

Advanced Geometry

Proving Triangles Congruent

Name KEY

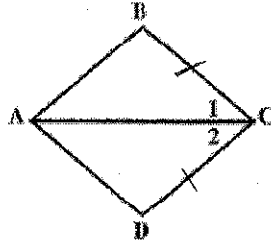
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1)

Given: $\overline{BC} \cong \overline{CD}$

\overline{AC} bisects $\angle BCD$

Prove: $\triangle ABC \cong \triangle ADC$



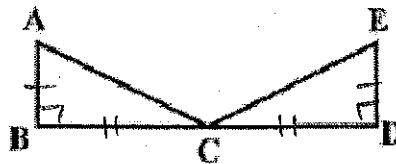
Statements	Reasons
1) $\overline{BC} \cong \overline{CD}$	1) Given
2) \overline{AC} bis $\angle BCD$	2) Given
3) $\angle 1 \cong \angle 2$	3) Def of Bis
4) $\overline{AC} \cong \overline{AC}$	4) Reflexive Property
5) $\triangle ABC \cong \triangle ADC$	5) SAS

Given: $\overline{AB} \cong \overline{ED}$

C is midpoint \overline{BD}

$\overline{AB} \perp \overline{BD}$; $\overline{ED} \perp \overline{BD}$

2) Prove: $\triangle ABC \cong \triangle EDC$

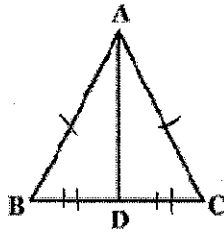


Statements	Reasons
1) $\overline{AB} \cong \overline{ED}$	1) Given
2) C is mid of \overline{BD}	2) Given
3) $\overline{AB} \perp \overline{BD}$, $\overline{ED} \perp \overline{BD}$	3) Given
4) $\overline{BC} \cong \overline{CD}$	4) Def of Midpt
5) $\angle ABC \cong \angle EDC$	5) \perp Lines form $\cong 90^\circ$ \angle 's
6) $\triangle ABC \cong \triangle EDC$	6) SAS
7)	7)

Given: $\overline{AB} \cong \overline{AC}$

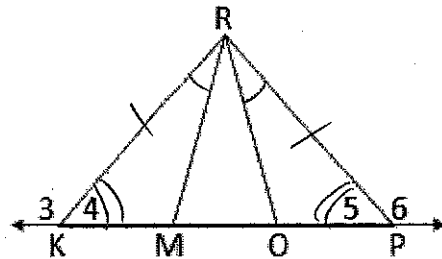
\overline{AD} bisects \overline{BC}

3) Prove: $\triangle ABD \cong \triangle ACD$



Statements	Reasons
1) $\overline{AB} \cong \overline{AC}$	1) Given
2) \overline{AD} bis \overline{BC}	2) Given
3) $\overline{BD} \cong \overline{DC}$	3) Def of bis
4) $\overline{AD} \cong \overline{AD}$	4) Reflexive
5) $\triangle ABD \cong \triangle ACD$	5) SSS

Given: $\angle 3 \cong \angle 6$
 $\overline{KR} \cong \overline{PR}$
 $\angle KRM \cong \angle PRO$

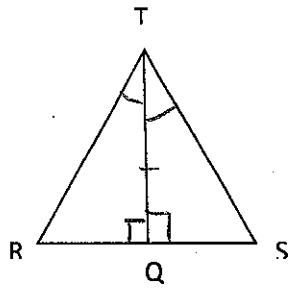


4)

Prove: $\triangle KRM \cong \triangle PRO$

Statements	Reasons
1) $\angle 3 \cong \angle 6$	1) Given
2) $\overline{KR} \cong \overline{PR}$	2) Given
3) $\angle KRM \cong \angle PRO$	3) Given
4) $\angle 3$ supp to $\angle 4$	4) Form a straight L
5) $\angle 5$ supp to $\angle 6$	5) Same as 4
6) $\angle 4 \cong \angle 5$	6) If 2 \angle 's are supp to $\cong \angle$'s, then they are \cong .
7) $\triangle KRM \cong \triangle PRO$	7) ASA

5)

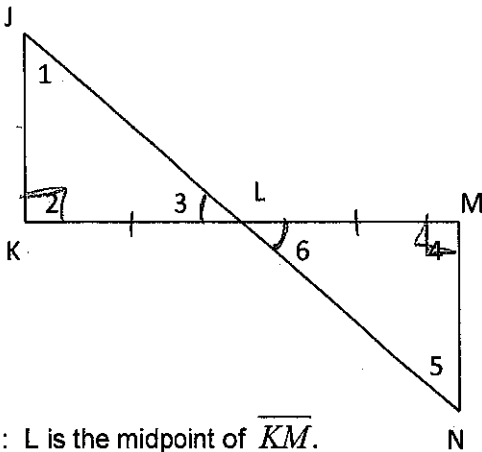


Given: \overline{TQ} bisects $\angle RTS$
 $\overline{TQ} \perp \overline{RS}$

Prove: $\triangle RTQ \cong \triangle STQ$

Statements	Reasons
① \overline{TQ} bis. $\angle RTS$	① Given
② $\overline{TQ} \perp \overline{RS}$	② Given
③ $\angle RTQ \cong \angle STQ$	③ \perp lines form $\cong, 90^\circ \angle$'s
④ $\angle RTQ \cong \angle STQ$	④ Def of Bis.
⑤ $\overline{TQ} \cong \overline{TQ}$	⑤ Reflexive
⑥ $\triangle RTQ \cong \triangle STQ$	⑥ ASA

6)



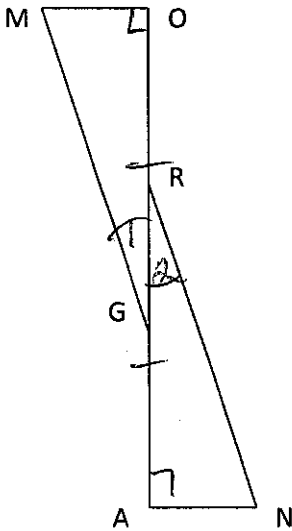
Given: L is the midpoint of \overline{KM} .

$\overline{JK} \perp \overline{KM}, \overline{NM} \perp \overline{KM}$

Prove: $\triangle KJL \cong \triangle MLN$

Statements	Reasons
① L is midpt of \overline{KM}	① Given
② $\overline{JK} \perp \overline{KM}, \overline{NM} \perp \overline{KM}$	② Given
③ $\overline{KL} \cong \overline{LM}$	③ Def of Midpt
④ $\angle 3 \cong \angle 6$	④ Vertical \angle 's are \cong
⑤ $\angle JKL \cong \angle MNL$ ($\angle 2 \cong \angle 4$)	⑤ \perp lines form $\cong, 90^\circ \angle$'s
⑥ $\triangle KJL \cong \triangle MLN$	⑥ ASA

7)



Statements

Reasons

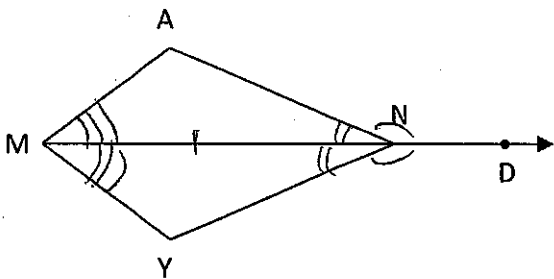
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|--|--|
| ① $\overline{MO} \perp \overline{OA}, \overline{AN} \perp \overline{OA}$ | ① Given |
| ② $\angle 1 \cong \angle 2$ | ② Given |
| ③ $\overline{OR} \cong \overline{GA}$ | ③ Given |
| ④ $\overline{RG} \cong \overline{RG}$ | ④ Reflexive |
| ⑤ $\overline{OG} \cong \overline{RA}$ | ⑤ Addition (+ \overline{RG}) |
| ⑥ $\angle MOG \cong \angle NAR$ | ⑥ \perp lines form $\cong, 90^\circ$ \angle 's |
| ⑦ $\triangle MOG \cong \triangle NAR$ | ⑦ ASA |

Given: $\overline{MO} \perp \overline{OA}, \overline{AN} \perp \overline{OA}$

$\angle 1 \cong \angle 2, \overline{OR} \cong \overline{GA}$

Prove: $\triangle MOG \cong \triangle NAR$

8)



Statements

Reasons

Given: \overline{MN} bisects $\angle AMY$

$\angle AND \cong \angle YND$

Prove: $\triangle MAN \cong \triangle MYN$

- | | |
|---------------------------------------|---|
| ① \overline{MN} bis. $\angle AMY$ | ① Given |
| ② $\angle AND \cong \angle YND$ | ② Given |
| ③ $\overline{MN} \cong \overline{MN}$ | ③ Reflexive |
| ④ $\angle AND$ supp to $\angle ANM$ | ④ If 2 \angle 's form a straight \angle then they are supp |
| ⑤ $\angle YND$ supp to $\angle YNM$ | ⑤ same as 4 |
| ⑥ $\angle ANM \cong \angle YNM$ | ⑥ If 2 \angle 's are supp to \cong \angle 's, then they are \cong |
| ⑦ $\angle AMN \cong \angle YMN$ | ⑦ Def. of Bisector |
| ⑧ $\triangle AMN \cong \triangle YMN$ | ⑧ ASA |