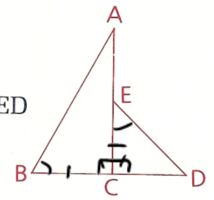
Name KEY | Ch 5: Parallel Lines and Related Figures | Ms. Kresovic

Adv Geo - | 5.1: Indirect Proof | Date: 19 NOV 2015

Homework

3 Given: $\overline{AC} \perp \overline{BD}$,
$\overline{BC} \cong \overline{EC}$,
$\overline{AB} \not\cong \overline{ED}$

Prove: $\angle B \not\cong \angle CED$



Either $\angle B \cong \angle CED$ or $\angle B \not\cong \angle CED$.

Assume $\angle B \cong \angle CED$.

We are given $\overline{BC} \cong \overline{EC}$ & $AC \perp BD$.

If two segments are perpendicular then they form right angles, thus $\angle BCA$ & $\angle DCE$ RT∠S.

IF 2 RT∠S THEN ≅∠S, $\angle BCA \cong \angle DCE$. HENCE $\triangle BCA \cong \triangle ECD$ BY ASA.

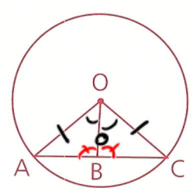
Then by CPTPC, $\overline{AB} \cong ED$.

But this is impossible as it contradicts the given information $\overline{AB} \not\cong ED$

Consequently the assumption is false and $\angle B \not\cong \angle CED$ is the only possibility. QED

5 Given: ⊙O;
$\overline{OB}$ is not an altitude.

Prove: $\overrightarrow{OB}$ does not bisect $\angle AOC$.



Either $\overrightarrow{OB}$ bisects $\angle ADC$ or $\overrightarrow{OB}$ does not bisect $\angle ADC$. Assume $\overrightarrow{OB}$ bisects $\angle ADC$.

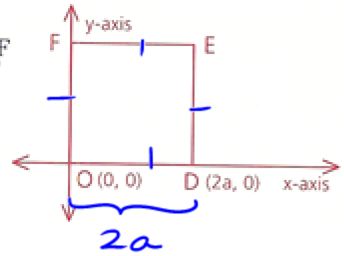
Statements	Reasons
1. ⊙O	1. GIVEN
S 2. $\overline{OA} \cong \overline{OC}$	2. ⊙ ⇒ ≅ RADII (1)
3. $\overrightarrow{OB}$ BIS $\angle AOC$	3. GIVEN ASSUMPTION
A 4. $\angle AOB \cong \angle COB$	4. → BIS ∠ ⇒ 2 ≅∠S (3)
S 5. $\overline{OB} \cong \overline{OB}$	5. REF
6. $\triangle AOB \cong \triangle COB$	6. SAS (2 4 5)
7. $\angle ABO \cong \angle CBO$	7. CPCTC (6)
8. $\angle ABO$ supp $\angle CBO$	8. st∠ ⇒ suppl∠s
9. $\angle ABO$ & $\angle CBO$ right ∠s	9. IF ∠S ARE ≅ & SUPP THEN RT∠S (7 & 8)
10. $\overline{OB} \perp \overline{AC}$	10. rt∠ ⇒ ⊥
11. $\overline{OB}$ alt	11. ⊥ ⇒ alt

But this is impossible as it contradicts the given information $\overline{OB}$ ia not an altitude. Therefore our assumption is incorrect and $\overrightarrow{OB}$ does not bisect $\angle ADC$ is the only other possibility.

6 ODEF is a square. ALL SIDES ≅
In terms of a, find

a The coordinates of points E and F

$(2a, 2a)$ $(0, 2a)$



b The area of the square

$A = (s)^2 \Rightarrow A = (2a)^2 \Rightarrow A = 4a^2$

c The midpoint of $\overline{FD}$

$F(0, 2a), D(2a, 0)$

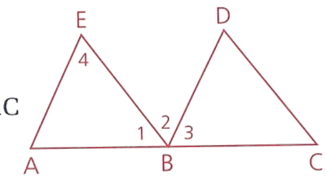
$\left(\frac{0+2a}{2}, \frac{2a+0}{2}\right) \Rightarrow (a, a)$

d The midpoint of $\overline{OE}$

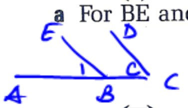
$O(0,0)$ & $E(2a, 2a)$

$\left(\frac{0+2a}{2}, \frac{0+2a}{2}\right) \Rightarrow (a, a)$

9 Identify each of the following pairs of angles as alternate interior, alternate exterior, or corresponding.

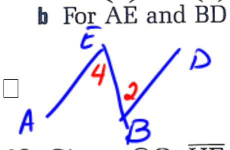


a For $\overleftrightarrow{BE}$ and $\overleftrightarrow{CD}$ with transversal $\overleftrightarrow{BC}$, ∠1 and ∠C



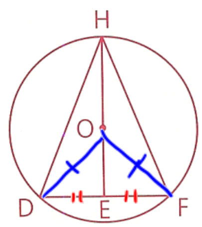
corresponding ∠s

b For $\overleftrightarrow{AE}$ and $\overleftrightarrow{BD}$ with transversal $\overleftrightarrow{BE}$, ∠2 and ∠4



ALT. INT. ∠S

12 Given: ⊙O; $\overline{HE}$ is not the perpendicular bisector of $\overline{DF}$.
Prove: $\overline{DE} \ncong \overline{EF}$



Either $\overline{DE} \cong \overline{EF}$ or $\overline{DE} \ncong \overline{EF}$. Assume $\overline{DE} \cong \overline{EF}$.

Statements	Reasons
1. ⊙O	1. GIVEN
2. Draw $\overline{OD}$ & $\overline{OF}$	2. AUX
3. $\overline{OD} \cong \overline{OF}$	3. ⊙ ⇒ ≅ RADII
4. $\overline{DE} \cong \overline{EF}$	4. ASSUMPTION GIVEN
5. $\overline{HE}$ ⊥ bis $\overline{DF}$	5. = DIST ⇒ ⊥ BIS (3, 4)

But this is impossible because it contradicts the given information that $\overline{HE}$ is not the perpendicular bisector of $\overline{DF}$. Therefore, our assumption is wrong and $\overline{DE} \ncong \overline{EF}$ is the only other possibility.