

Advanced Mathematics

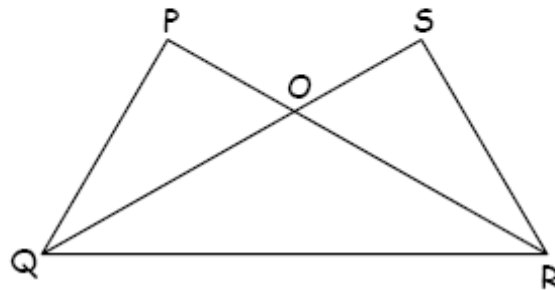
Proofs

1.

Given: $\overline{PO} \cong \overline{SO}$

$$\overline{OQ} \cong \overline{OR}$$

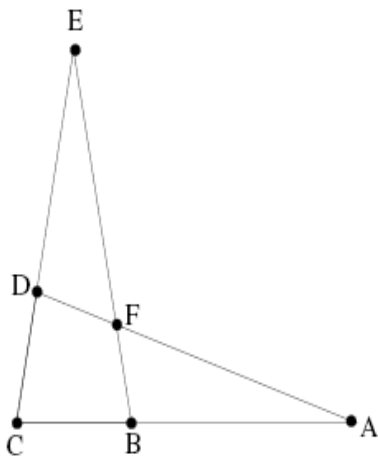
Prove: $\triangle PQR \cong \triangle SRQ$



2.

99. In the figure below, E, D, and C are collinear and A, B, and C are collinear:

(4 points)



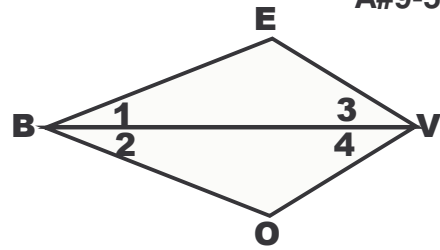
Given: $\overline{CD} \cong \overline{CB}$

$$\overline{DE} \cong \overline{BA}$$

Prove: $\angle E \cong \angle A$

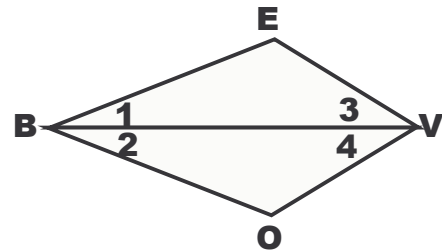
Statement(s)	Reason(s)

3. GIVEN: $\overrightarrow{BV}$ bisects $\angle EBO$
 $\overline{BE} \cong \overline{BO}$
 PROVE: $\triangle BEV \cong \triangle BOV$



STATEMENTS	REASONS

4. GIVEN: $\overleftrightarrow{VB}$ bisects $\angle EVO$
 $\overleftrightarrow{BV}$ bisects $\angle EBO$
 PROVE: $\angle E \cong \angle O$

[illegible]

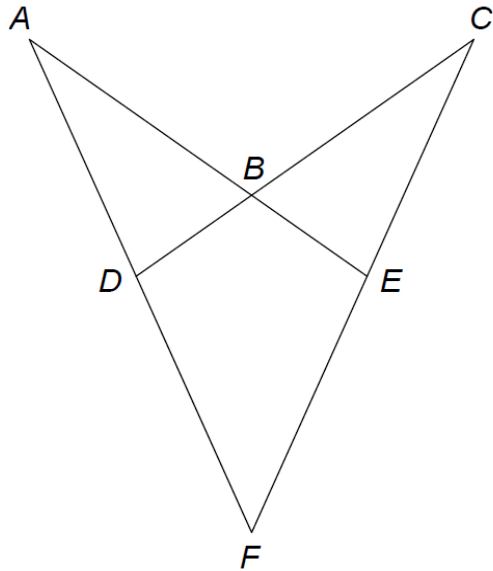
~~5. Page 220 Question # 31 (see diagram in margin)~~

~~6. Page 220 Question # 32~~

5.

Given: $\angle A \cong \angle C$
 $\overline{AE} \cong \overline{CD}$

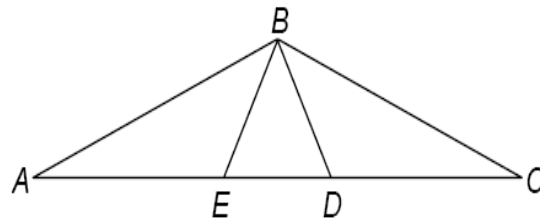
Prove: $\overline{AF} \cong \overline{CF}$



6.

1. Given: $\angle BED \cong \angle BDE$
 $\overline{AE} \cong \overline{DC}$

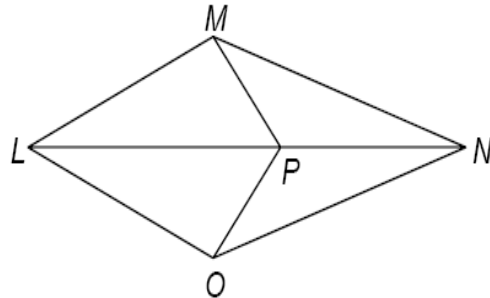
Prove: $\angle A \cong \angle C$



7.

2. Given: $\overline{MP} \cong \overline{OP}$
 $\angle MPN \cong \angle OPN$

Prove: $\overline{LO} \cong \overline{LM}$



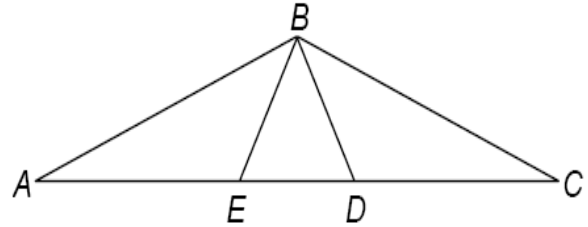
8

1. Given: $\angle ABD \cong \angle EBC$

$$\angle A \cong \angle C$$

$$\overline{BE} \cong \overline{BD}$$

Prove: $\overline{BA} \cong \overline{BC}$



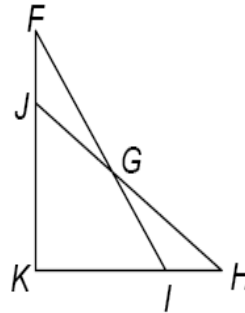
9

2. Given: $\overline{JK} \cong \overline{KI}$

$$\overline{FI} \cong \overline{JH}$$

$\angle K$ is a right angle

Prove: $\angle F \cong \angle H$

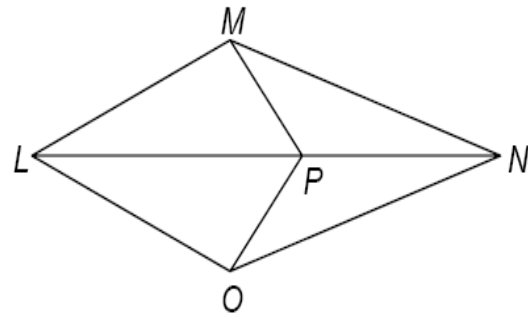


10

3. Given: $\overline{MP} \cong \overline{PO}$

$$\angle MPN \cong \angle OPN$$

Prove: $\angle PMN \cong \angle PON$

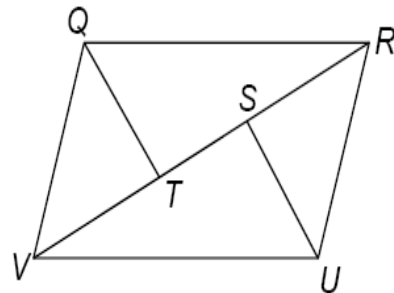


11

4. Given: $\overline{QV} \cong \overline{RU}$

$$\angle QVT \cong \angle URS$$

Prove: $\overline{QR} \cong \overline{VU}$



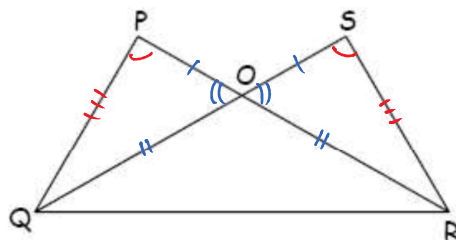
Advanced Mathematics Proofs

1.

Given: $\overline{PO} \cong \overline{SO}$

$\overline{OQ} \cong \overline{OR}$

Prove: $\triangle PQR \cong \triangle SRQ$



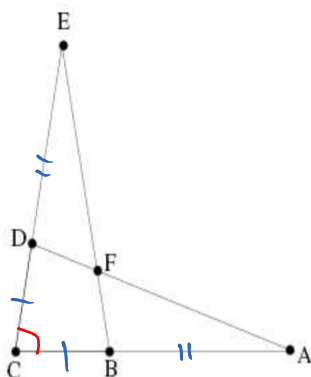
$PO = SO$ given (S)
 $\angle POQ = \angle SOR$ X pattern (A)
 $OQ = OR$ given (S)
 $\therefore \triangle POQ \cong \triangle SOR$ by SAS (S)

$PR = SR$ adding sides that were proven equal (S)
 $\angle P = \angle S$ by (1) congruent Δ 's (A)
 $PQ = SR$ by (1) congruent Δ 's (S)
 $\therefore \triangle PQR \cong \triangle SRQ$ by SAS

2.

99. In the figure below, E, D, and C are collinear and A, B, and C are collinear:

(4 points)



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

$\overline{DE} \cong \overline{BA}$

Prove: $\angle E \cong \angle A$

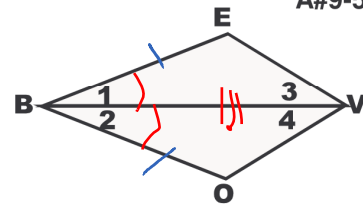
Statement(s)	Reason(s)
$CD = CB$	given
$\angle C = \angle C$	shared
$CA = CE$	adding given sides that were equal
$\therefore \triangle ECB \cong \triangle ACD$	by SAS
$\therefore \angle E = \angle A$	by congruent Δ 's

S

A

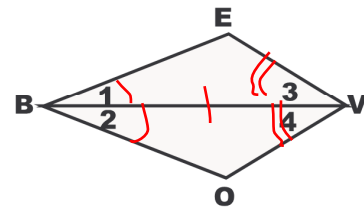
S

3. GIVEN: $\overrightarrow{BV}$ bisects $\angle EBO$
 $\overline{BE} \cong \overline{BO}$
 PROVE: $\triangle BEV \cong \triangle BOV$



STATEMENTS	REASONS
$BE = BO$	given (S)
$\angle 1 = \angle 2$	since BV bisects $\angle EBO$ (A)
$BV = BV$	shared side (S)
$\therefore \triangle BEV \cong \triangle BOV$	by SAS

4. GIVEN: $\overrightarrow{VB}$ bisects $\angle EVO$
 $\overrightarrow{BV}$ bisects $\angle EBO$
 PROVE: $\angle E \cong \angle O$



STATEMENTS	REASONS
$\angle 1 = \angle 2$	bisected angle (A)
$BV = BV$	shared side (S)
$\angle 3 = \angle 4$	bisected angle (A)
$\therefore \triangle EBV \cong \triangle OBV$	by ASA
$\therefore \angle E = \angle O$	by congruent Δ 's

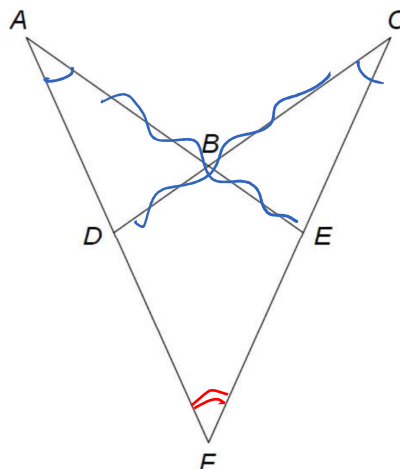
5. Page 220 Question # 31 (see diagram in margin)

6. Page 220 Question # 32

5

Given: $\angle A \cong \angle C$
 $\overline{AE} \cong \overline{CD}$

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



$\angle A = \angle C$ given (A)

$AE = CD$ given (S)

$\angle F = \angle F$ shared (A)

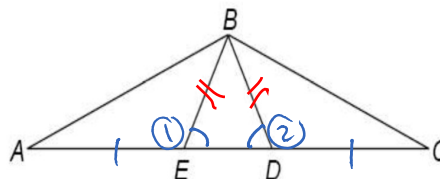
$\therefore \triangle AFE \cong \triangle CFD$ by ASA

$\therefore AF = CF$

6

1. Given: $\angle BED \cong \angle BDE$
 $\overline{AE} \cong \overline{DC}$

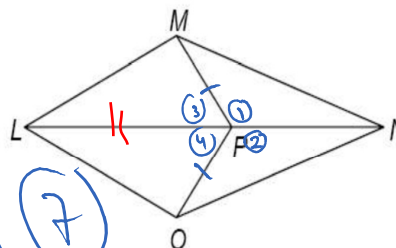
Prove: $\angle A \cong \angle C$



7

2. Given: $\overline{MP} \cong \overline{OP}$
 $\angle MPN \cong \angle OPN$

Prove: $\overline{LO} \cong \overline{LM}$



6

$BE = BD$
 $\angle (1) = \angle (2)$

$AE = CD$

$\therefore \triangle ABE \cong \triangle CBD$

$\therefore \angle A = \angle C$

$\triangle BED$ is isosceles
 supplementary
 to angles given
 given

by SAS
 by congruent Δ 's

(S)

(A)

(S)

7

$MP = OP$ given

$\angle (3) = \angle (4)$ supplementary to
 given angles

$LN = LN$ shared sides

$\therefore \triangle LMP \cong \triangle LOP$ by SAS

$\therefore LO = LM$ by congruent Δ 's

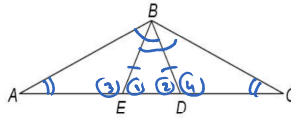
(S)

(A)

(S)

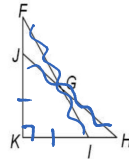
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1. Given: $\angle ABD \cong \angle EBC$
 $\angle A \cong \angle C$
 $BE \cong BD$
 Prove: $\overline{BA} \cong \overline{BC}$



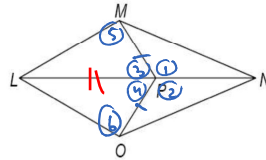
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 $\angle K$ is a right angle
 Prove: $\angle F \cong \angle H$



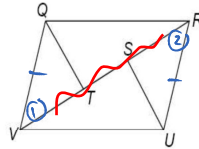
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3. Given: $\overline{MP} \cong \overline{PO}$
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 Prove: $\angle PMN \cong \angle PON$



11

4. Given: $\overline{QV} \cong \overline{RU}$
 $\angle QVT \cong \angle URS$
 Prove: $\overline{QR} \cong \overline{VU}$



8

$\angle 1 = \angle 2$ isosceles Δ (A)
 $\angle 3 = \angle 4$ supplementary to given angles (A)
 $BE = BD$ given (S)
 $\therefore \triangle ABD \cong \triangle CBE$ by AAS
 $\therefore AB = CB$ by congruent Δ 's

9

$JH = IF$ given (S)
 $JK = IK$ given (S)
 $FK = HK$ by pythag. th. since $\angle K$ is 90° (S)
 $\therefore \triangle FKI \cong \triangle HKJ$ by SSS
 $\therefore \angle F \cong \angle H$ by congruent Δ 's

10

$MP = OP$ given (S)
 $\angle 3 = \angle 4$ supplementary to given angles (A)
 $LP = LP$ shared (S)

$\therefore \triangle LMP \cong \triangle LOP$ by SAS
 $\therefore \angle 5 = \angle 6$ by congruent Δ 's

11

$QV = RU$ given (S)
 $\angle 1 = \angle 2$ given (A)
 $VR = VR$ shared (S)

$\therefore \triangle QVR \cong \triangle URV$ by SAS
 $\therefore QR = UV$ by congruent Δ 's