4.7

Geometry Honors
Proof Template

Name Key

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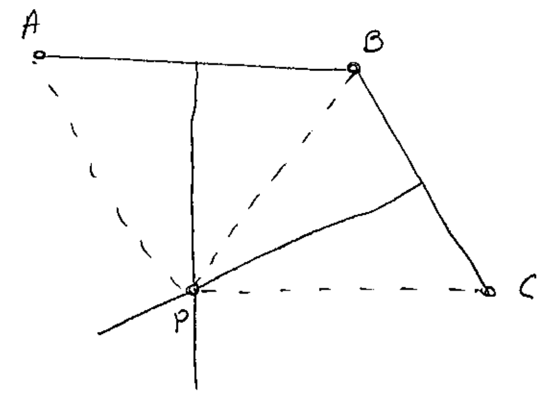
Given: P is on $\perp$ bis. of $\overline{AB}$
P is on $\perp$ bis. of $\overline{BC}$

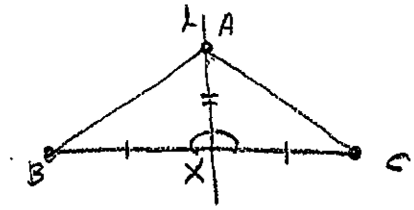
Prove: PA = PC

Diagram:



Statement	Reason
1. P is on $\perp$ bis. of $\overline{AB}$	1. Given
P is on $\perp$ bis. of $\overline{BC}$	
2. P is equid. from A + B	2. pt. on $\perp$ bis. $\rightarrow$ equid. from endpts.
P is equid. from B + C	
3. PA = PB; PB = PC	3. def. equid.
4. PA = PC	4. Transitive

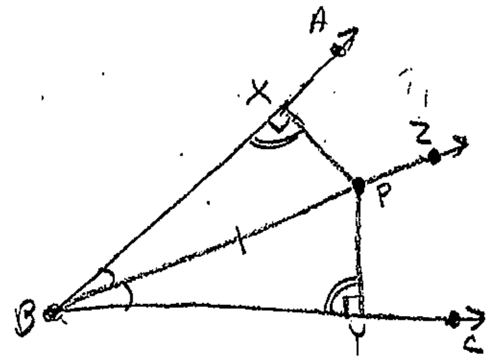
(14) Given: Line ℓ on $\perp$ bis. of $\overline{BC}$
A is on ℓ
Prove: $AB = AC$



1. ℓ is $\perp$ bis. of $\overline{BC}$; A is on ℓ	1. Given
2. ℓ is $\perp$ to $\overline{BC}$; X is mdpt. of $\overline{BC}$	2. def. $\perp$ bis.
3. $\angle AXB \cong \angle AXC$	3. $\perp$ lines $\rightarrow \cong$ adj. $\angle$s
4. $\overline{BX} \cong \overline{CX}$	4. def. mdpt.
5. $\overline{AX} \cong \overline{AX}$	5. Reflexive
6. $\triangle AXB \cong \triangle AXC$	6. SAS
7. $\overline{AB} \cong \overline{AC}$	7. CPCTC
8. $AB = AC$	8. def. $\cong$

(16) Given: $\overrightarrow{BZ}$ bisects $\angle ABC$
P lies on $\overrightarrow{BZ}$
$\overline{PX} \perp \overrightarrow{BA}$; $\overline{PY} \perp \overrightarrow{BC}$

Prove: $PX = PY$



1. $\overrightarrow{BZ}$ bisects $\angle ABC$; $\overline{PX} \perp \overrightarrow{BA}$; $\overline{PY} \perp \overrightarrow{BC}$	1. Given
2. $\angle PXB$ is rt. $\angle$; $\angle PYB$ is rt. $\angle$	2. def. $\perp$
3. $m\angle PXB = 90$; $m\angle PYB = 90$	3. def. rt. $\angle$
4. $m\angle PXB = m\angle PYB$	4. subst.
5. $\angle PXB \cong \angle PYB$	5. def. $\cong$ *All rt. $\angle$s $\cong$
6. $\angle XBP \cong \angle YBP$	6. def. $\angle$ bis.
7. $\overline{BP} \cong \overline{BP}$	7. Reflexive
8. $\triangle PXB \cong \triangle PYB$	8. AAS
9. $\overline{PX} \cong \overline{PY}$	9. CPCTC
10. $PX = PY$	10. def. $\cong$

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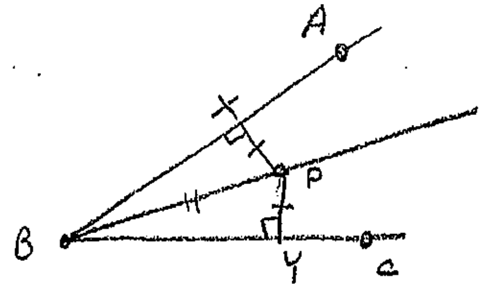
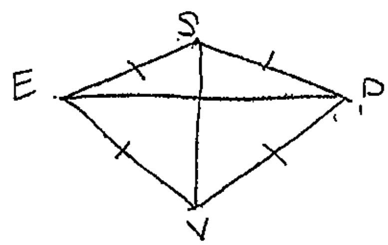
(17) $\overrightarrow{PX} \perp \overrightarrow{BA}$; $\overline{PY} \perp \overrightarrow{BC}$
$PX = PY$



Prove: $\overrightarrow{BP}$ bisects $\angle ABC$

1. $\overrightarrow{PX} \perp \overrightarrow{BA}$; $\overline{PY} \perp \overrightarrow{BC}$ $PX = PY$	1. Given
2. $\overline{BP} = \overline{BP}$	2. Reflexive
3. $\angle PXB$ + $\angle PYB$ rt. $\angle^s$	3. def. $\perp$
4. $\triangle PXB$ + $\triangle PYB$ rt $\triangle^s$	4. def. rt. $\triangle$
5. $\triangle PXB \cong \triangle PYB$	5. HL
6. $\angle XBP \cong \angle YBP$	6. CPCTC
7. $\overrightarrow{BP}$ bisects $\angle ABC$	7. def. $\angle$ bisector

(18) Given: S is equid. from E+D
V is equid. from E+D
Prove: $\overleftrightarrow{SV}$ is $\perp$ bis. of $\overline{ED}$

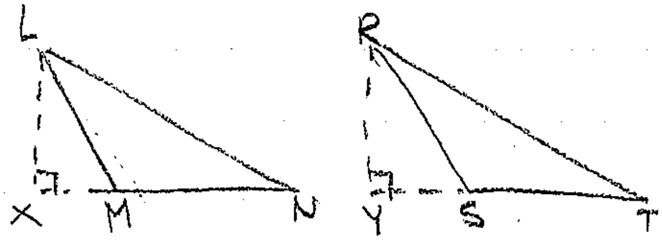


1. S is equid. from E+D V is equid. from E+D	1. Given
2. S is on $\perp$ bis. of $\overline{ED}$ V is on $\perp$ bis. of $\overline{ED}$	2. if pt. is equid. from endpts of segment $\rightarrow$ on $\perp$ bis.
3. $\overline{SV}$ is $\perp$ bis. of $\overline{ED}$	3. through 2 pts. there is 1 line

(20)

Given: $\triangle LMN \cong \triangle RST$

$\overline{LX}$ + $\overline{RY}$ are Altitudes



Prove: $\overline{LX} \cong \overline{RY}$

Statements	Reasons
1. $\triangle LMN \cong \triangle RST$	1. Given
2. $\overline{LN} \cong \overline{RT}$; $\angle N \cong \angle T$	2. CPCTC
3. $\overline{LX}$ + $\overline{RY}$ are altitudes	3. Given
4. $\overline{LX} \perp \overline{XN}$; $\overline{RY} \perp \overline{YT}$	4. def. altitude
5. $\angle X$ + $\angle Y$ rt. $\angle^s$	5. def. $\perp$
6. $\angle X \cong \angle Y$	6. All rt. $\angle^s \cong$
7. $\triangle LXN \cong \triangle RYT$	7. AAS
8. $\overline{LX} \cong \overline{RY}$	8. CPCTC

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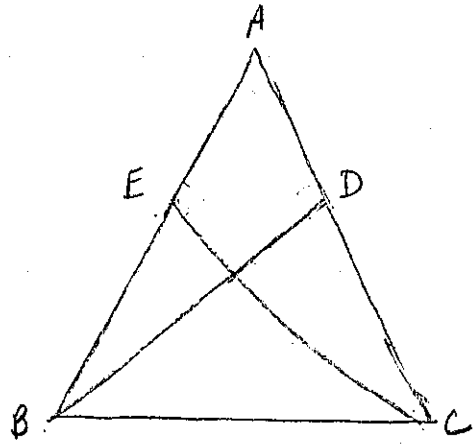
Given: $\overline{AB} \cong \overline{AC}$
$\overline{BD} \perp \overline{AC}$
$\overline{CE} \perp \overline{AB}$

Prove: $\overline{BD} \cong \overline{CE}$



Statements	Reasons
1. $\overline{AB} \cong \overline{AC}$; $\overline{BD} \perp \overline{AC}$; $\overline{CE} \perp \overline{AB}$	1. Given
2. $\angle AEC$ is rt. $\angle$; $\angle ADB$ is rt. $\angle$	2. def. $\perp$
3. $\angle AEC \cong \angle ADB$	3. All rt. $\angle^s \cong$
4. $\angle A \cong \angle A$	4. Reflexive
5. $\triangle AEC \cong \triangle ADB$	5. AAS
6. $\overline{BD} \cong \overline{CE}$	6. CPCTC

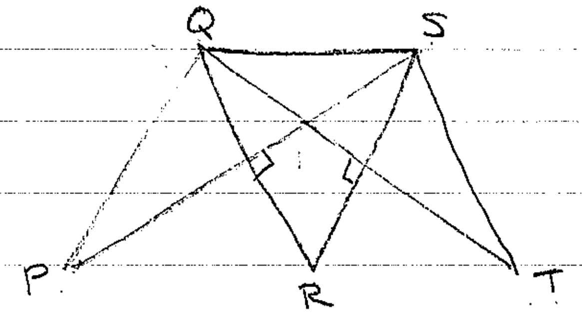
OR

1. $\overline{AB} \cong \overline{AC}$; $\overline{BD} \perp \overline{AC}$; $\overline{CE} \perp \overline{AB}$	1. Given
2. $\angle BEC$ + $\angle CDB$ rt. $\angle^s$	2. def. $\perp$
3. $\angle BEC \cong \angle CDB$	3. All rt. $\angle^s \cong$
4. $\angle ABC \cong \angle ACB$	4. Isosc. $\triangle$ Thm.
5. $\overline{BC} \cong \overline{BC}$	5. Reflexive
6. $\triangle EBC \cong \triangle DCB$	6. AAS
7. $\overline{BD} \cong \overline{CE}$	7. CPCTC

(23)

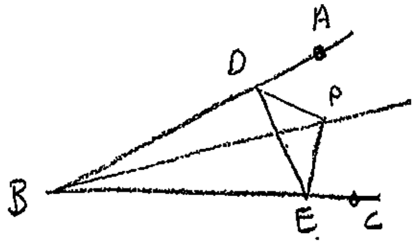
Given: $\overleftrightarrow{SR}$ is $\perp$ bis. of $\overline{QT}$
$\overleftrightarrow{QR}$ is $\perp$ bis. of $\overline{SP}$

Prove: $PQ = TS$



Statements	Reasons
1. $\overleftrightarrow{SR}$ is $\perp$ bis. of $\overline{QT}$ $\overleftrightarrow{QR}$ is $\perp$ bis. of $\overline{SP}$	1. Given
2. Q is equid. from P + S. S is equid. from Q + T	2. pt. on $\perp$ bis. $\rightarrow$ equid. from endpts.
3. $PQ = QS$; $QS = TS$	3. def. equid.
4. $PQ = TS$	4. Transitive

(24) Given: $\overrightarrow{DP}$ bis. $\angle ADE$
$\overrightarrow{EP}$ bis. $\angle DEC$
Prove: $\overrightarrow{BP}$ bis. $\angle ABC$



Key Steps

1. $\overrightarrow{DP}$ bis. $\angle ADE$; $\overrightarrow{EP}$ bis. $\angle DEC$
2. P is equid. from $\overrightarrow{DA}$ + $\overrightarrow{DE}$
   P is equid. from $\overrightarrow{ED}$ + $\overrightarrow{EC}$
3. P is equid. from $\overrightarrow{DA}$ + $\overrightarrow{EC}$
4. P is on bis. of $\angle ABC$