

**Basic Two-Column Proofs**

Remember to look for your basic geometry "Tools":

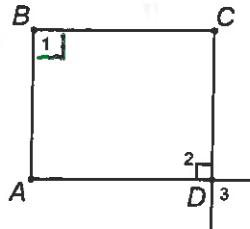
1. Intersecting lines → Vertical angles & Supplementary Angles
2. Midpoints & Segment Bisectors → the "Rainbow Connection"
3. Angle Bisectors
4. Properties of Equality → Transitive & Reflexive

Also...the better you know your definitions & theorems, the better you will be at proofs!  
 "One does not speak fluently by looking up every word"

1. Given:  $\overline{AB} \perp \overline{CB}$  ← makes  $\angle 1$  Right.

$\angle 2$  is a right angle

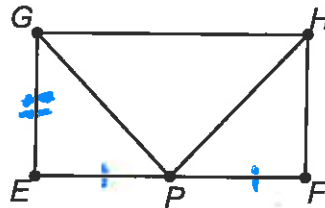
Prove:  $\angle 1 \cong \angle 3$



Statements	Reasons
① $\overline{AB} \perp \overline{CB}$	① Given
② $\angle 1$ is Right.	② $\perp$ lines form Rt $\angle$ 's.
③ $\angle 2$ vert. to $\angle 3$	③ other non-adj. $\angle$ 's formed by 2 int lines are vertical.
④ $\angle 2 \cong \angle 3$	④ Vert. $\angle$ 's are $\cong$
⑤ $\angle 1 \cong \angle 2$ Link.	⑤ All Rt $\angle$ 's are $\cong$
⑥ $\angle 1 \cong \angle 3$	⑥ Transitive.

2. Given:  $\overline{HP}$  bisects  $\overline{EF}$  at P ← makes P a midpt.

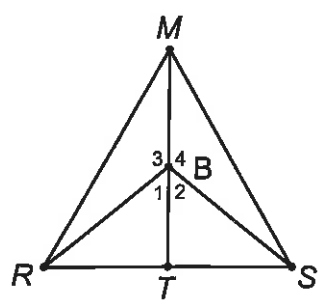
Link →  $\overline{GE} \cong \overline{EP}$  } show that  $\overline{EP} \cong \overline{FP}$   
 Prove:  $\overline{GE} \cong \overline{FP}$



Statement	Reason
① $\overline{HP}$ bisects $\overline{EF}$ at P.	① Given
② P is midpt of $\overline{EF}$	② Seg. bisector goes through midpt.
③ $\overline{EP} \cong \overline{FP}$	③ midpt $\div$ seg. into 2 $\cong$ segs.
④ $\overline{GE} \cong \overline{EP}$	④ Given
⑤ $\overline{GE} \cong \overline{FP}$	⑤ Transitive.

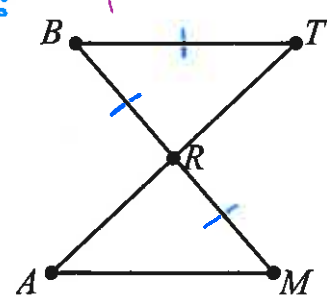
Rainbow connection

3. Given:  $\overline{MBT}$   
 $\overline{MT}$  bisects  $\angle RBS$   
 Prove:  $\angle 3 \cong \angle 4$



Statements	Reasons.
① $\overline{MBT}$ , $\overline{MT}$ bisects $\angle RBS$	① Given
② $\angle 1 \cong \angle 2$	② $\angle$ bisector $\div$ $\angle$ into 2 $\cong$ $\angle$ 's.
③ $\angle 1$ supp. $\angle 3$ $\angle 2$ supp. $\angle 4$	③ Adj. $\angle$ 's formed by 2 int. lines are supp.
④ $\angle 3 \cong \angle 4$	④ $\cong$ $\angle$ 's have $\cong$ supps.

4. Given: R is the midpoint of  $\overline{MB}$   
 $\overline{BT} \cong \overline{MR}$



Prove:  $\overline{BR} \cong \overline{MR}$   
 $\overline{BT} \cong \overline{AT}$

Statements	Reasons.
① R is midpt. of $\overline{MB}$	① Given
② $\overline{BR} \cong \overline{MR}$ link.	② midpt makes 2 $\cong$ segs.
③ $\overline{MR} \cong \overline{BT}$	③ Given
④ $\overline{BR} \cong \overline{BT}$	④ Transitive.