A#38 [Pt I] p. 165 Cumulative Review #1-18 [2-column Proofs #16-18] (Key)

[Pt II] p.131 #9-12 and p.158 #26, 29

[Pt I] p.165 Cumulative Review #1-18

1. If S is between R and T, then RS + ST = RT by the <u>Segment Add. Post.</u>

2. If 2 ∥ planes are cut by a 3rd plane, then the lines of intersection are <u>parallel</u>.

3. ① $\overrightarrow{BD}$ bisects ∠ABC, m∠ABC = 5x − 4, m∠CBD = 2x + 10 [Given]

② m∠CBD = ½ m∠ABC [∠ bisector Thm #1]

③ $2x+10 = \frac{1}{2}(5x-4)$ [Subst. Prop. of = (1→2)]

$4x + 20 = 5x - 4$

$x = 24$ → m∠ABC = 5(24) − 4 → m∠ABC = 116° [<u>Obtuse</u>]

4. If 2 intersecting lines form ≅ adj. ∠s, then the lines are <u>perpendicular</u>.

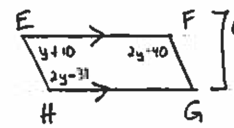
5. If ∠1 and ∠2 are complements and m∠1 = 74°, then m∠2 = <u>16°</u>.

6. OS: If x = 9, then 3x = 27. CS: <u>If 3x = 27, then x = 9.</u>

7. ① $I_1 = 144°$ (Given)

② $E_1 = 36°$ [$I_1 + E_1 = 180°$]

③ $\boxed{n = 10}$ [$E_1 = \frac{360°}{n}$]

8. 

Given. By the SS Int ∠s Thm:

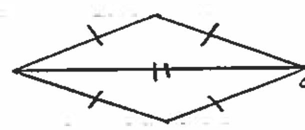
① y + 10 + 2y − 31 = 180

3y = 201

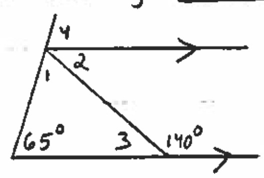
y = 67 → m∠F = 94°

② m∠G + 94 = 180

$\boxed{m∠G = 86°}$

9. Equilateral Quadrilateral →  ← [Refl. Prop of ≅]

2 ≅ △s by <u>SSS ≅ Post</u>

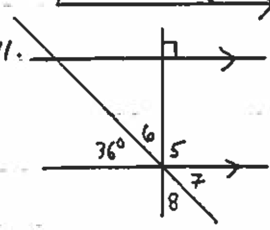
10. 

① m∠3 = 40° [∠ Add Post]

② m∠2 = 40° [Alt. Int ∠s Thm]

③ m∠1 = 75° [△ sum Thrm]

④ m∠4 = 65° [Corr. ∠s Post]

11. 

① m∠7 = 36° [Vert ∠s Thrm]

② m∠5 = 90° [Corr. ∠s Post]

③ m∠6 = 54° [∠ Add Post]

④ m∠8 = 54° [Vert. ∠s thrm]

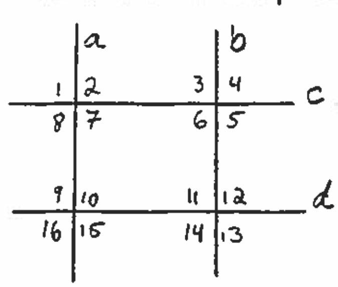
12. m∠8 + m∠9 = 180° → c ∥ d [SS Int. ∠s Conv.]

13. ∠1 ≅ ∠4 → No ∥ lines

14. m∠2 = m∠6 → a ∥ b [Alt. Int. ∠s Conv.]

15. ∠8 and ∠5 are Rt. ∠s → a ∥ b [In a plane, 2 lines ⊥ to the same line are ∥]

For Ex #12-15



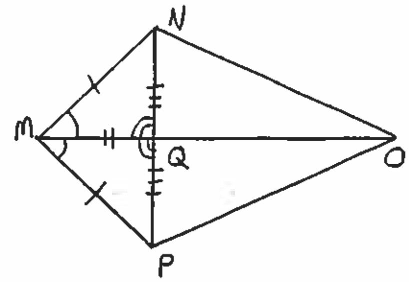
A#38 continued

Key

P+I p. 165 Cumulative Review #16-18

16. Given: $\overline{MN} \cong \overline{MP}$; $\angle NMO \cong \angle PMO$

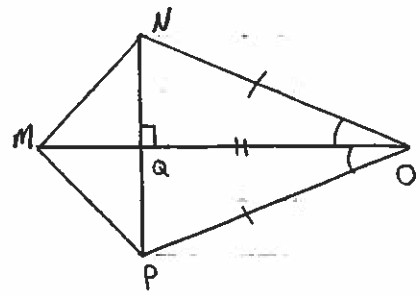
Prove: $\overleftrightarrow{MO}$ is the $\perp$ bisector of $\overline{NP}$



Statements	Reasons
① $\overline{MN} \cong \overline{MP}$; $\angle NMO \cong \angle PMO$	① Given
② $\overline{MQ} \cong \overline{MQ}$	② Refl. Prop. of $\cong$
③ $\triangle MNQ \cong \triangle MPQ$	③ SAS $\cong$ Post
④ $\overline{NQ} \cong \overline{PQ}$, $\angle NQM \cong \angle PQM$	④ CPCTC
⑤ Q is the midpt of $\overline{NP}$	⑤ Def. of midpt
⑥ $\overline{MQ} \perp \overline{NP}$	⑥ Lines form $\cong$ adj $\angle$s $\to$ $\perp$ lines
⑦ $\overleftrightarrow{MO}$ is the $\perp$ bisector of $\overline{NP}$	⑦ Def. of $\perp$ bisector

17. Given: $\overline{MO} \perp \overline{NP}$; $\overline{NO} \cong \overline{PO}$

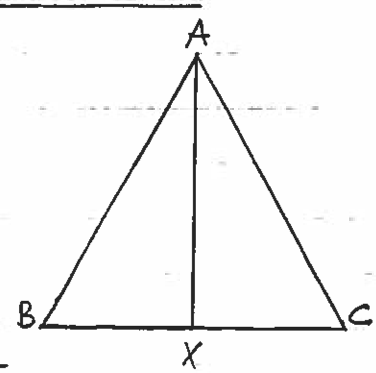
Prove: $\overline{MN} \cong \overline{MP}$



Statements	Reasons
① $\overline{MO} \perp \overline{NP}$; $\overline{NO} \cong \overline{PO}$	① Given
② $\overline{OQ} \cong \overline{OQ}$; $\overline{MO} \cong \overline{MO}$	② Refl. Prop. of $\cong$
③ $\triangle NQO \cong \triangle PQO$	③ HL $\cong$ Thrm
④ $\angle NOQ \cong \angle POQ$	④ CPCTC
⑤ $\triangle MNO \cong \triangle MPO$	⑤ SAS $\cong$ Post
⑥ $\overline{MN} \cong \overline{MP}$	⑥ CPCTC

18. Given: $\overline{AX}$ is both a median and an altitude of $\triangle ABC$

Prove: $\triangle ABC$ is isosceles



Statements	Reasons
① $\overline{AX}$ is a median and an altitude of $\triangle ABC$	① Given
② X is the midpt of $\overline{BC}$	② Def. of median
③ $\overline{AX} \perp \overline{BC}$	③ Def. of altitude
④ $\overline{AX}$ is the $\perp$ bisector of $\overline{BC}$	④ Def. of $\perp$ bisector
⑤ $AB = AC$	⑤ $\perp$ bisector Thrm
⑥ $\overline{AB} \cong \overline{AC}$	⑥ Def. of $\cong$ seg.
⑦ $\triangle ABC$ is isosceles	⑦ Def. of isosceles $\triangle$

A#38 continued

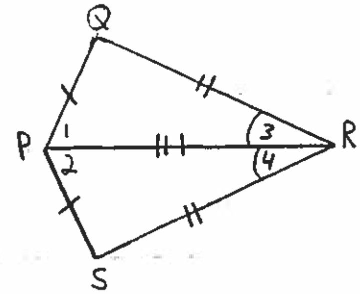
Key

Pt II p. 131 #9-12 and p. 158 #26,29

9. * You don't need $\angle 1 \cong \angle 2$.

Given: $\overline{PQ} \cong \overline{PS}$; $\overline{QR} \cong \overline{SR}$

Prove: $\angle 3 \cong \angle 4$

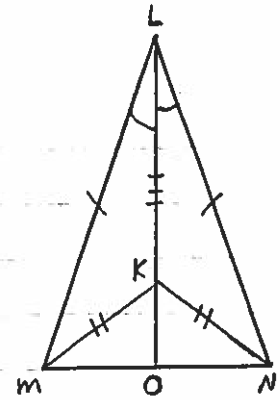


Statements	Reasons
① $\overline{PQ} \cong \overline{PS}$; $\overline{QR} \cong \overline{SR}$	① Given
② $\overline{PR} \cong \overline{PR}$	② Refl. Prop. of $\cong$
③ $\triangle PQR \cong \triangle PSR$	③ SSS $\cong$ Post.
④ $\angle 3 \cong \angle 4$	④ CPCTC

10. * You don't need $\overrightarrow{KO}$ bisects $\angle MKN$.

Given: $\overline{LM} \cong \overline{LN}$; $\overline{KM} \cong \overline{KN}$

Prove: $\overrightarrow{LO}$ bisects $\angle MLN$



Statements	Reasons
① $\overline{LM} \cong \overline{LN}$; $\overline{KM} \cong \overline{KN}$	① Given
② $\overline{LK} \cong \overline{LK}$	② Refl. Prop. of $\cong$
③ $\triangle MLK \cong \triangle NLK$	③ SSS $\cong$ Post
④ $\angle MLK \cong \angle NLK$	④ CPCTC
⑤ $\overrightarrow{LO}$ bisects $\angle MLN$	⑤ Def. of $\angle$ bisector

11. ① $\overline{WX} \perp \overline{YZ}$; $\angle 1 \cong \angle 2$; $\overline{UX} \cong \overline{VX}$ [Given]

② $\angle 1$ is comp to $\angle 3$; $\angle 2$ is comp to $\angle 4$ [Ext. sides $\perp \rightarrow$ adj comp. $\angle$s]

③ $\angle 3 \cong \angle 4$ [$\cong$ Complements Thrm]

④ $\overline{WX} \cong \overline{WX}$ [Refl. Prop. of $\cong$]

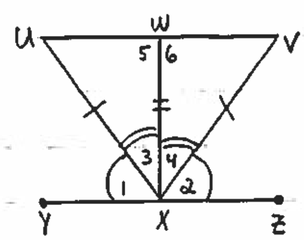
⑤ $\triangle XWU \cong \triangle XWV$ [SAS $\cong$ Post]

⑥ $\angle 5 \cong \angle 6$ [CPCTC]

⑦ $\overline{XW} \perp \overline{UV}$ [Lines form $\cong$ adj. $\angle$s $\rightarrow \perp$ lines] ① Proved ✓

⑧ $\overline{UV} \parallel \overline{YZ}$ [In a plane, 2 lines $\perp$ to the same line are $\parallel$] ② Proved ✓

*③ cannot be proved



12. ① $\overline{WX} \perp \overline{UV}$; $\overline{WX} \perp \overline{YZ}$; $\overline{WU} \cong \overline{WV}$ [Given]

② $\angle 5 \cong \angle 6$ [$\perp$ lines form $\cong$ adj. $\angle$s]

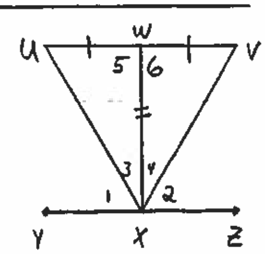
③ $\overline{WX} \cong \overline{WX}$ [Refl. Prop. of $\cong$]

④ $\triangle UWX \cong \triangle VWX$ [SAS $\cong$ Post]

* ⑤ $\angle 3 \cong \angle 4$ [CPCTC]

⑥ $\angle 1$ is comp to $\angle 3$, $\angle 2$ is comp to $\angle 4$ [Ext. sides $\perp \rightarrow$ adj comp. $\angle$s]

* ⑦ $\angle 1 \cong \angle 2$ [$\cong$ complements Thrm]



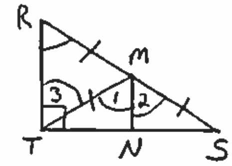
A#38 continued

Key

Pt II p. 158 #26, 29

26. Given: $m\angle RTS = 90^\circ$; $\overleftrightarrow{MN}$ is the $\perp$ bisector of $\overline{TS}$

Prove: $\overline{TM}$ is a median



Statements	Reasons
① $m\angle RTS = 90^\circ$; $\overleftrightarrow{MN}$ is the $\perp$ bisector of $\overline{TS}$	① Given
② $\overline{RT} \perp \overline{TS}$ / $\overline{MN} \perp \overline{TS}$	② Def of $\perp$ / Def. of $\perp$ bisector
③ $MT = MS$ / $\overline{MT} \cong \overline{MS}$	③ $\perp$ bisector Thm / Def. of $\cong$ seg.
④ $\overline{MN} \cong \overline{MN}$	④ Refl. Prop. of $\cong$
⑤ $\triangle TMN \cong \triangle SMN$	⑤ HL $\cong$ Thrm
⑥ $\angle 1 \cong \angle 2$; $\overline{TM} \cong \overline{SM}$	⑥ CPCTC
⑦ $\overline{RT} \parallel \overline{MN}$	⑦ In a plane, 2 lines $\perp$ to the same line are $\parallel$.
⑧ $\angle 2 \cong \angle R$ / $\angle 3 \cong \angle 1$	⑧ Corr. $\angle$s Post / Alt. Int. $\angle$s Thrm
⑨ $\angle 3 \cong \angle R$	⑨ Trans. Prop. of $\cong$
⑩ $\overline{RM} \cong \overline{TM}$	⑩ Base $\angle$s Thrm
⑪ $\overline{RM} \cong \overline{MS}$	⑪ Trans Prop. of $\cong$
⑫ M is the midpt of $\overline{RS}$	⑫ Def. of midpt
⑬ $\overline{TM}$ is a median	⑬ Def. of median

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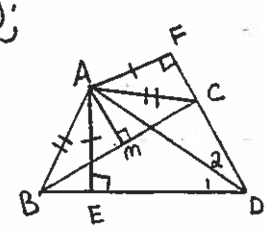
29. Given: $\overleftrightarrow{AM}$ is the $\perp$ bisector of $\overline{BC}$; $\overline{AE} \perp \overline{BD}$;
$\overline{AF} \perp \overline{DF}$; $\angle 1 \cong \angle 2$

Prove: $\overline{BE} \cong \overline{CF}$



Statements	Reasons
① $\overleftrightarrow{AM}$ is the $\perp$ bisector of $\overline{BC}$; $\overline{AE} \perp \overline{BD}$; $\overline{AF} \perp \overline{DF}$; $\angle 1 \cong \angle 2$	① Given
② $\overline{AD}$ is the bisector of $\angle FDE$	② Def. of $\angle$ bisector
③ $AE = AF$	③ $\angle$ bisector thrm #2
④ $AB = AC$	④ $\perp$ bisector thrm
⑤ $\overline{AE} \cong \overline{AF}$; $\overline{AB} \cong \overline{AC}$	⑤ Def. of $\cong$ seg.
⑥ $\triangle BAE \cong \triangle CAF$	⑥ HL $\cong$ Thrm
⑦ $\overline{BE} \cong \overline{CF}$	⑦ CPCTC