

### 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

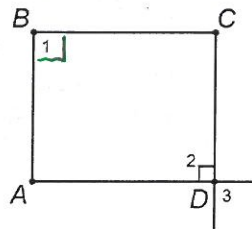
Also...the better you know your definitions & theorems, the better you will be at proofs!

"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

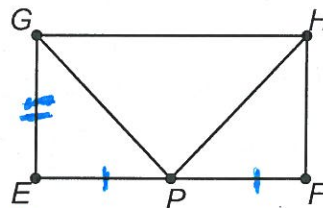
Prove:  $\angle 1 \cong \angle 3$



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 the 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:  $\overline{GE} \cong \overline{FP}$



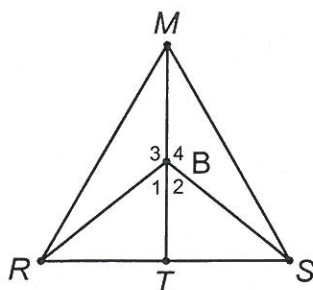
Statement	Reason
① $\overline{HP}$ bisects $\overline{EF}$ at P	① Given
② P is midpt of $\overline{EF}$	② Seg. bisector goes through midpt. } Rainbow connection
③ $\overline{EP} \cong \overline{FP}$	③ midpt $\div$ seg. into 2 $\cong$ segs. }
④ $\overline{GE} \cong \overline{EP}$	④ Given
⑤ $\overline{GE}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

3. Given:  $\overline{MBT}$

$\overline{MT}$  bisects  $\angle RBS$

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

*makes  $\angle 1 \cong \angle 2$*



Statements

Reasons.

- ①  $\overline{MBT}$ ,  $\overline{MT}$  bisects  $\angle RBS$
- ②  $\angle 1 \cong \angle 2$
- ③  $\angle 1$  supp.  $\angle 3$   
 $\angle 2$  supp.  $\angle 4$
- ④  $\angle 3 \cong \angle 4$

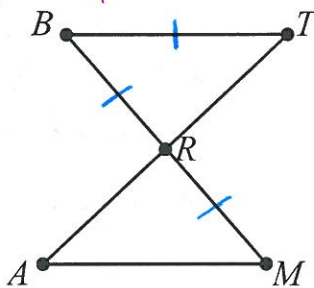
- ① Given
- ②  $\angle$  bisector  $\div$   $\angle$  into 2  $\cong$   $\angle$ 's.
- ③ Adj.  $\angle$ 's formed by 2 int. lines are supp.
- ④  $\cong$   $\angle$ 's have  $\cong$  supps.

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

$\overline{BT} \cong \overline{MR}$

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

*makes 2  $\cong$  segs.*



Statements

Reasons.

- ① R is midpt. of  $\overline{MB}$
- ②  $\overline{BR} \cong \overline{MR}$  *link.*
- ③  $\overline{MR} \cong \overline{BT}$
- ④  $\overline{BR} \cong \overline{BT}$

- ① Given
- ② midpt makes 2  $\cong$  segs.
- ③ Given
- ④ Transitive.