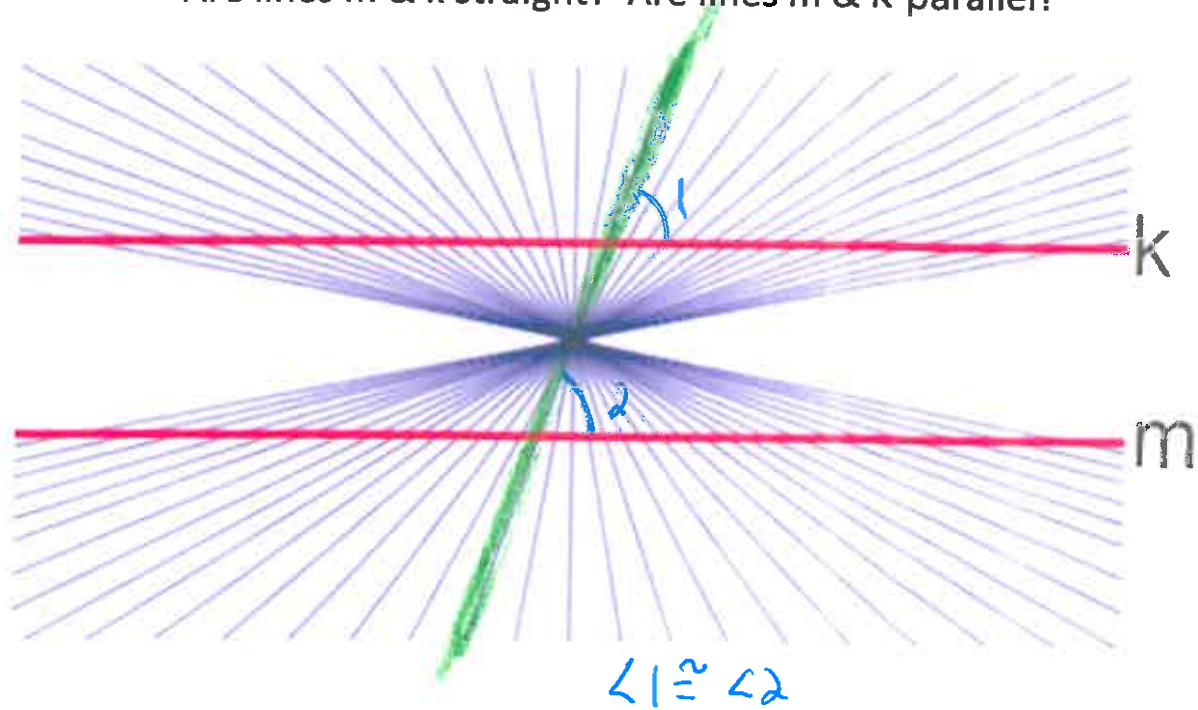


### Proving Lines Parallel

Are lines m & k straight? Are lines m & K parallel?



If 2 lines are cut by a transversal with...

Corr.  $\angle$ 's  $\cong$

OR

Alt int/ext  $\angle$ 's  $\cong$

then

the lines are  $\parallel$ .

OR

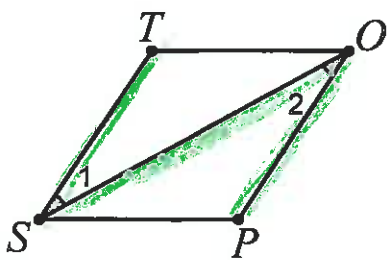
Same-side int/ext

$\angle$ 's Supp.

Example: Based on the given angles in each picture:

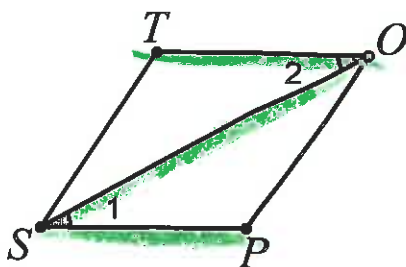
- State which lines are parallel.
- State the reason why the lines are parallel.

1.



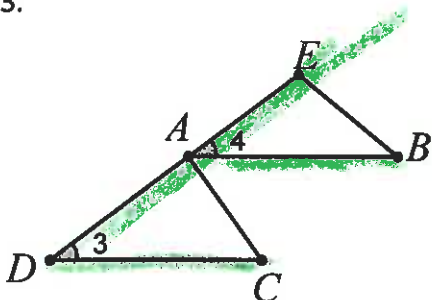
$\overline{ST} \parallel \overline{PO}$  - 2 lines cut by a trans. with alt int  $\angle$ 's  $\cong$  are  $\parallel$ .

2.



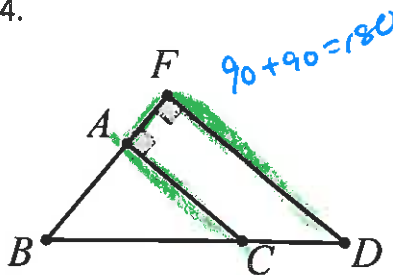
$\overline{TO} \parallel \overline{PS}$  2 lines cut by a trans. with alt int  $\angle$ 's  $\cong$  are  $\parallel$ .

3.



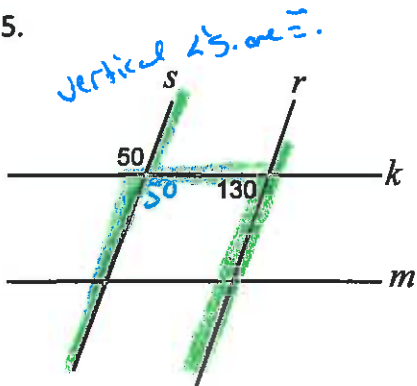
$\overline{AB} \parallel \overline{DC}$  2 lines cut by a trans w/ corr.  $\angle$ 's  $\cong$  are parallel.

4.



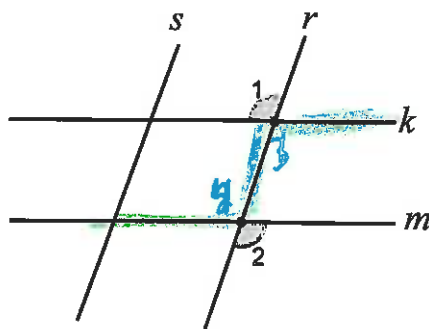
$\overline{AC} \parallel \overline{FD}$  2 lines cut by a trans w/ same side int  $\angle$ 's supp are parallel.

5.



$s \parallel r$  2 lines cut by trans w/ same side int  $\angle$ 's supp are  $\parallel$ .

6.

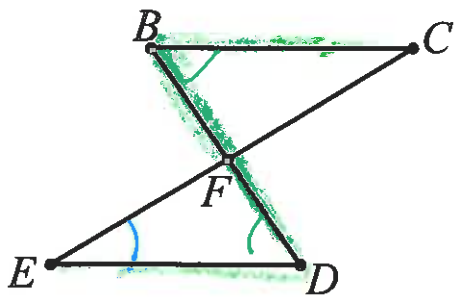


$k \parallel m$  2 lines cut by a trans w/ alt. ext.  $\angle$ 's  $\cong$  are  $\parallel$ .

**Two – Column Proof:**

1. Given:  $\angle E \cong \angle B$   
 $\angle E \cong \angle D$

Prove:  $\overline{BC} \parallel \overline{ED}$

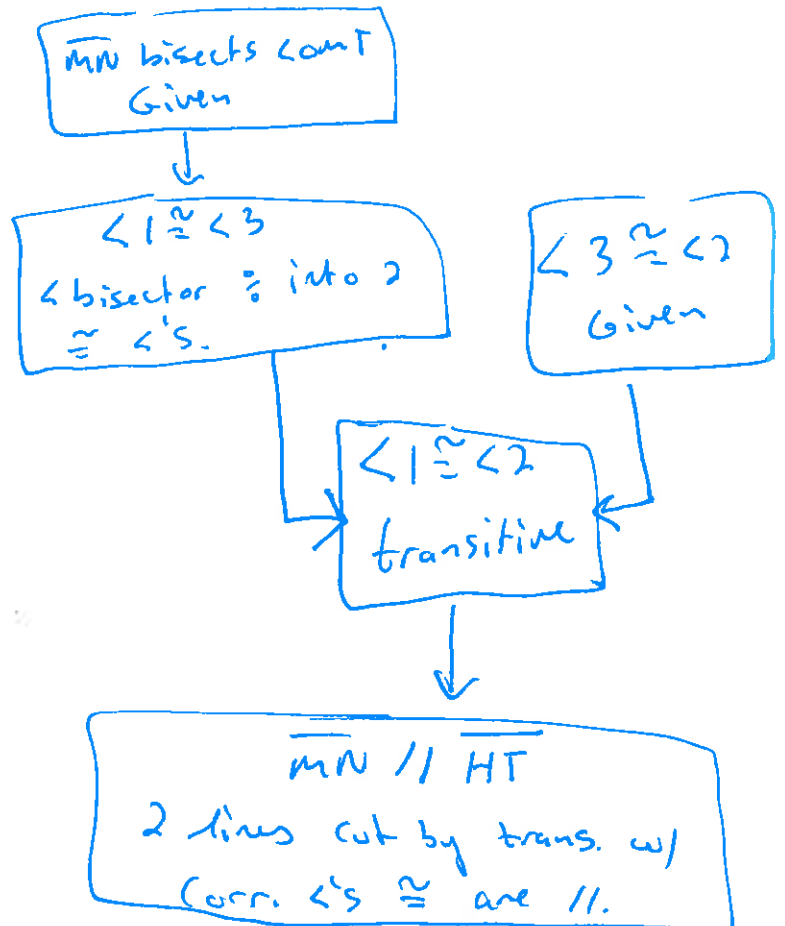
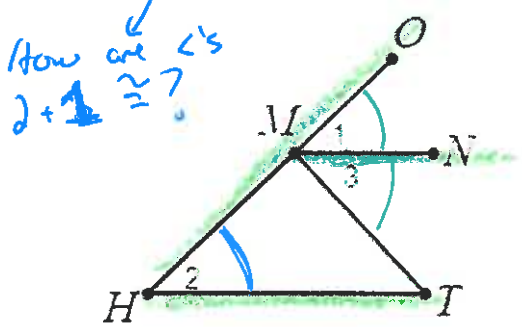


Statement	Reason.
① $\angle E \cong \angle B$ $\angle E \cong \angle D$	① Given
② $\angle B \cong \angle D$	② transitive.
③ $\overline{BC} \parallel \overline{ED}$	③ 2 lines cut by a trans. w/ alt int. $\angle$ 's $\cong$ are $\parallel$ .

**Flow Chart Proof:**

2. Given:  $\overline{MN}$  bisects  $\angle OMT$   
 $\angle 3 \cong \angle 2$

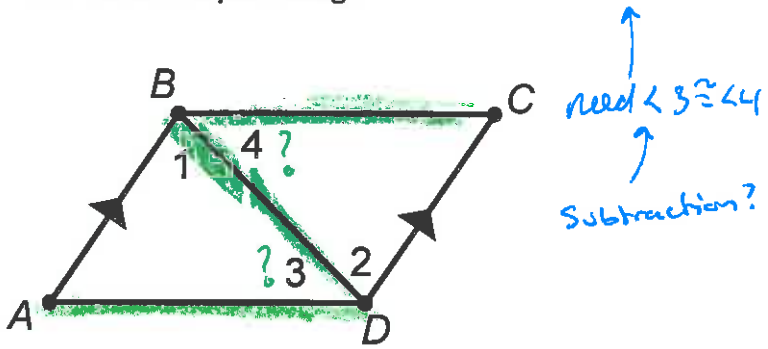
Prove:  $\overline{MN} \parallel \overline{HT}$



3. Complete a Two-Column, Paragraph, or Flow Chart Proof:

Given:  $\overline{AB} \parallel \overline{CD}$  → alt. int.  $\angle$ 's  $\cong$ . →  $\angle 1 \cong \angle 2$  (parts)  
 $\angle ABC \cong \angle CDA$  (whole)

Prove: ABCD is a parallelogram ← need  $\overline{BC} \parallel \overline{AD}$



Statement	Reason
① $\overline{AB} \parallel \overline{CD}$	① Given.
② $\angle 1 \cong \angle 2$	② 2 $\parallel$ lines cut by a trans. make alt. int. $\angle$ 's $\cong$ .
③ $m\angle ABC = m\angle CDA$	③ Given.
④ $m\angle 1 + m\angle 4 = m\angle 3 + m\angle 2$	④ Angle Addition.
⑤ $m\angle 2 + m\angle 4 = m\angle 3 + m\angle 2$	⑤ Substitution.
⑥ $m\angle 4 = m\angle 3$	⑥ Subtraction.
⑦ $\overline{BC} \parallel \overline{AD}$	⑦ 2 lines cut by a trans. w/ Alt. int. $\angle$ 's $\cong$ are $\parallel$ .
⑧ ABCD is a parallelogram.	⑧ Quad w/ 2 pairs $\parallel$ sides is a parallelogram.