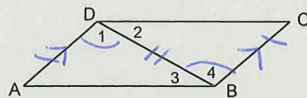


## Advanced: Proving Triangles Congruent -

1. Given:  $\overline{AD} \cong \overline{BC}$ ,  $\overline{BC} \parallel \overline{AD}$   
Prove:  $\triangle ABD \cong \triangle CDB$



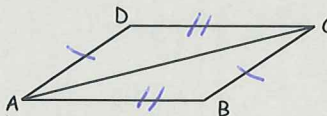
Statements

Reasons

1.  $\overline{AD} \cong \overline{BC}$ ,  $\overline{BC} \parallel \overline{AD}$
2.  $\overline{BD} \cong \overline{BD}$
3.  $\angle 1 \cong \angle 4$
4.  $\triangle ABD \cong \triangle CDB$

1. given
2. reflexive
3. alt. int.  $\angle$ s are  $\cong$
4. SAS

2. Given:  $\overline{AD} \cong \overline{CB}$ ,  $\overline{DC} \cong \overline{BA}$   
Prove:  $\triangle ABC \cong \triangle CDA$



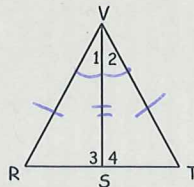
Statements

Reasons

1.  $\overline{AD} \cong \overline{CB}$ ,  $\overline{DC} \cong \overline{BA}$
2.  $\overline{AC} \cong \overline{AC}$
3.  $\triangle ABC \cong \triangle CDA$

1. given
2. reflexive
3. SSS

3. Given:  $\overline{RV} \cong \overline{TV}$ ,  $\overline{VS}$  bisects  $\angle RVT$   
Prove:  $\triangle RSV \cong \triangle TSV$



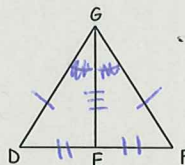
Statements

Reasons

1.  $\overline{RV} \cong \overline{TV}$ ,  $\overline{VS}$  bisects  $\angle RVT$
2.  $\angle 1 \cong \angle 2$
3.  $\overline{VS} \cong \overline{VS}$
4.  $\triangle RSV \cong \triangle TSV$

1. given
2. def of bisects
3. reflexive
4. SAS

4. Given:  $\overline{GE}$  bisects  $\overline{DF}$ ,  $\overline{GD} \cong \overline{GF}$   
Prove:  $\triangle GDE \cong \triangle GFE$



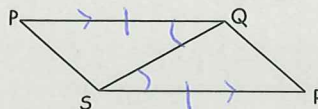
Statements

Reasons

1.  $\overline{GE}$  bisects  $\overline{DF}$ ,  $\overline{GD} \cong \overline{GF}$
2.  $\overline{DE} \cong \overline{EF}$
3.  $\overline{GE} \cong \overline{GE}$
4.  $\triangle GDE \cong \triangle GFE$

1. given
2. def of bisects
3. reflexive
4. SSS

5. Given:  $\overline{PQ} \parallel \overline{RS}$ ,  $\overline{PQ} \cong \overline{RS}$   
Prove:  $\triangle PQS \cong \triangle RSQ$



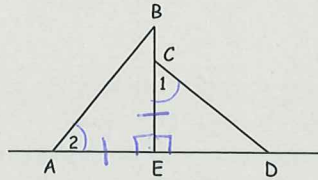
Statements

Reasons

1.  $\overline{PQ} \cong \overline{RS}$ ,  $\overline{PQ} \parallel \overline{RS}$
2.  $\angle PQS \cong \angle RSQ$
3.  $\overline{SQ} \cong \overline{SQ}$
4.  $\triangle PQS \cong \triangle RSQ$

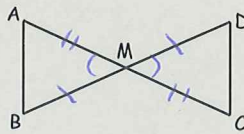
1. given
2. alt. int  $\angle$ s are  $\cong$
3. reflexive
4. SAS

6. Given:  $\overline{AE} \cong \overline{CE}$ ,  $\angle 1 \cong \angle 2$ ,  $\overline{BE} \perp \overline{AD}$   
 Prove:  $\triangle AEB \cong \triangle CED$



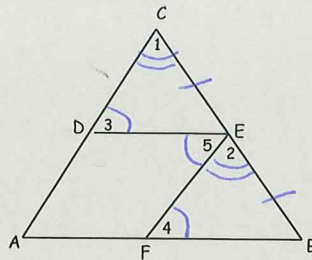
Statements	Reasons
1. $\overline{AE} \cong \overline{CE}$ , $\angle 1 \cong \angle 2$	1. given
2. $\overline{BE} \perp \overline{AD}$	2. given
3. $\angle AEB$ and $\angle CED$ are right angles	3. def of $\perp$
4. $\angle AEB \cong \angle CED$	4. substitution
5. $\triangle AEB \cong \triangle CED$	5. ASA

7. Given:  $\overline{AC}$  and  $\overline{BD}$  bisect each other at M  
 Prove:  $\triangle AMB \cong \triangle CMD$



Statements	Reasons
1. $\overline{AC}$ and $\overline{BD}$ bisect each other	1. given
2. $\overline{AM} \cong \overline{CM}$ , $\overline{BM} \cong \overline{DM}$	2. def of bisects
3. $\angle AMB \cong \angle CMD$	3. Vert. $\angle$ 's $\cong$
4. $\triangle AMB \cong \triangle CMD$	4. SAS

8. Given:  $\overline{DE} \parallel \overline{AB}$ ,  $\overline{CA} \parallel \overline{EF}$ ,  
 $\angle 1 \cong \angle 2$ ,  
 E is the midpoint of  $\overline{BC}$   
 Prove:  $\triangle CDE \cong \triangle EFB$

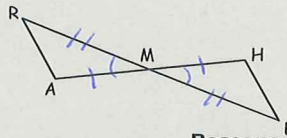


Statements	Reasons
1. $\overline{CA} \parallel \overline{EF}$	1. given
2. $\angle 3 \cong \angle 5$	2. <del>given</del> alt int $\angle$ 's are $\cong$
3. $\overline{DE} \parallel \overline{AB}$	3. given
4. $\angle 5 \cong \angle 4$	4. alt int $\angle$ 's are $\cong$
5. $\angle 3 \cong \angle 4$	5. substitution
6. $\angle 1 \cong \angle 2$	6. Given
7. E is the midpoint of $\overline{BC}$	7. given
8. $CE = EB$	8. def of midpt
9. $\overline{CE} \cong \overline{EB}$	9. def. $\cong$ segs.
10. $\triangle CDE \cong \triangle EFB$	10. AAS

Give a reason to support each statement.

- linear pairs are Suppl  
vertical angles are  $\cong$   
subs/trans  
Cpctc  
def of compl.  
angle addition  
def of bisector
1. If  $\angle A$  and  $\angle B$  are a linear pair then  $\angle A$  and  $\angle B$  are supplementary.
  2. If  $\angle A$  and  $\angle C$  are vertical angles, then  $\angle A \cong \angle C$ .
  3. If  $m\angle 1 = m\angle 2$ , and  $m\angle 2 = m\angle 3$ , then  $m\angle 1 = m\angle 3$ .
  4. If  $\triangle ABF \cong \triangle CED$ , then  $\angle A \cong \angle C$ .
  5. If  $\angle A$  and  $\angle D$  are complementary, then  $m\angle A + m\angle D = 90$ .
  6. If T is in the interior of  $\angle SRF$ , then  $m\angle SRT + m\angle TRF = m\angle SRF$ .
  7. If  $\overrightarrow{RT}$  bisects  $\angle SRF$ , then  $m\angle SRT = m\angle TRF$ .

8. Given:  $\overline{AH}$  and  $\overline{BR}$  bisect each other at M  
Prove:  $\angle A \cong \angle H$



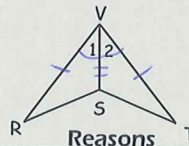
Statements

Reasons

1.  $\overline{AH}$  and  $\overline{BR}$  bisect each other at M
2.  $\overline{AM} \cong \overline{HM}$ ,  $\overline{RM} \cong \overline{BM}$
3.  $\angle RMA \cong \angle BMH$
4.  $\triangle AMR \cong \triangle HMB$
5.  $\angle A \cong \angle H$

1. given
2. def of bisect
3. vertical  $\angle$ s are  $\cong$
4. SAS
5. CPCTC

9. Given:  $\overline{RV} \cong \overline{VT}$ ,  $\overline{VS}$  bisects  $\angle RVT$   
Prove:  $\overline{RS} \cong \overline{TS}$



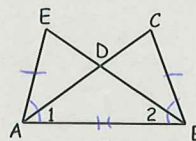
Statements

Reasons

1.  $\overline{RV} \cong \overline{VT}$ ,  $\overline{VS}$  bisects  $\angle RVT$
2.  $\angle 1 \cong \angle 2$
3.  $\overline{VS} \cong \overline{VS}$
4.  $\triangle RSV \cong \triangle TSV$
5.  $\overline{RS} \cong \overline{TS}$

1. given
2. def of bisect
3. reflexive
4. SAS
5. CPCTC

10. Given:  $\overline{AE} \cong \overline{BC}$ ,  $\angle EAB \cong \angle CBA$   
Prove:  $\angle 1 \cong \angle 2$



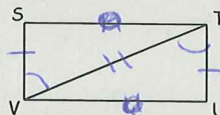
Statements

Reasons

1.  $\overline{AE} \cong \overline{BC}$ ,  $\angle EAB \cong \angle CBA$
2.  $\overline{AB} \cong \overline{AB}$
3.  $\triangle ABC \cong \triangle BAE$
4.  $\angle 1 \cong \angle 2$

1. given
2. reflexive
3. SAS
4. CPCTC

11. Given:  $\angle SVT \cong \angle UTV$ ,  $\overline{SV} \cong \overline{UT}$   
Prove:  $\angle STV \cong \angle UVT$



Statements

Reasons

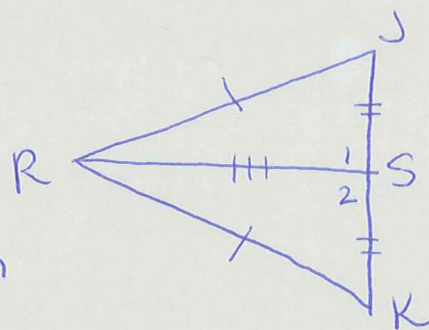
1.  $\angle SVT \cong \angle UTV$
2.  $\overline{SV} \cong \overline{UT}$
3.  $\overline{VT} \cong \overline{VT}$
4.  $\triangle SVT \cong \triangle UTV$
5.  $\angle STV \cong \angle UVT$

1. given
2. Given
3. reflexive
4. SAS
5. CPCTC



1. Given:  $RJ \cong RK$ ,  $SJ \cong SK$

Prove:  $\triangle RSJ \cong \triangle RSK$



1.  $RJ \cong RK$ ,  $SJ \cong SK$

1. given

2.  $RS \cong RS$

2. reflexive

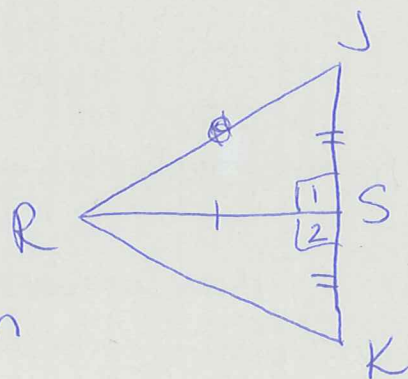
3.  $\triangle RSJ \cong \triangle RSK$

3. SSS

2. Given:  $\angle 1$  and  $\angle 2$  are right angles

$JS \cong KS$

Prove:  $\triangle RSJ \cong \triangle RSK$



1.  $\angle 1$  and  $\angle 2$  are right angles

1. given

$JS \cong KS$

2.  $\angle 1 \cong \angle 2$

2. substitution

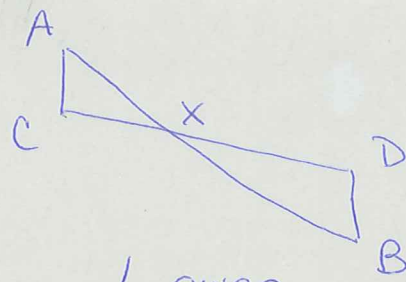
3.  $RS \cong RS$

3. reflexive

4.  $\triangle RSJ \cong \triangle RSK$

4. SAS

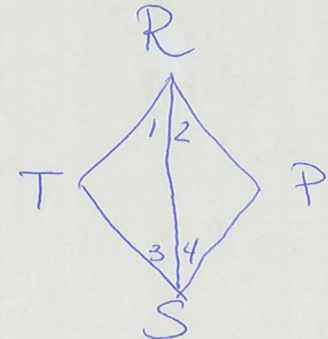
3. Given:  $AB$  &  $CD$  bisect each other  
 Prove:  $\triangle AXC \cong \triangle BXD$



1.  $AB$  &  $CD$  bisect each other
2.  $AX \cong XB$   
 $CX \cong XD$
3.  $\angle AXC \cong \angle DXB$
4.  $\triangle AXC \cong \triangle BXD$

1. given
2. def of bisect
3. vertical angles are  $\cong$
4. SAS

4. Given:  $\angle 3 \cong \angle 4$ ,  $RS$  bisects  $\angle TRP$   
 Prove:  $\triangle RST \cong \triangle RSP$

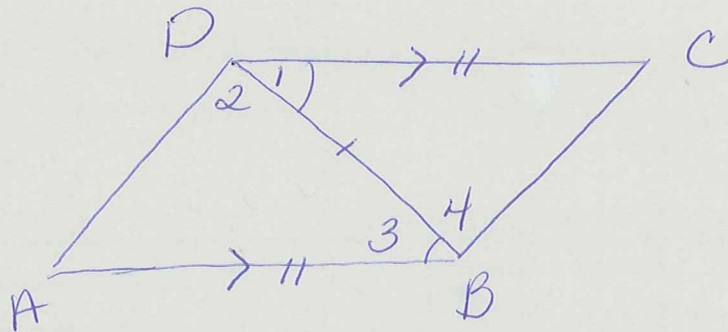


1.  $\angle 3 \cong \angle 4$   
 $RS$  bisects  $\angle TRP$
2.  $\angle 1 \cong \angle 2$
3.  $RS \cong RS$
4.  $\triangle RST \cong \triangle RSP$

1. given
2. def of bisects
3. reflexive
4. ASA

5.) Given:  $AB \cong CD$   
 $AB \parallel CD$

Prove:  $\triangle ABD \cong \triangle CDB$



1.  $AB \cong CD, AB \parallel CD$

2.  $\angle 3 \cong \angle 1$

3.  $BD \cong BD$

4.  $\triangle ABD \cong \triangle CDB$

1. given

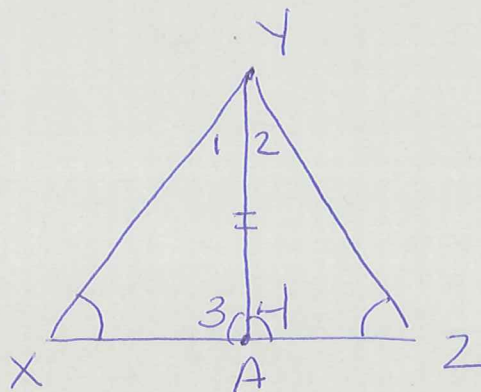
2. alt. interior  $\angle$ s are  $\cong$

3. reflexive

4. SAS

6.) Given:  $\angle X \cong \angle Z$   
 $\angle 3 \cong \angle 4$

Prove:  $\triangle XYA \cong \triangle ZYA$



1.  $\angle X \cong \angle Z, \angle 3 \cong \angle 4$

2. ~~XYA~~  $YA \cong YA$

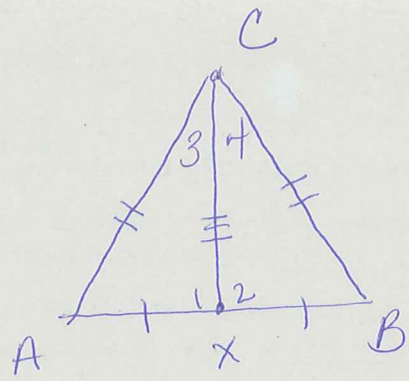
3.  $\triangle XYA \cong \triangle ZYA$

1. given

2. Reflexive

3. AAS

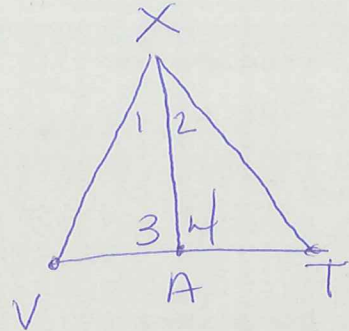
7.) Given:  $AC \cong BC$   
 $X$  is midpt of  $AB$   
 Prove:  $\triangle ACX \cong \triangle BCX$



1.  $AC \cong BC$   
 $X$  is midpt of  $AB$
2.  $AX \cong XB$
3.  $XC \cong XC$
4.  $\triangle ACX \cong \triangle BCX$

1. given
2. def of midpt
3. Reflexive
4. SSS

8.) Given:  $AX \perp VT$   
 $\angle 1 \cong \angle 2$   
 Prove:  $\triangle VXA \cong \triangle TXA$



1.  $AX \perp VT$ ,  $\angle 1 \cong \angle 2$
2.  $\angle 3 = 90^\circ$ ,  $\angle 4 = 90^\circ$
3.  $\angle 3 \cong \angle 4$
4.  $XA \cong XA$
5.  $\triangle VXA \cong \triangle TXA$

1. given
2. def of  $\perp$
3. Substitution
4. Reflexive
5. ASA