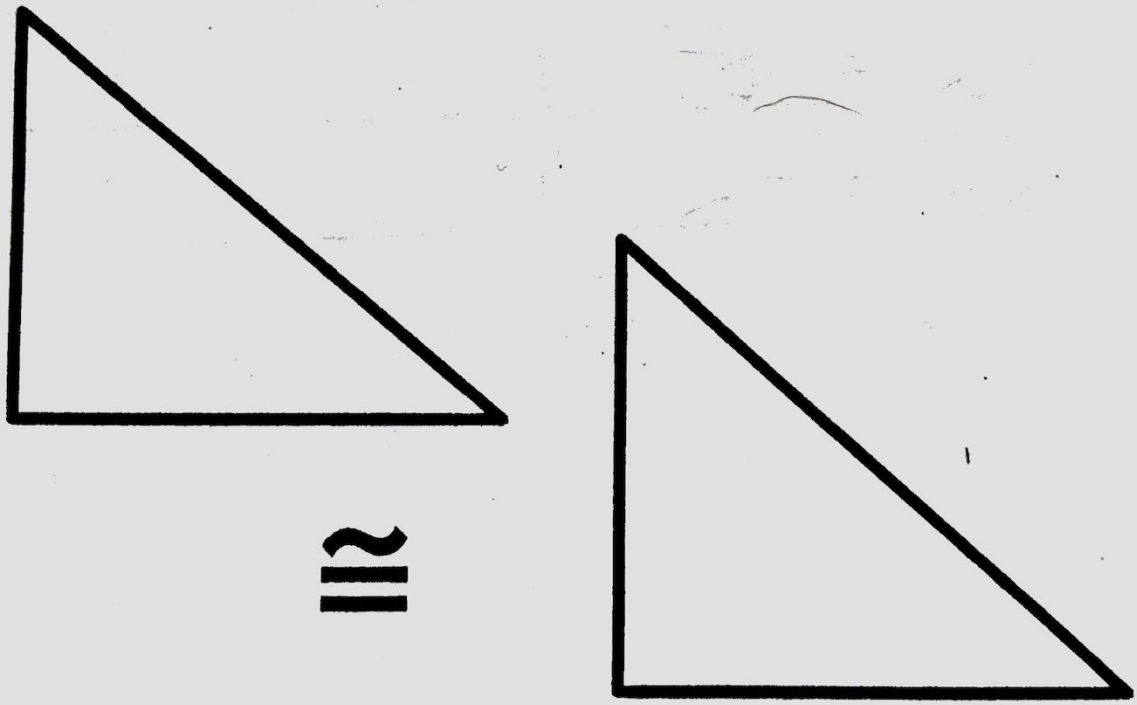
TRIANGLES

Congruence Proofs



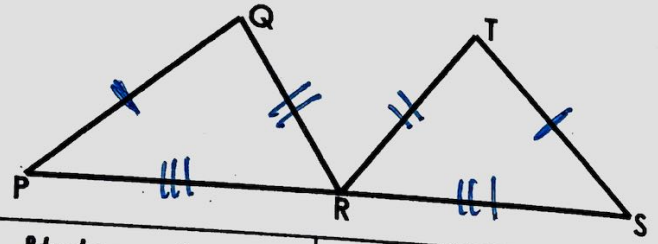
Created by:

Mrs. Cole

SSS PROOF #1

Given: $\overline{PQ} \cong \overline{ST}$, $\overline{QR} \cong \overline{TR}$, R is the midpoint of $\overline{PS}$

prove: $\Delta PQR \cong \Delta STR$



Statements	Reasons
$\overline{PQ} \cong \overline{ST}$	Given
$\overline{QR} \cong \overline{TR}$	Given
R is the midpt of $\overline{PS}$	Given
$\overline{PR} \cong \overline{SR}$	Def. of Midpoint
$\Delta PQR \cong \Delta STR$	SSS

$\overline{PQ} \cong \overline{ST}$ | Def. of Midpoint | $\overline{QR} \cong \overline{TR}$

R is the midpoint of $\overline{PS}$ | Given

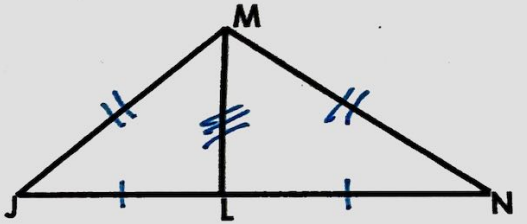
$\overline{PR} \cong \overline{SR}$ | Given | SSS

Given | $\Delta PQR \cong \Delta STR$

SSS PROOF #2

Given: L is the midpoint of $\overline{JN}$, $\overline{JM} \cong \overline{NM}$,

prove: $\Delta JLM \cong \Delta NLM$



Statements	Reasons
L is the midpt of $\overline{JN}$	Given
$\overline{JM} \cong \overline{NM}$	Given
$\overline{JL} \cong \overline{NL}$	Def. of midpoint
$\overline{LM} \cong \overline{LM}$	Reflexive Property
$\Delta JLM \cong \Delta NLM$	SSS

$\overline{JL} \cong \overline{NL}$ | L is the midpoint of $\overline{JN}$ | $\overline{JM} \cong \overline{NM}$

Def. of Midpoint | $\Delta JLM \cong \Delta NLM$

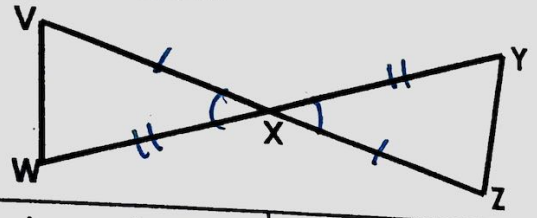
Given | Given | SSS

$\overline{LM} \cong \overline{LM}$ | Reflexive Property

SAS PROOF #1

Given: X is the midpoint of $\overline{VZ}$, X is the midpoint of $\overline{WY}$

prove: $\Delta VWX \cong \Delta ZYX$



Statements	Reasons
X is the midpt of $\overline{VZ}$	Given
X is the midpt of $\overline{WY}$	Given
$\overline{VX} \cong \overline{XZ}$	Def of midpoint
$\overline{WX} \cong \overline{XY}$	Def of midpoint
$\angle WXV \cong \angle YXZ$	Vertical Angles
$\Delta VWX \cong \Delta ZYX$	SAS

Def. of Midpoint

Def. of Midpoint

$\overline{WX} \cong \overline{XY}$

$\angle WXV \cong \angle YXZ$

Vertical Angles

X is the midpoint of $\overline{VZ}$

Given

$\overline{VX} \cong \overline{XZ}$

X is the midpoint of $\overline{WY}$

SAS

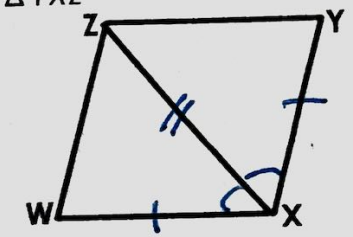
Given

$\Delta VWX \cong \Delta ZYX$

SAS PROOF #2

Given: $\overline{XW} \cong \overline{XY}$, $\overline{XZ}$ bisects $\angle WXY$

prove: $\Delta WXZ \cong \Delta YXZ$



Statements	Reasons
$\overline{XW} \cong \overline{XY}$	Given
$\overline{XZ}$ bisects $\angle WXY$	Given
$\angle WXY \cong \angle YXZ$	Def. of Angle Bisector
$\overline{XZ} \cong \overline{XZ}$	Reflexive Property
$\Delta WXZ \cong YXZ$	SAS

$\angle WXZ \cong \angle YXZ$

$\overline{XZ}$ bisects $\angle WXY$

$\overline{XW} \cong \overline{XY}$

$\Delta WXY \cong \Delta YXZ$

Given

Def. of Angle Bisector

Given

SAS

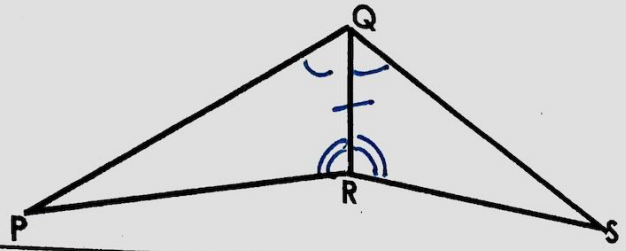
$\overline{XZ} \cong \overline{XZ}$

Reflexive Property

ASA PROOF #1

Given: $\overline{QR}$ bisects $\angle PQS$, $\angle PRQ \cong \angle SRQ$

prove: $\Delta PQR \cong \Delta SQR$



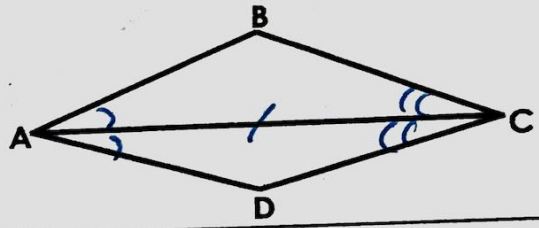
Statements	Reasons
$\overline{QR}$ bisects $\angle PQS$	Given
$\angle PRQ \cong \angle SRQ$	Given
$\angle PQR \cong \angle SQR$	Def of Angle Bisector
$\overline{QR} \cong \overline{QR}$	Reflexive Property
$\Delta PQR \cong \Delta SQR$	ASA

$\overline{QR} \cong \overline{QR}$ | Given | $\angle PQR \cong \angle SQR$ | Def. of Angle Bisector | Given | $\overline{QR}$ bisects $\angle PQS$ | Reflexive Property | $\angle PRQ \cong \angle SRQ$ | ASA | $\Delta PQR \cong \Delta SQR$

ASA PROOF #2

Given: $\overline{AC}$ bisects $\angle BAD$, $\overline{AC}$ bisects $\angle BCD$

prove: $\Delta BAC \cong \Delta DAC$



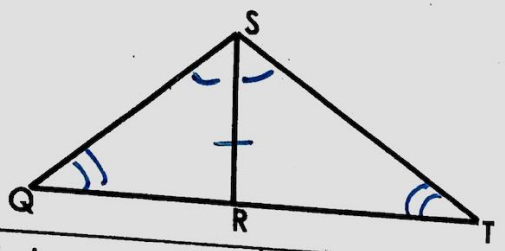
Statements	Reasons
$\overline{AC}$ bisects $\angle BAD$	Given
$\overline{AC}$ bisects $\angle BCD$	Given
$\angle BAC \cong \angle DAC$	Def. of Angle Bisector
$\angle BCA \cong \angle DCA$	Def. of Angle Bisector
$\overline{AC} \cong \overline{AC}$	Reflexive Property
$\Delta BAC \cong \Delta DAC$	ASA

Def. of Angle Bisector | Reflexive Property | $\overline{AC} \cong \overline{AC}$ | Given | $\angle BAC \cong \angle DAC$ | $\overline{AC}$ bisects $\angle BCD$ | Given | $\overline{AC}$ bisects $\angle BAD$ | $\angle BCA \cong \angle DCA$ | ASA | Def. of Angle Bisector | $\Delta BAC \cong \Delta DAC$

AAS PROOF #1

Given: $\overline{SR}$ bisects $\angle QST$, $\angle SQR \cong \angle STR$

prove: $\Delta QSR \cong \Delta TSR$



Statements	Reasons
$\overline{SR}$ bisects $\angle QST$	Given
$\angle SQR \cong \angle STR$	Given
$\angle QSR \cong \angle TSR$	Def. of Angle Bisector
$\overline{SR} \cong \overline{SR}$	Reflexive Property
$\Delta QSR \cong \Delta TSR$	AAS

$\angle QSR \cong \angle TSR$ | Reflexive Property | Given

$\Delta QSR \cong \Delta TSR$ | Given

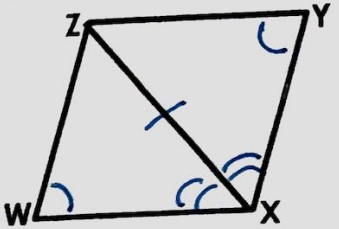
$\angle SQR \cong \angle STR$ | $\overline{SR}$ bisects $\angle QST$ | AAS

Def. of Angle Bisector | $\overline{SR} \cong \overline{SR}$

AAS PROOF #2

Given: $\angle XWZ \cong \angle XYZ$, $\overline{XZ}$ bisects $\angle WXY$

prove: $\Delta XWZ \cong \Delta XYZ$



Statements	Reasons
$\angle XWZ \cong \angle XYZ$	Given
$\overline{XZ}$ bisects $\angle WXY$	Given
$\angle WXZ \cong \angle YXZ$	Def. of Angle Bisector
$\overline{XZ} \cong \overline{XZ}$	Reflexive Property
$\Delta XWZ \cong \Delta XYZ$	AAS

$\overline{XZ} \cong \overline{XZ}$ | Reflexive Property | $\angle XWZ \cong \angle XYZ$

$\angle WXZ \cong \angle YXZ$ | Given

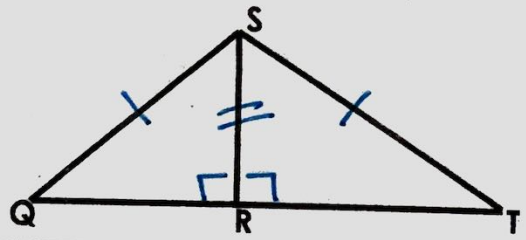
Given | $\overline{XZ}$ bisects $\angle WXY$ | AAS

Def. of Angle Bisector | $\Delta XWZ \cong \Delta XYZ$

HL PROOF #1

Given: ΔQSR and ΔTSR are right triangles, $\overline{QS} \cong \overline{TS}$

prove: $\Delta QSR \cong \Delta TSR$



Statements	Reasons
ΔQRS and ΔTSR are right triangles	Given
$\overline{QS} \cong \overline{TS}$	Given
$\overline{SR} \cong \overline{SR}$	Reflexive Property
$\Delta QSR \cong \Delta TSR$	HL

$\overline{QS} \cong \overline{TS}$ | HL | Given

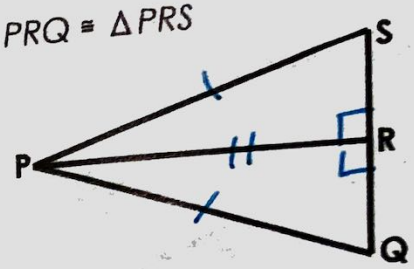
ΔQSR and ΔTSR are right triangles | Given

Reflexive Property | $\Delta QSR \cong \Delta TSR$ | $\overline{SR} \cong \overline{SR}$

HL PROOF #2

Given: $\overline{PR} \perp \overline{SQ}$, $\overline{PQ} \cong \overline{PS}$

prove: $\Delta PRQ \cong \Delta PRS$



Statements	Reasons
$\overline{PR} \perp \overline{SQ}$	Given
$\overline{PQ} \cong \overline{PS}$	Given
$\overline{PR} \cong \overline{PR}$	Reflexive Property
$\angle PRQ$ and $\angle PRS$ are right angles	Def. of $\perp$
$\angle PRQ \cong \angle PRS$	All right angles are $\cong$
$\Delta PRQ \cong \Delta PRS$	HL

$\angle PRQ \cong \angle PRS$ | Given

$\overline{PQ} \cong \overline{PS}$ | Reflexive Property | $\overline{PR} \perp \overline{SQ}$

Def. of $\perp$ | HL

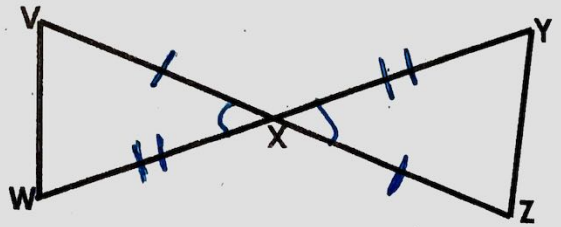
$\overline{PR} \cong \overline{PR}$ | $\angle PRQ$ and $\angle PRS$ are right $\angle$'s | Given

All right $\angle$'s are $\cong$ | $\Delta PRQ \cong \Delta PRS$

CPCTC PROOF #1

Given: X is the midpoint of $\overline{VZ}$, X is the midpoint of $\overline{WY}$

prove: $\angle XVW \cong \angle XZY$



Statements	Reasons
X is the midpt of $\overline{VZ}$	Given
X is the midpt of $\overline{WY}$	Given
$\overline{VX} \cong \overline{ZX}$	Def. of midpoint
$\overline{WX} \cong \overline{YX}$	Def. of midpoint
$\angle WXV \cong \angle YXZ$	Vertical Angles
$\triangle VWX \cong \triangle ZYX$	SAS
$\angle XVW \cong \angle XZY$	CPCTC

Given

Def. of Midpoint

$\overline{VX} \cong \overline{ZX}$

Def. of Midpoint

$\angle XVW \cong \angle XZY$

X is the midpoint of $\overline{VZ}$

Given

$\angle WXV \cong \angle YXZ$

$\overline{WX} \cong \overline{YX}$

$\triangle VWX \cong \triangle ZYX$

Vertical Angles

X is the midpoint of $\overline{WY}$

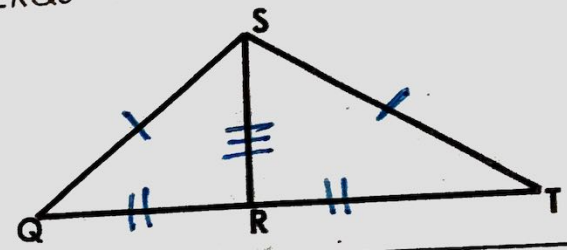
CPCTC

SAS

CPCTC PROOF #2

Given: $\overline{QS} \cong \overline{TS}$, R is the midpoint of $\overline{QT}$

prove: $\angle RQS \cong \angle RTS$



Statements	Reasons
$\overline{QS} \cong \overline{TS}$	Given
R is the midpt. of $\overline{QT}$	Given
$\overline{QR} \cong \overline{TR}$	Def. of midpoint
$\overline{RS} \cong \overline{RS}$	Reflexive Property
$\triangle QRS \cong \triangle TRS$	SSS
$\angle RQS \cong \angle RTS$	CPCTC

$\overline{RS} \cong \overline{RS}$

Reflexive Property

$\overline{QS} \cong \overline{TS}$

Given

$\angle RQS \cong \angle RTS$

Def. of Midpoint

Given

$\overline{QR} \cong \overline{TR}$

CPCTC

SSS

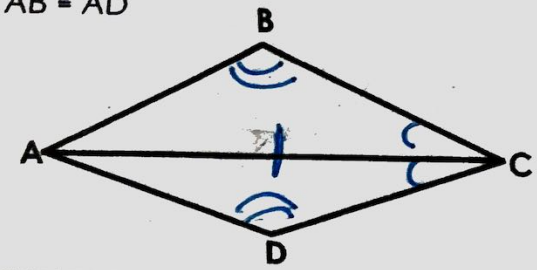
R is the midpoint of $\overline{QT}$

$\triangle QRS \cong \triangle TRS$

CPCTC PROOF #3

Given: $\overline{AC}$ bisects $\angle BCD$, $\angle ABC \cong \angle ADC$

prove: $\overline{AB} \cong \overline{AD}$



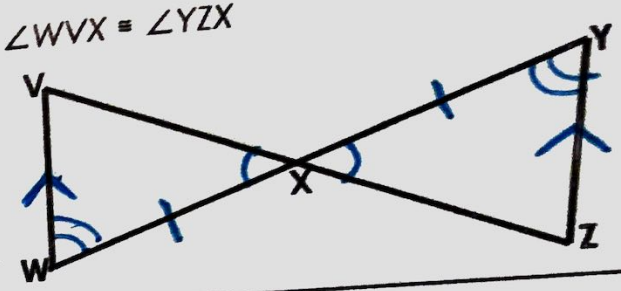
Statements	Reasons
$\overline{AC}$ bisects $\angle BCD$	Given
$\angle ABC \cong \angle ADC$	Given
$\angle BCA \cong \angle DCA$	Def. of Angle Bisector
$\overline{AC} \cong \overline{AC}$	Reflexive Property
$\triangle ABC \cong \triangle ADC$	AAS
$\overline{AB} \cong \overline{AD}$	CPCTC

Given | $\triangle ABC \cong \triangle ADC$ | $\overline{AC} \cong \overline{AC}$ | $\overline{AC}$ bisects $\angle BCD$ | $\angle ABC \cong \angle ADC$ | Def. of Angle Bisector | Given | $\overline{AB} \cong \overline{AD}$ | $\angle BCA \cong \angle DCA$ | AAS | Reflexive Property | CPCTC

CPCTC PROOF #4

Given: $\overline{WV} \parallel \overline{YZ}$, X is the midpoint of $\overline{WY}$,

prove: $\angle WVX \cong \angle YZX$



Statements	Reasons
$\overline{WV} \parallel \overline{YZ}$	Given
X is the midpt. of $\overline{WY}$	Given
$\overline{WX} \cong \overline{YX}$	Def. of Midpoint
$\angle VWX \cong \angle ZYX$	Alt. Interior Angles
$\angle VXW \cong \angle ZXY$	Vertical Angles
$\triangle VXW \cong \triangle ZXY$	ASA
$\angle WVX \cong \angle YZX$	CPCTC

ASA | $\triangle VXW \cong \triangle ZXY$ | $\overline{WX} \cong \overline{YX}$ | $\overline{WV} \parallel \overline{YZ}$ | CPCTC | Given | Def. of Midpoint | Alt. Interior Angles | $\angle VXW \cong \angle ZXY$ | $\angle WVX \cong \angle YZX$ | X is the midpoint of $\overline{WY}$ | $\angle VWX \cong \angle ZYX$ | Given | Vertical Angles