Lesson 11-10: Circle Proofs

TEST is on: WED ORANGE
WED BLUE
FRI PURPLE

AGENDA:
- Check & Review Homework 11-9
- Complete Graphic Organizer
- Lesson Notes

HOMEWORK:
- Worksheet: Circle Proofs
- **Start Review**

p. 802-804
#10, 12,14,20,28, 30, 31, 34, 35, 39

Write the equation of each circle.

10. $\odot R$ with center $R(-12, -10)$ and radius 8 $(x+12)^2+(y+10)^2=64$

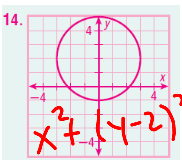
11. $\odot S$ with center $S(1.5, -2.5)$ and radius $\sqrt{3}$ $(x-1.5)^2+(y+2.5)^2=3$

12. $\odot C$ that passes through $(2, 2)$ and that has center $C(1, 1)$ $(x-1)^2+(y-1)^2=2$

14. $x^2+(y-2)^2=9$

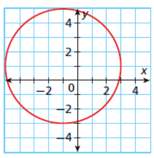
16. $x^2+y^2=100$

14.



$x^2+(y-2)^2=9$

20.



$(x+1)^2+(y-1)^2=16$

28. Consider the circle whose equation is $(x-4)^2+(y+6)^2=25$. Write, in point-slope form, the equation of the line tangent to the circle at $(1, -10)$. $y+10=-\frac{3}{4}(x-1)$

Find the center and radius of each circle.

30. $(x-2)^2+(y+3)^2=81$ $(2, -3)$; 9

31. $x^2+(y+15)^2=25$ $(0, -15)$; 5

34. circle with equation $(x-8)^2+(y+5)^2=7$ $A=7\pi$; $C=2\sqrt{7}\pi$

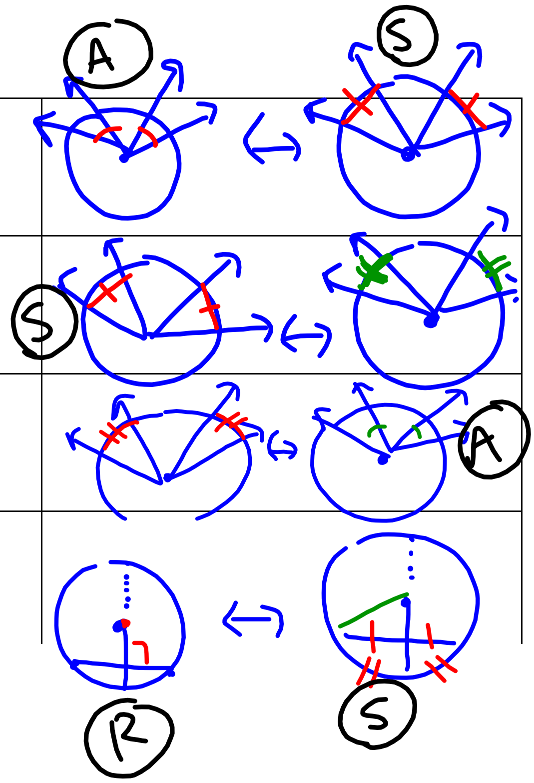
35. circle with center $(-1, 3)$ that passes through $(2, -1)$ $A=25\pi$; $C=10\pi$

39. $\odot A$ has a diameter with endpoints $(-3, -2)$ and $(5, -2)$. Write the equation of $\odot A$.

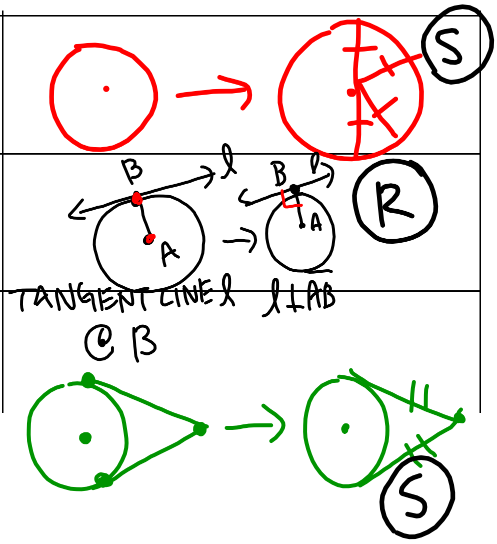
39. $(x-1)^2+(y+2)^2=16$

R, A, S

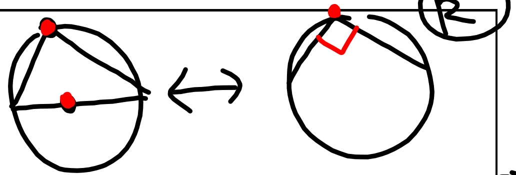
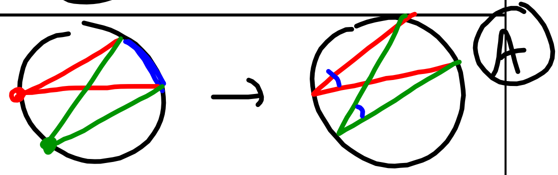
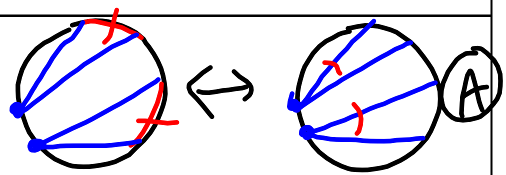
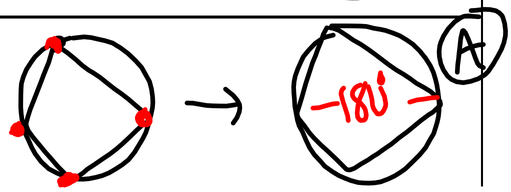
Arcs and Chords	• ≅ central angles have ≅ chords	A ↔ S
	• ≅ chords have ≅ arcs	S ↔
	• ≅ arcs have ≅ central angles	↔ A
	• If a radius (or diameter) is ⊥ to a chord →it bisects the chord and the arc	R ↔ S



Radii and Tangents	• In a circle all radii are ≅	→ S
	• A tangent is ⊥ to the radius at the point of tangency	R
	• 2 segs. tangent to circle from the same external point → segs. ≅	→ S



Graphic Organizer (back)

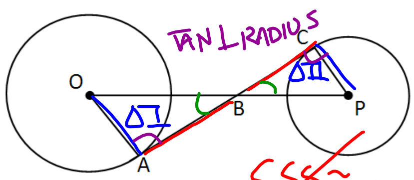
Inscribed Angles	• If an ∡ is inscribed in a semi circle → it is a right ∡	
	• If two inscribed ∡'s intercept the same arc → the ∡'s are ≅	
	• If two inscribed ∡'s intercept ≅ arcs → the ∡'s are ≅	
	• If a quadrilateral is inscribed in a circle → Opposite ∡'s are supplementary	

Practice Proof 1:

GIVEN: $\overline{AC}$ tangent to $\odot O$ at A

$\overline{AC}$ tangent to $\odot P$ at C

PROVE: $OA \bullet CB = AB \bullet PC$



ΔI ~ ΔII

$\frac{\Delta I}{\Delta II} : \frac{OA}{PC} = \frac{AB}{CB}$

~~SSS~~~
~~SAS~~~
AA~

STATEMENTS	REASONS
① $\overline{AC}$ TANGENT ⊙O @ A ⊙P @ C	① GIVEN
② $\overline{OA} \perp \overline{AC}$, $\overline{PC} \perp \overline{AC}$	② TANGENT ⊥ RADIUS @ POINT OF TANGENCY
③ ∡OAC & ∡ACP ARE RT ∡'S	③ ⊥ → RT ∡'S
④ ∡OAC ≅ ∡ACP Ⓐ	④ ALL RIGHT ∡'S ARE CONGRUENT
⑤ ∡OBA ≅ ∡PBC Ⓐ	⑤ VERTICAL ∡'S ARE ≅
⑥ ΔI ~ ΔII	⑥ AA~
⑦ $\frac{OA}{PC} = \frac{AB}{CB}$	⑦ ~Δ'S → PROPORTIONAL SIDES
⑧ OA·CB = AB·PC	⑧ CROSS PRODUCTS PROPERTY

Practice Proof 2:

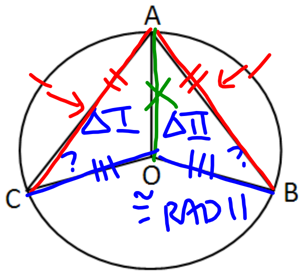
GIVEN: $\overset{\frown}{AC} \cong \overset{\frown}{AB}$ in $\odot O$

PROVE: $\measuredangle ACO \cong \measuredangle ABO$

① ΔI ≅ ΔII

② CPCTC

SSS ≅, ASA ≅
SAS ≅, AAS ≅
RHL ≅



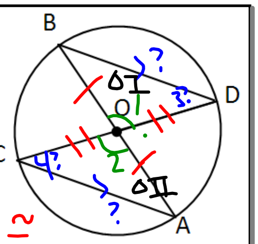
STATEMENTS	REASONS
① $\overset{\frown}{AC} \cong \overset{\frown}{AB}$ IN ⊙O	① GIVEN
② $\overline{AC} \cong \overline{AB}$ Ⓢ	② IN A ⊙, ≅ ARCS → ≅ CHORDS
③ $\overline{AO} \cong \overline{AO}$ Ⓢ	③ REFLEXIVE PROP OF ≅
④ $\overline{OC} \cong \overline{OB}$ Ⓢ	④ IN A ⊙, RADII ≅
⑤ ΔI ≅ ΔII	⑤ SSS ≅ (Could also use SAS ≅: ≅ ARCS → ≅ CENTRAL ∡'S IN ⊙)
⑥ $\measuredangle ACO \cong \measuredangle ABO$	⑥ CPCTC

Practice Proof 3:

GIVEN: Diameters $\overline{AOB}$ and $\overline{COD}$ in $\odot O$

PROVE: $\overline{AC} \parallel \overline{BD}$

ΔI ≅ ΔII BY SAS ≅
CPCTC



ΔI ≅ ΔII BY

S: $\boxed{\overline{OB} \cong \overline{OA}}$ IN A ⊙, RADII ≅

A: $\boxed{\measuredangle 1 \cong \measuredangle 2}$ VERTICAL ∡'S ARE ≅

S: $\boxed{\overline{OD} \cong \overline{OC}}$ IN A ⊙, RADII ≅

ΔI ≅ ΔII BY SAS ≅ — ≅ IN ⊙ CENTRAL ∡'S → ≅ (Could also use SSS ≅) CHORDS

∡3 ≅ ∡4 BY CPCTC

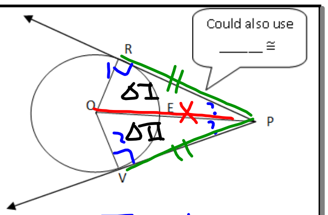
$\overline{AC} \parallel \overline{BD}$ ≅ ALT INT ∡'S → ∥ LINES

Practice Proof 4:

GIVEN: Circle O with tangents $\overline{PR}$ and $\overline{PV}$

PROVE: $\angle RPO \cong \angle VPO$

RHL ≅



⊙O W/ TANGENTS $\overline{PR}$ & $\overline{PV}$ IS GIVEN SO $\overline{OR} \perp \overline{PR}$ & $\overline{OV} \perp \overline{PV}$ B/C TANGENT ⊥ RADIUS @ PT TANGENCY.

∴ BY DEFN ⊥ LINES, ∡1 & ∡2 ARE RT ∡'S, MAKING ΔI & ΔII RT Δ'S BY DEFN. (R)

$\overline{OP} \cong \overline{OP}$ BY REFLEXIVE PROP OF ≅. (H)

$\overline{PR} \cong \overline{PV}$ B/C TANGENT SEGMENTS FROM THE SAME EXTERNAL POINT ARE CONGRUENT. ΔI ≅ ΔII BY RHL ≅

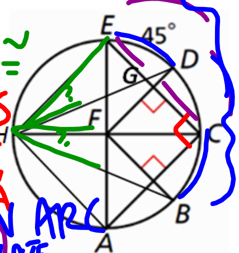
SO ∡RPO ≅ ∡VPO BY CPCTC.

SAS ≅ OR SSS ≅

≅ RADII, EXT TAN, RT ∡'S

≅ RADII

Additional Practice: Given $\odot F$ with $\overline{EFA}$, $\overset{\frown}{ED} \cong \overset{\frown}{CB}$, $\overline{FD} \perp \overline{EC}$, fill in each reason:



- $\measuredangle EHD \cong \measuredangle CHB$: INSCRIBED ∡'S FROM ≅ ARCS ARE ≅
- $\measuredangle ECA$ is a right angle: INSCRIBED ∡ FROM SEMICIRCLE IS A RT ∡
- $\overline{EG} \cong \overline{CG}$ and $\overset{\frown}{ED} \cong \overset{\frown}{CD}$: A RADIUS ⊥ CHORD BISECTS THE CHORD & THE ARC
- $\overset{\frown}{DC} \cong \overset{\frown}{DC}$: REFLEXIVE then $\overset{\frown}{EC} \cong \overset{\frown}{DB}$: OVERLAPPING/COMMON ARC THM

  or ARC ADDITION POSTULATE