Name: _____

Geometry Worksheet: 3.3 CPCTC and Circles Date: _____

Defn: **Circle** – the set of all points in a plane that are equidistant from a single point called the center.

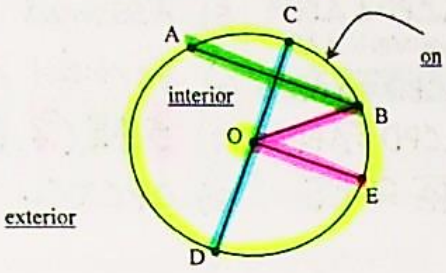
(*note*: name a circle by its center.)

Defn: **Radius** – a segment joining the center to any point on the circle.

Defn: **Chord** – a segment joining any two points on the circle.

Defn: **Diameter** – a chord that passes through the center. (*note*: d = 2r)

***Special Formulas**: Area = πr^2 and Circumference = $2\pi r$.



1. Name the circle: $\odot O$
2. Name 4 radii: $\overline{OB}$ $\overline{OE}$ $\overline{OC}$ $\overline{OD}$
3. Name 2 chords: $\overline{AB}$ $\overline{CD}$
4. Name a diameter: $\overline{CD}$
5. If OB = 6, then OE = 6 and CD = 12.

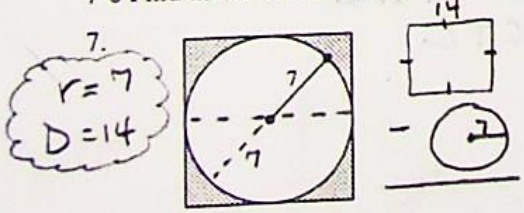
Theorem: All radii of a circle are ≡.

$r = 6$

6. If OB = 6, then (in terms of π) the area of the circle is $36\pi u^2$ ($A = \pi r^2$) and the circumference is $12\pi u$ ($C = 2\pi r$).

7-8 Find the area of the shaded region.

7.

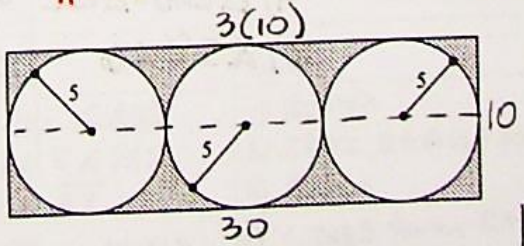


$A_{shaded} = (196 - 49\pi)u^2$

$14^2 = 196$

$\pi(7)^2 = -49\pi$

8.



$A_{shaded} = (300 - 75\pi)u^2$

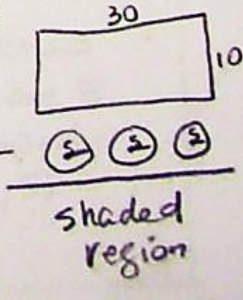
$(30)(10) = 300$

(5) $3(\pi 5^2) = 75\pi$

$3(25\pi)$

$r = 5$

$D = 10$

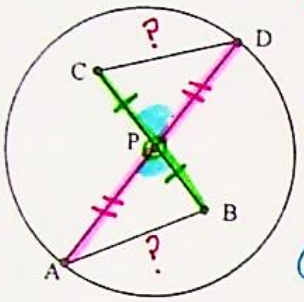


shaded region

CPCTC – Corresponding Parts of Congruent Triangles are Congruent
*This allows you to go on **AFTER** you have proved that two triangles are congruent.

9. Given: ⊙P
P mdpt $\overline{CB}$

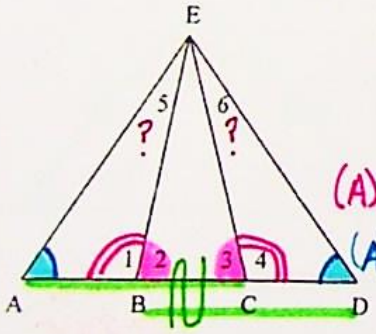
Prove: $\overline{AB} \cong \overline{CD}$



Statements	Reasons
1) ⊙P	1) Given
(S) 2) $\overline{PD} \cong \overline{PA}$	2) All radii of a ⊙ are ≅
3) P mdpt $\overline{CB}$	3) Given
(S) 4) $\overline{CP} \cong \overline{CB}$	4) A mdpt ÷ seg into 2 ≅ segs
5) ∠CPD & ∠BPA are vert ∠'s	5) Assumed from diagram
(A) 6) ∠CPD ≅ ∠BPA	6) Vertical ∠'s are ≅
7) △CPD ≅ △BPA	7) SAS (2, 6, 4)
8) $\overline{AB} \cong \overline{CD}$	8) CPCTC

10. Given: $\overline{AC} \cong \overline{BD}$
$\angle 2 \cong \angle 3$
$\angle A \cong \angle D$

Prove: $\angle 5 \cong \angle 6$

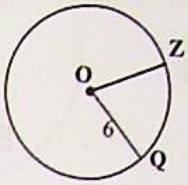


Statements	Reasons
1) $\overline{AC} \cong \overline{BD}$	1) Given
2) $\overline{BC} \cong \overline{BC}$	2) Reflexive Prop
(S) 3) $\overline{AB} \cong \overline{DC}$	3) Subtraction Prop.
4) ∠2 ≅ ∠3	4) Given
5) ∠2 supps ∠1	5) If 2 ∠'s form str ∠, then supp
6) ∠3 supps ∠4	6) Same as # 5
(A) 7) ∠1 ≅ ∠4	7) Supps of ≅ ∠'s are ≅
(A) 8) ∠A ≅ ∠D	8) Given
9) △EAB ≅ △EDC	9) ASA (7, 3, 8)
10) ∠5 ≅ ∠6	10) CPCTC

Geometry: 3.3 – CPCTC and Circles

Name _____

A **circle** is the set of all points that are equidistant from a given point, the center.



We name a circle by its center, in this case ⊙O

A **radius** of a circle is a segment with one endpoint on the center and the other on the circle.

ex: $\overline{OZ}$ or $\overline{OQ}$

Theorem: All radius of a ⊙ are ≅

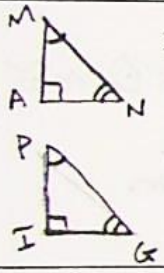
AREA = πr^2	CIRCUMFERENCE = $2\pi r$	$\pi \approx 3.14$

1. Find the area and circumference, *in terms of* π, of $\odot O$.

$r = 6$

$\pi(6)^2$ 1. A = 36π

$2\pi(6)$ C = 12π



2. $\triangle MAN \cong \triangle PIG$. List the six pairs of congruent corresponding parts.

M	A	N
P	I	G

$\angle M \cong \angle P$
$\angle A \cong \angle I$
$\angle N \cong \angle G$

$\overline{MA} \cong \overline{PI}$

$\overline{MAN}$
$\overline{PIG}$
$\overline{AN} \cong \overline{IG}$

$\overset{\frown}{MAN}$
$\overset{\frown}{PIG}$
$\overline{MN} \cong \overline{PG}$

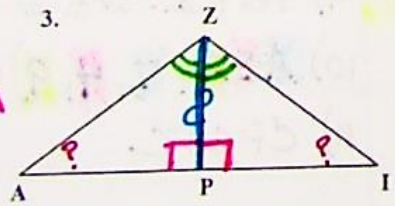
If you can show two triangles are congruent, then you can state that any pair of corresponding parts are congruent.

Rule: ***C**orresponding **P**arts **o**f **C**ongruent **T**riangles **a**re **C**ongruent*

Shortcut: CPCTC

***OBVIOUS ALERT*:** in order to use this, you must first prove the triangles ≅!

3. ASA



Given: $\overline{ZP}$ bis. $\angle AZI$
$\overline{ZP} \perp \overline{AI}$

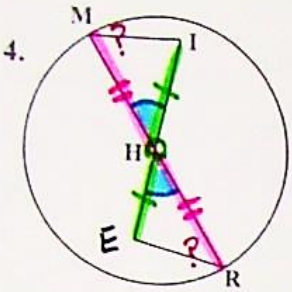
Prove: $\angle A \cong \angle I$

Statements	Reasons
1) $\overrightarrow{ZP}$ bis $\angle AZI$	1) Given
2) $\angle PZA \cong \angle PZI$	2) If bis, an $\angle$ is ÷ into 2 ≅ $\angle$'s
3) $\overline{ZP} \perp \overline{AI}$	3) Given
4) $\angle ZPA$ & $\angle ZPI$ are Rt $\angle$'s	4) ⊥ segs form Rt $\angle$s
5) $\angle ZPA \cong \angle ZPI$	5) All Right $\angle$'s are ≅
6) $\overline{ZP} \cong \overline{ZP}$	6) Reflexive Property
7) $\triangle ZPA \cong \triangle ZPI$	7) ASA (2, 6, 5)
8) $\angle A \cong \angle I$	8) CPCTC

* missing point E

SAS

4.



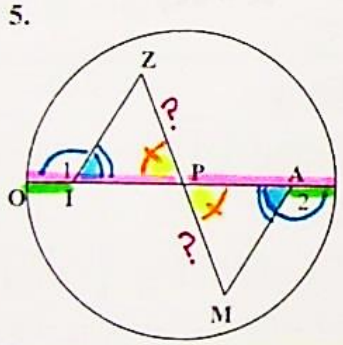
Given: ⊙H
H midpt. EI

Prove: ∠R ≅ ∠M

Statements	Reasons
1) ⊙H	1) Given
(S) 2) $\overline{HM} \cong \overline{HR}$	2)
3) H mdpt $\overline{EI}$	3) Given
(S) 4) $\overline{HE} \cong \overline{HI}$	4) A mdpt ÷ seg into 2 ≅ segs
5) △MHI are vert ∠'s △RHE	5) Assumed from diagram
(A) 6) △MHI ≅ △RHE	6) Vertical ∠'s are ≅
7) △MHI ≅ △RHE	7) SAS (2, 6, 4)
8) ∠R ≅ ∠M	8) CPCTC

ASA

5.



Given: ⊙P
$\overline{IO} \cong \overline{AB}$
∠1 ≅ ∠2

Prove: $\overline{PZ} \cong \overline{PM}$

Statements	Reasons
1) ⊙P	1) Given
2) $\overline{PO} \cong \overline{PB}$	2) All radii of a ⊙ are ≅
3) $\overline{IO} \cong \overline{AB}$	3) Given
(S) 4) $\overline{PI} \cong \overline{PA}$	4) Subtraction
5) ∠1 ≅ ∠2	5) Given
6) ∠1 supps ∠PIZ ∠2 supps ∠PAM	6) If 2 ∠s form str ∠, then supp
(A) 7) ∠PIZ ≅ ∠PAM	7) Supps of ≅ ∠s are ≅
8) ∠ZPI & ∠MPA are vert ∠'s	8) Assumed from diagram
(A) 9) ∠ZPI ≅ ∠MPA	9) Vert ∠'s are ≅
10) △PIZ ≅ △PAM	10) ASA (7, 4, 9)
11) $\overline{PZ} \cong \overline{PM}$	11) CPCTC