

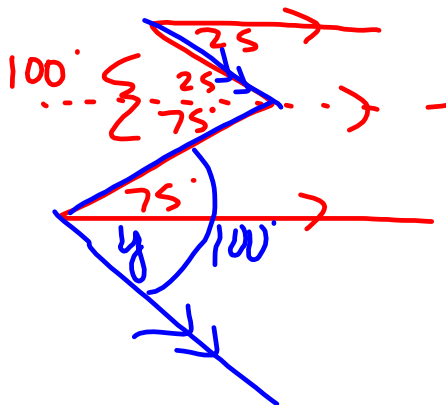
## Lesson 3.4L: Proving Lines Parallel

### AGENDA:

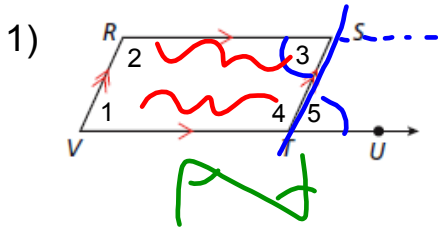
- Homework (Worksheet) Check & Review
- Lesson 3.3

### Homework:

- Pg. 167 #22-35
- Remember: CR#2 due Tues 10/25



Warm-up

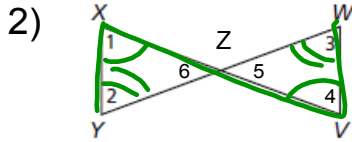


a. Name a pair of congruent alternate interior angles:

$\angle 3 \cong \angle 4$

c. Name 3 pairs of supplementary angles:

$\angle 1 + \angle 2$ ,  $\angle 2 + \angle 3$ ,  $\angle 4 + \angle 5$

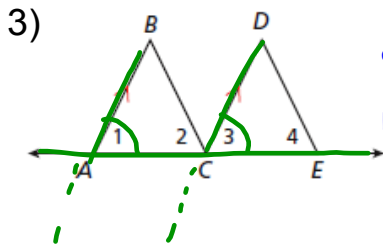


a. Name a pair of alternate interior angles:

$\angle 1 \cong \angle 4$ ,  $\angle 2 \cong \angle 3$

b. Name a pair of vertical angles:

$\angle 6 \cong \angle 5$



a. Name a pair of congruent corresponding angles:

$\angle 1 \cong \angle 3$

b. Name a pair of corresponding angles:

$\angle 2 \cong \angle 4$

~~54 126 54 126~~  
126 e 54 126 54

~~68 112 68 112~~  
112 68 112 68

$m\angle e = 54^\circ$

$m\angle f = 68^\circ$

→  $\cong$  OR SUPP  $\angle$ 'S

Given:  $\overline{AB} \parallel \overline{CD}; \overline{BC} \parallel \overline{DE}$

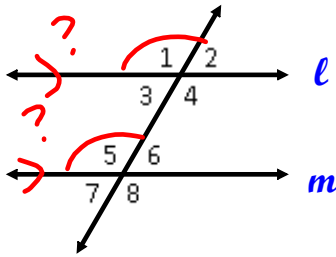
Prove:  $\angle ABC \cong \angle CDE$

TRANS/SUBST

Statements	Reasons
1. $\overline{AB} \parallel \overline{CD}$ $\overline{BC} \parallel \overline{DE}$	1. GIVEN
2. $\angle ABC$ & $\angle BCD$ ARE ALT INT $\angle$ 'S	2. DEFN OF ALT INT $\angle$ 'S
3. $\angle ABC \cong \angle BCD$ $\angle BCD \cong \angle CDE$	3. $\parallel$ LINES → ALT INT $\angle$ 'S $\cong$
4. $\angle ABC \cong \angle CDE$	4. SUBSTITUTION

CONJUNCTION :  $\sphericalangle$  TYPE +  $\cong$  / SUPP  $\rightarrow$   $\parallel$

☺ Theorem 3-3-1 Converse of Corresponding Angles Theorem LINES

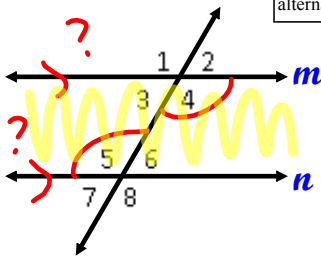


If 2 coplanar lines are cut by a transversal such that corresponding angles are congruent, then the lines are parallel.

STATEMENTS	REASONS
1) $\sphericalangle 1 \cong \sphericalangle 5$	1) Given
2) $\sphericalangle 1$ and $\sphericalangle 5$ are corresponding angles	2) Definition of corresponding angles
3) $l \parallel m$	3) <u>Congruent corresponding angles</u> $\rightarrow \parallel$ lines

☺ Theorem 3-3-3 Converse of Alt Interior Angles Theorem

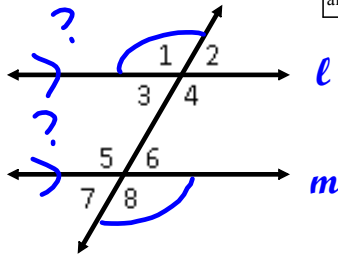
If 2 coplanar lines are cut by a transversal such that alternate interior angles are congruent, then the lines are parallel.



STATEMENTS	REASONS
1) $\sphericalangle 4 \cong \sphericalangle 5$	1) Given
2) $\sphericalangle 4$ & $\sphericalangle 5$ ARE ALT INT $\sphericalangle$ 'S	2) DEFN OF ALT INT $\sphericalangle$ 'S
3) $m \parallel n$	3) $\cong$ ALT INT $\sphericalangle$ 'S $\rightarrow \parallel$ LINES

☺ Theorem 3-3-4 Converse of Alt Ext Angles Theorem

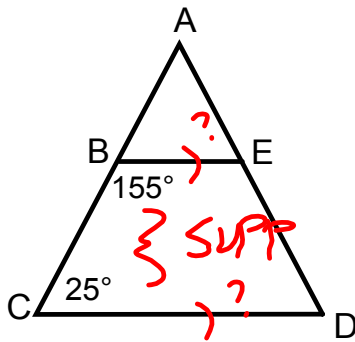
If 2 coplanar lines are cut by a transversal such that alternate exterior angles are congruent, then the lines are parallel.



STATEMENTS	REASONS
1) $\angle 1 \cong \angle 8$	1) Given
2) $\angle 1$ & $\angle 8$ ARE ALT EXT $\angle$ 'S	2) DEFN OF ALT EXT $\angle$ 'S
3) $l \parallel m$	3) ALT EXT $\angle$ 'S $\cong \rightarrow \parallel$ LINES

☺ Theorem 3-3-5 Converse of Same Side Interior Angles Theorem

If 2 coplanar lines are cut by a transversal such that same side interior angles are supplementary, then the lines are parallel.



STATEMENTS	REASONS
1) $m\angle EBC + m\angle BCD = 180^\circ$	1) Given
2) $\angle EBC$ SUPP $\angle BCD$	2) DEFN OF SUPP $\angle$ 'S
3) $\angle EBC$ & $\angle BCD$ ARE SAME SIDE INT $\angle$ 'S	3) DEFN OF SAME SIDE INT $\angle$ 'S
4) $\overline{BE} \parallel \overline{CD}$	4) SUPP SAME SIDE INT $\angle$ 'S $\rightarrow \parallel$ LINES

PRACTICE  
 Given:  $l \parallel m$ ,  $\angle 1 \cong \angle 3$   
 Prove:  $q \parallel p$

$\cong$  OR SUPP  $\angle$ 'S  
 CORR  $\angle$ 'S  
 $\cong$

WHICH  $\angle$  PAIR WILL PROVE  $l \parallel m$ ? MUST BE ON SAME TRANSVERSAL

$l \parallel m$  GIVEN  
 $\angle 1 \cong \angle 2$  CORR  $\angle$ 'S  
 DEFN CORR  $\angle$ 'S

$\angle 1 \cong \angle 2$   $\parallel$  LINES  $\rightarrow$  CORR  $\angle$ 'S  
 $\angle 1 \cong \angle 3$  GIVEN

DEFN OF ALT EXT  $\angle$ 'S  
 $\angle 2 \cong \angle 3$  ALT EXT  $\angle$ 'S

$\angle 2 \cong \angle 3$  SUBSTITUTION

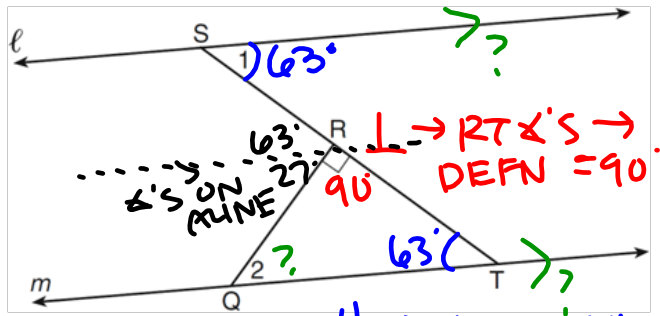
$q \parallel p$

$\cong$  ALT EXT  $\angle$ 'S  $\rightarrow$   $\parallel$  LINES

PRACTICE 2

Using the drawing at right, if the  $m\angle 1 = 63^\circ$ , what measure of angle 2 would prove  $l \parallel m$ ?

Explain your reasoning:



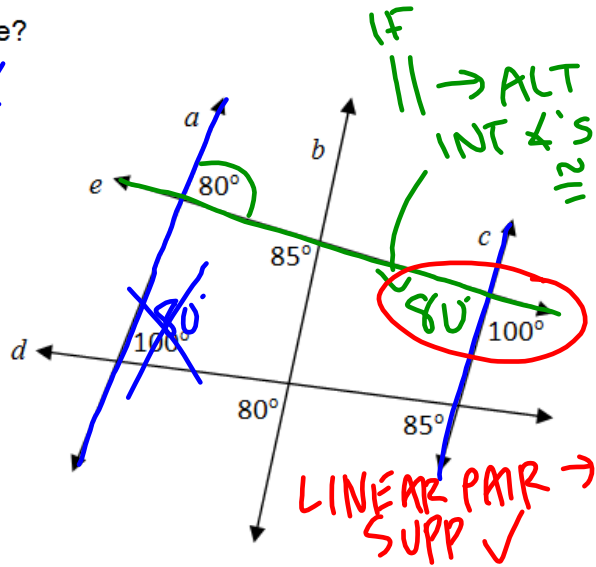
$\Delta$  SUM  
 $90^\circ + m\angle 2 + 63^\circ = 180^\circ$   
 IF  $m\angle 2 = 27^\circ$   
 THEN  $l \parallel m$

**PRACTICE 3**

Based on the diagram, which statement is true?

- 1)  ~~$a \parallel b$~~  ALT INT  $\angle$ 'S  $\neq$
- 2)  $a \parallel c$
- 3)  ~~$b \parallel c$~~  CORRES  $\angle$ 'S  $\neq$
- 4)  $d \parallel e$

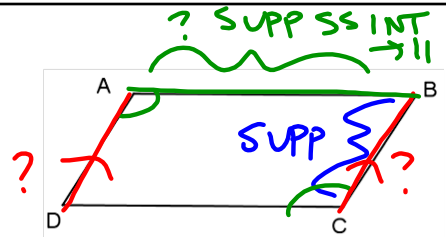
Explain your reasoning behind your choice:



**PRACTICE 4**

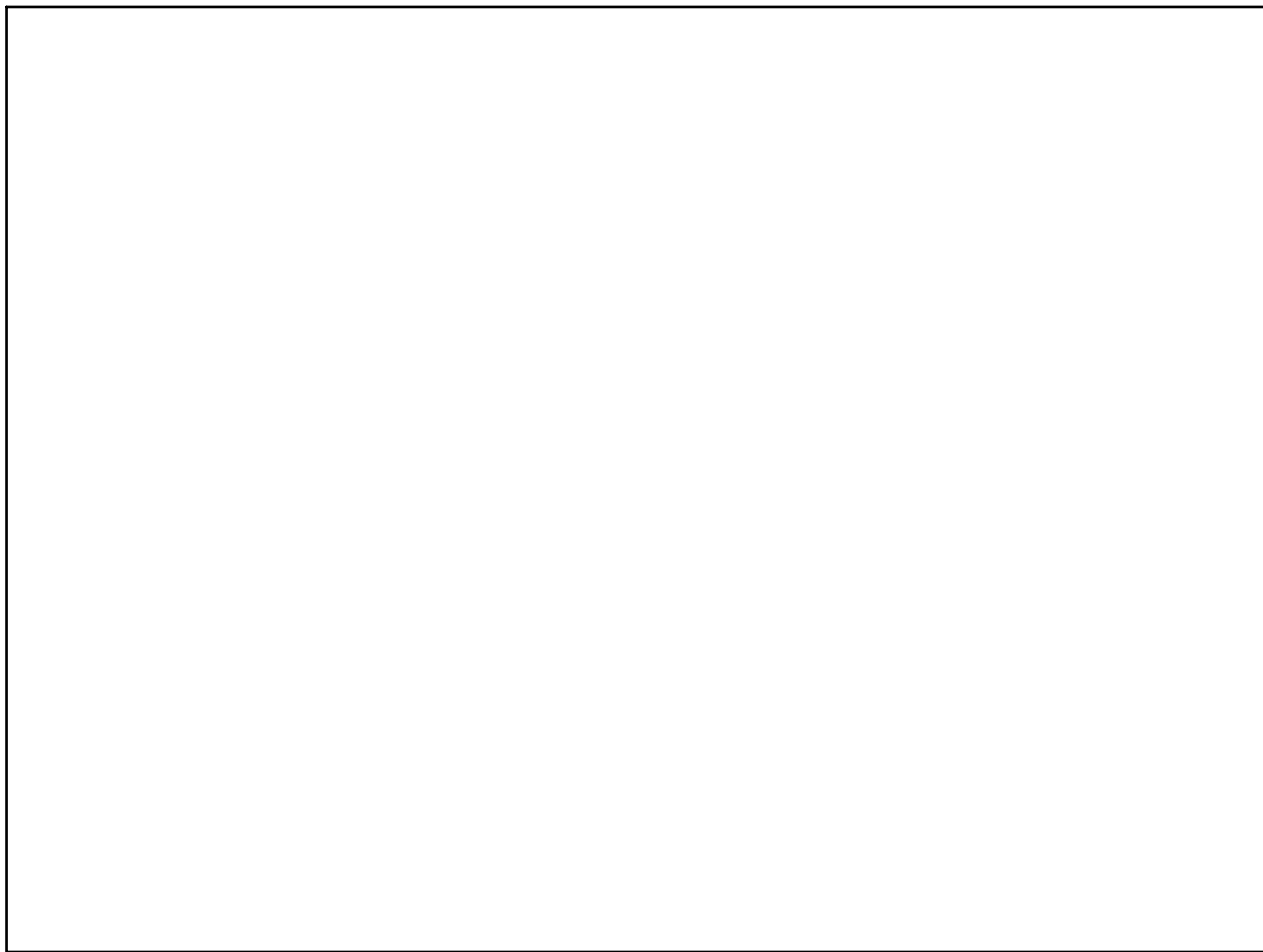
Given:  $\angle B$  and  $\angle C$  are supplementary angles;  $m\angle A = m\angle C$

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



- STATEMENTS**
1.  $\angle B$  SUPP  $\angle C$
  2.  $m\angle B + m\angle C = 180^\circ$
  3.  $m\angle A = m\angle C$
  4.  $m\angle B + m\angle A = 180^\circ$
  5.  $\angle B$  SUPP  $\angle A$
  6.  $\angle B$  &  $\angle A$  ARE SAME SIDE INT  $\angle$ 'S
  7.  $\overline{AD} \parallel \overline{BC}$

- REASONS**
1. GIVEN
  2. DEFN SUPP  $\angle$ 'S
  3. GIVEN
  4. SUBSTITUTION
  5. DEFN SUPP  $\angle$ 'S
  6. DEFN OF SAME SIDE INT  $\angle$ 'S
  7. SUPP SAME SIDE INT  $\angle$ 'S  $\rightarrow$  // LINES



## Attachments

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3-2 Worksheet 2014-15.pdf