + x$
$48 = y - x$
$224 = 2y$
$112 = y$

$48 - y = -x$
$-48 + y = x$
$-48 + 112 = x$
$64 = x$

10.



m∠1 = 120
x = 80
y = 100

$\angle 1 = 180 - 60$
$= 120$

$m\angle 1 = \frac{1}{2}\left(m\widehat{BC} + m\widehat{AF}\right)$
$120 = \frac{1}{2}(160 + x)$
$120 = 80 + \frac{1}{2}x$
$40 = \frac{1}{2}x$
$80 = x$

$m\angle CED = 180 - (90 + 30)$
$= 180 - 120$
$= 60$

$y = 180 - x$
$= 180 - 80$
$= 100$

In problems 11-14, determine which statements are true and which are false.

11. No tangents of a circle are secants of that circle. *true*

12. A point of tangency is outside the circle. *false*

13. If a line contains a point inside a circle, it is a secant of that circle. *true*

14. From a given point, there is only one tangent to a given circle. *false*

Quiz Form B Name ______________________________

Unit VI - Circles
Part B - Angle and Arc Relationships

Lesson 4 - Theorem 69 - "If, for a circle, two secant lines intersect inside the circle, then the measure of an angle formed by the two secant lines, (or its vertical angle) is equal to one-half the sum of the measures of the arcs intercepted by the angle, and its vertical angle."

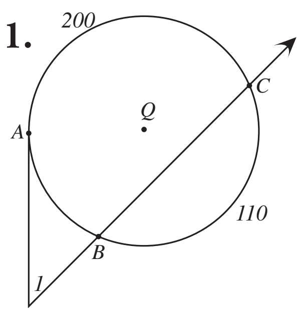
Theorem 70 - "If, for a circle, two secant lines intersect outside the circle, then the measure of an angle formed by the two secant lines, (or its vertical angle), is equal to one-half the difference of the measures of the arcs intercepted by the angle."

Lesson 5 - Theorem 71 -"If, for a circle, a secant line and a tangent line intersect outside a circle, then the measure of the angle formed, is equal to one-half the difference of the measures of the arcs intercepted by the angle."

Theorem 72 - "If, for a circle, two tangent lines intersect outside the circle, then the measure of the angle formed, is equal to one-half the difference of the measures of the arcs intercepted by the angle."

In problems 1-10, find the measure of each numbered angle or lettered arc in ⊙Q.

1.

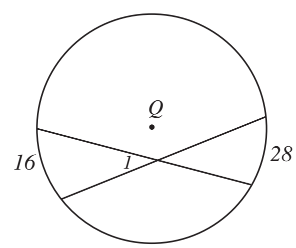


$m\angle 1 =$ 75

$$m\widehat{AB} = 360 - (200 + 110) = 360 - 310 = 50$$

$$m\angle 1 = \frac{1}{2}(200 - 50) = \frac{1}{2}(150) = \frac{\cancel{2}\cdot 75}{\cancel{2}} = 75$$

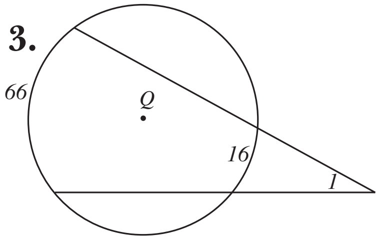
2.



$m\angle 1 =$ 22

$$m\angle 1 = \frac{1}{2}(28 + 16) = \frac{1}{2}(44) = \frac{\cancel{2}\cdot 22}{\cancel{2}} = 22$$

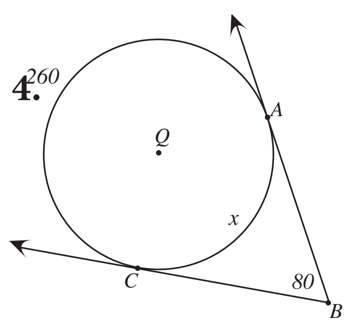
3.



$m\angle 1 =$ 25

$$m\angle 1 = \frac{1}{2}(66 - 16) = \frac{1}{2}(50) = \frac{\cancel{2}\cdot 25}{\cancel{2}} = 25$$

4.



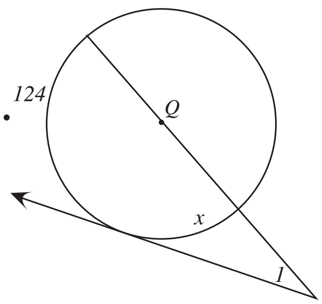
$x =$ 100

$$80 = \frac{1}{2}(260 - x)$$
$$80 = 130 - \frac{1}{2}x$$
$$-50 = -\frac{1}{2}x$$
$$100 = x$$

(another way)
$x = 360 - 260$
$x = 100$

Name ____________________

5.



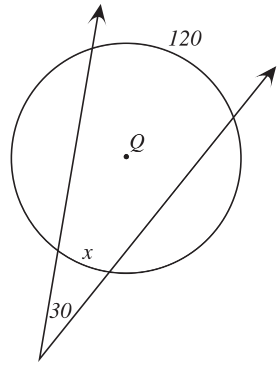
m∠1 = $\underline{\ 34\ }$

x = $\underline{\ 56\ }$

$$x = 180 - 124$$
$$= 56$$

$$m\angle 1 = \frac{1}{2}(124 - 56)$$
$$= \frac{1}{2}(68)$$
$$= \frac{\cancel{2} \cdot 34}{\cancel{2}}$$
$$= 34$$

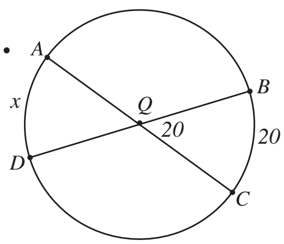
6.



x = $\underline{\ 60\ }$

$$30 = \frac{1}{2}(120 - x)$$
$$30 = 60 - \frac{1}{2}x$$
$$-30 = -\frac{1}{2}x$$
$$60 = x$$

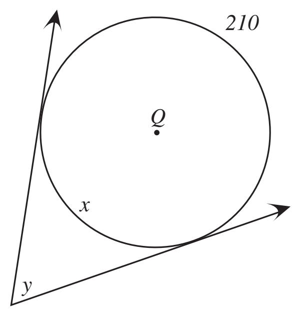
7.



x = $\underline{\ 20\ }$

$$x = 20\ (\textit{from a central angle})$$
or
$$20 = \frac{1}{2}(x + 20)$$
$$20 = \frac{1}{2}x + 10$$
$$10 = \frac{1}{2}x$$
$$20 = x$$

8.



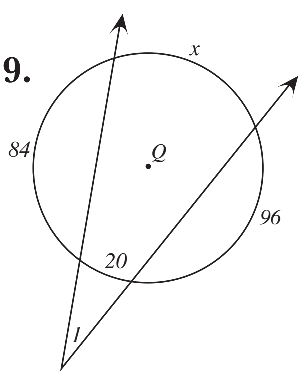
y = $\underline{\ 30\ }$

x = $\underline{\ 150\ }$

$$x = 360 - 210$$
$$= 150$$

$$y = \frac{1}{2}(210 - 150)$$
$$= \frac{1}{2}(60)$$
$$= \frac{\cancel{2} \cdot 30}{\cancel{2}}$$
$$= 30$$

9.



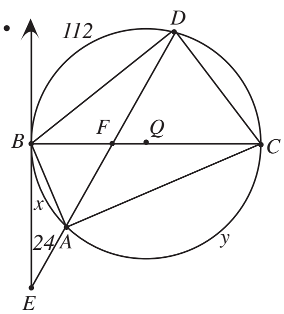
m∠1 = $\underline{\ 70\ }$

x = $\underline{\ 160\ }$

$$x = 360 - (84 + 20 + 96)$$
$$x = 360 - 200$$
$$x = 160$$

$$m\angle 1 = \frac{1}{2}(160 - 20)$$
$$= \frac{1}{2}(140)$$
$$= \frac{\cancel{2} \cdot 70}{\cancel{2}}$$
$$= 70$$

10.



x = $\underline{\ 64\ }$

y = $\underline{\ 116\ }$

m∠DFC = $\underline{\ 66\ }$

$$m\widehat{DC} = 180 - 112$$
$$= 68$$

$$24 = \frac{1}{2}(112 - x)$$
$$48 = 112 - x$$
$$-64 = -x$$
$$64 = x$$

$$y = 180 - x$$
$$= 180 - 64$$
$$= 116$$

$$m\angle DFC = \frac{1}{2}\left(x + m\widehat{DC}\right)$$
$$= \frac{1}{2}(64 + 68)$$
$$= \frac{1}{2}(132)$$
$$= \frac{\cancel{2} \cdot 66}{\cancel{2}}$$
$$= 66$$

In problems 11-14, determine which statements are true and which are false.

11. A secant of a circle has two points of tangency on the circle. *false*

12. If $\overleftrightarrow{AB}$ and $\overleftrightarrow{AC}$ are tangent to circle Q, then AB = AC. *false*

13. For a given circle, the distance between a point of tangency and the center of the circle equals the radius. *true*

14. If the intersection of a line and a circle consists of two points, the line is a tangent of the circle. *false*