AMDG

NAME | Ms. Kresovic

Acc Geo - | 10-6: More Angle-Arc Theorems | W 27 Jan 2016

Review

If the vertex of the angle is ____ the circle	Then use this formula to find the angle's measure:
IN	$\frac{arc + arc}{2}$
ON	$\frac{arc}{2}$
OUT	$\frac{arc - arc}{2}$

Objectives

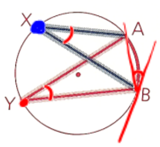
After studying this section, you will be able to

- Recognize congruent inscribed and tangent-chord angles
- Determine the measure of an angle inscribed in a semicircle
- Apply the relationship between the measures of a tangent-tangent angle and its minor arc

Theorem 89 ***If two inscribed or tangent-chord angles intercept the same arc, then they are congruent.***

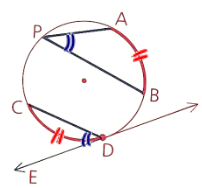
Given: X and Y are inscribed angles intercepting arc AB.

Conclusion: $\angle X \cong \angle Y$



Theorem 90 ***If two inscribed or tangent-chord angles intercept congruent arcs, then they are congruent.***

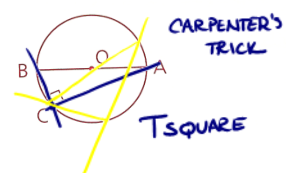
If $\overleftrightarrow{ED}$ is the tangent at D and $\overset{\frown}{AB} \cong \overset{\frown}{CD}$, we may conclude that $\angle P \cong \angle CDE$.



Theorem 91 ***An angle inscribed in a semicircle is a right angle.***

Given: $\overline{AB}$ is a diameter of ⊙O.

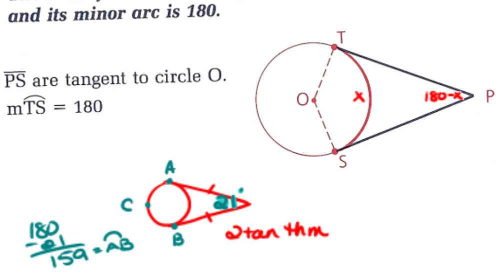
Prove: $\angle C$ is a right angle.



Theorem 92 ***The sum of the measures of a tangent-tangent angle and its minor arc is 180.***

Given: $\overline{PT}$ and $\overline{PS}$ are tangent to circle O.

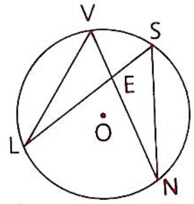
Prove: $m\angle P + m\overset{\frown}{TS} = 180$



Classwork

Problem 1 Given: ⊙O

Conclusion: $\triangle LVE \sim \triangle NSE$, $EV \cdot EN = EL \cdot SE$

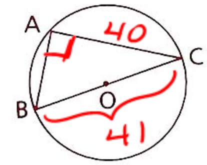


Proof

1 ⊙O	1 Given
2 $\angle V \cong \angle S$	2 inscribed ∠s form same arc ⇒ ≅ ∠s
3 $\angle L \cong \angle N$	3 Same as 2
4 $\triangle LVE \sim \triangle NSE$	4 AA~
5 $\frac{EV}{SE} = \frac{EL}{EN}$	5 ~△s ⇒ corr. sds. prop.
6 $EV \cdot EN = EL \cdot SE$	6 means extremes product (cross mult.)

} see ch 7

Problem 2 *In circle O, $\overline{BC}$ is a diameter and the radius of the circle is 20.5 mm. Chord $\overline{AC}$ has a length of 40 mm. Find AB.* =9



Solution Since ∠A is inscribed in a semicircle, it is a right angle. By the Pythagorean Theorem,

$BC = 20.5(2) = 41$

$AB^2 + 40^2 = 41^2$

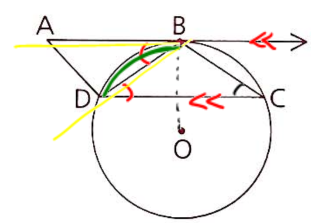
$AB = \sqrt{41^2 - 40^2}$

$(40+1)(40+1)$ FOIL

$1600 + 80 + 1$

Problem 3 Given: ⊙O with $\overleftrightarrow{AB}$ tangent at B, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$

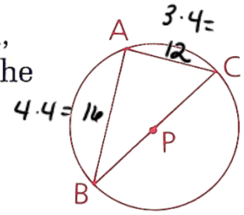
Prove: $\angle C \cong \angle BDC$



Proof

1 $\overleftrightarrow{AB}$ is tangent to ⊙O.	1 Given
2 $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$	2 Given
3 $\angle ABD \cong \angle BDC$	3 ∥ ⇒ alt int ∠s ≅
4 $\angle C \cong \angle ABD$	4 2 inscribed ∠s form same ⌒ ⇒ ≅ ∠s
5 $\angle C \cong \angle BDC$	5 transitive

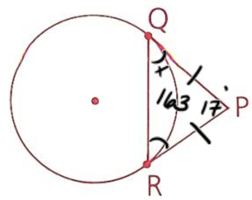
3 In ⊙P, $\overline{BC}$ is a diameter, AC = 12 mm, and BA = 16 mm. Find the radius of the circle.



4(3 4 5)

d = 20 , r = 10 mm

4 Given: $\overline{PQ}$ and $\overline{PR}$ are tangent segments.
$\overset{\frown}{QR} = 163°$



Find: **a** ∠P = 180 − 163 = 17°

b ∠PQR = $\frac{163}{2}$ = 81.5

↳ alt → Σ∠s Δ = 180 ∴ 2x + 17° = 180
2x = 163°
x = 81.5°

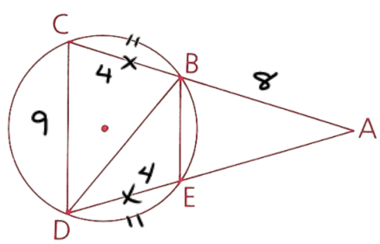
⇒ $\overline{BC} \cong \overline{EC}$

6 Given: $\overset{\frown}{BC} \cong \overset{\frown}{ED}$, AB = 8, BC = 4, CD = 9

a Are $\overline{BE}$ and $\overline{CD}$ parallel?

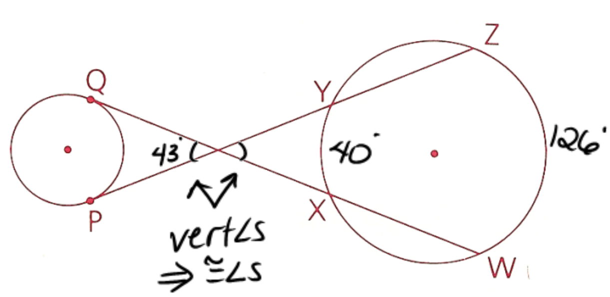
b Find BE.

c Is △ACD scalene?



7 Given: $\overleftrightarrow{PY}$ and $\overleftrightarrow{QW}$ are tangents.
$\widehat{WZ} = 126°$, $\widehat{XY} = 40°$

Find: $\widehat{PQ}$

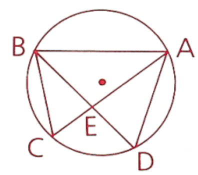


$\widehat{XY} = \frac{126-40}{2} = \frac{86}{2} = 43°$

$\widehat{QP} = 180 - 43 = 137°$

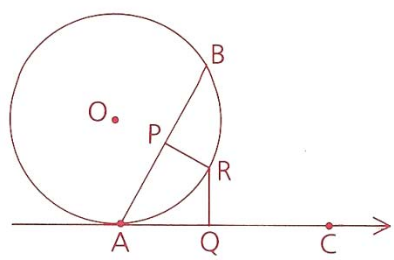
18 Given: $\widehat{BC} \cong \widehat{CD}$

Conclusion: $\triangle ABC \sim \triangle AED$



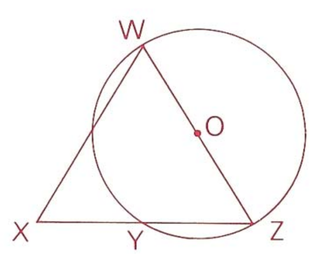
19 Given: $\overleftrightarrow{AC}$ is tangent at A. $\angle APR$ and $\angle AQR$ are right $\angle$s. R is the midpoint of $\widehat{AB}$.

Conclusion: $\overline{PR} \cong \overline{RQ}$ (Hint: Draw $\overline{AR}$.)



20 Given: $\triangle WXZ$ is isosceles, with $\overline{WX} \cong \overline{WZ}$.
$\overline{WZ}$ is a diameter of $\odot O$.

Prove: Y is the midpoint of $\overline{XZ}$.
(Hint: Draw $\overline{WY}$.)



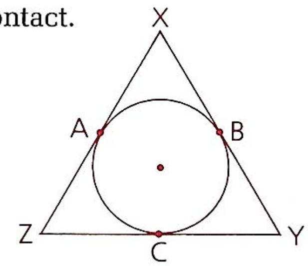
NAME Ms. Kresovic

Acc Geo - 10-6: More Angle-Arc Theorems W 27 Jan 2016

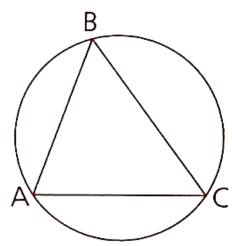
Homework

5 Given: A, B, and C are points of contact.
$\widehat{AB} = 145°$, $\angle Y = 48°$

Find: $\angle Z$



8 If $\triangle ABC$ is inscribed in a circle and $\widehat{AC} \cong \widehat{AB}$, tell whether each of the following must be true, could be true, or cannot be true.



a $\overline{AB} \cong \overline{AC}$

b $\overline{AC} \cong \overline{BC}$

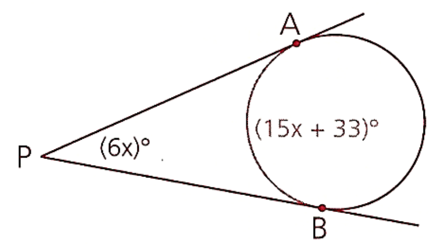
c $\overline{AB}$ and $\overline{AC}$ are equidistant from the center of the circle.

d $\angle B \cong \angle C$

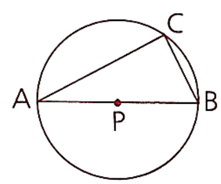
e $\angle BAC$ is a right angle.

f $\angle ABC$ is a right angle.

9 In the figure shown, find m∠P.



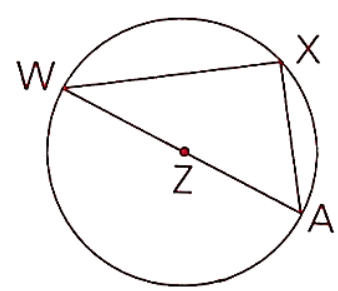
10 If $\overline{AB}$ is a diameter of ⊙P, CB = 1.5 m, and CA = 2 m, find the radius of ⊙P.



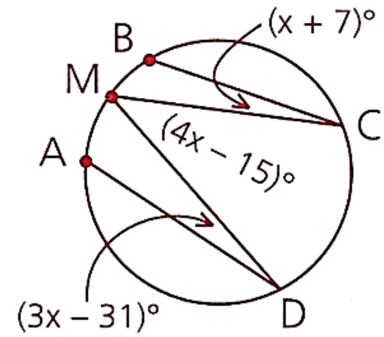
11 The radius of ⊙Z is 6 cm and $\overset{\frown}{WX} = 120°$.

Find: **a** AX

b The perimeter of △WAX

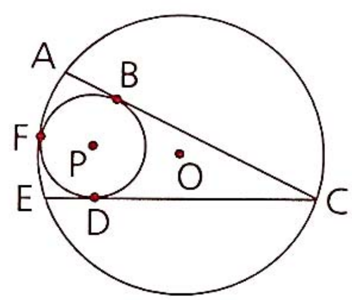


12 M is the midpoint of $\widehat{AB}$. Find $m\widehat{CD}$.



15 Quadrilateral ABCD is inscribed in circle O. AB = 12, BC = 16, CD = 10, and ∠ABC is a right angle. Find the measure of $\overline{AD}$ in simplified radical form.

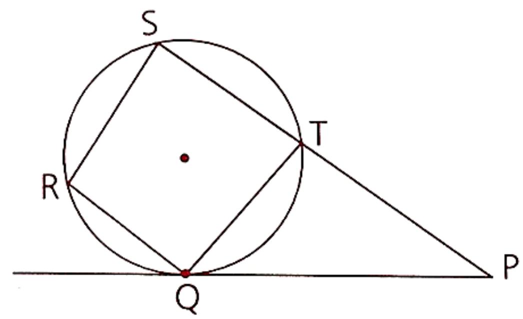
16 Circles O and P are tangent at F. $\overline{AC}$ and $\overline{CE}$ are tangent to ⊙P at B and D. If $\widehat{DFB} = 223°$, find $\widehat{AE}$.



17 Given: $\angle S = 88°$, $\widehat{QT} = 104°$, $\widehat{ST} = 94°$, tangent $\overline{PQ}$

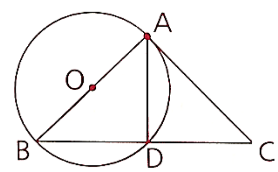
Find: **a** $\angle P$

b $\angle STQ$



21 Given: $\overline{AC}$ is tangent to $\odot O$ at A.

Conclusion: $\triangle ADC \sim \triangle BDA$

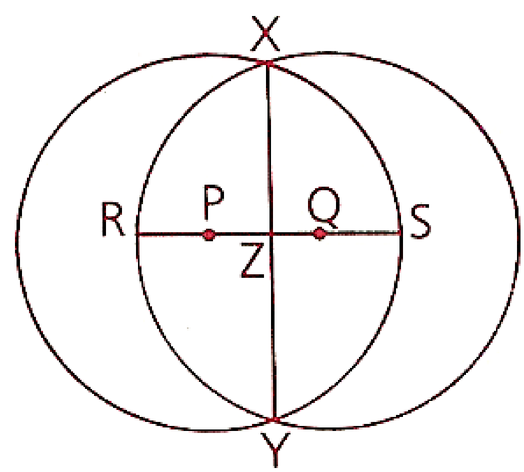


24 Given: $\odot P \cong \odot Q$,

$XY = 8$,

$RP = QS = 1$

Find: PQ



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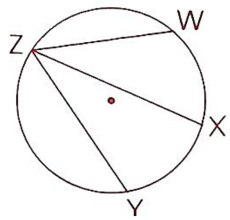
Acc Geo - 10-6: More Angle-Arc Theorems W 27 Jan 2016

Classwork

_____/12

Complete the problems on your own. Compare work with a partner. Discuss any differences, and revise. Hand in when completed (before the period ends).

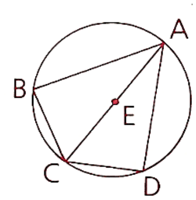
1 Given: X is the midpt. of $\widehat{WY}$.
Prove: $\overrightarrow{ZX}$ bisects $\angle WZY$.



(4 points, 1 pt per reason)

S	R
1. X is the midpoint of $\widehat{WY}$	1.
2. $\widehat{WX} \cong \widehat{XY}$	2.
3. $\angle WZX \cong \angle XZY$	3.
4. $\overrightarrow{ZX}$ bisects $\angle WZY$	4.

2 Given: $\odot E$ with diameter $\overline{AC}$, $\overline{BC} \cong \overline{CD}$
Conclusion: $\triangle ABC \cong \triangle ADC$



(5 points, wholistic)

13 A rectangle with dimensions 18 by 24 is inscribed in a circle.
Find the radius of the circle.

(3 pts)