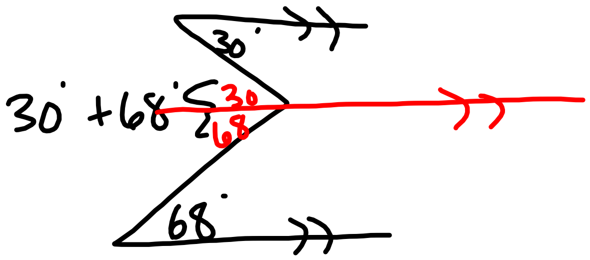
Lesson 3.3: Proving Lines Parallel

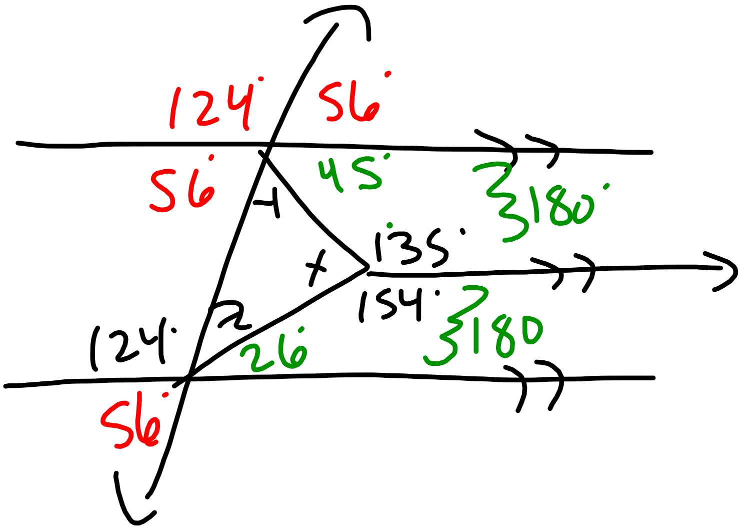
<u>AGENDA:</u>

- Homework (Worksheet) Check & Review
- Pick up compass pouch
- Lesson 3.3

<u>Homework:</u>

- Pg. 167 #22-35
- Do the practice constructions in the notes packet
- Remember: CR#2 due Tues 10/25

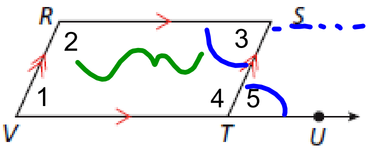




Warm-up

Z

1)



a. Name a pair of congruent alternate interior angles:

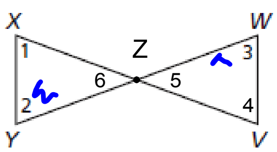
∡3 ≅ ∡5

b. Name 2 pairs of supplementary same side interior angles:

∡2 & ∡3 , ∡1 & ∡4   ∡4 & ∡5

c. Name 3 pairs of supplementary angles:

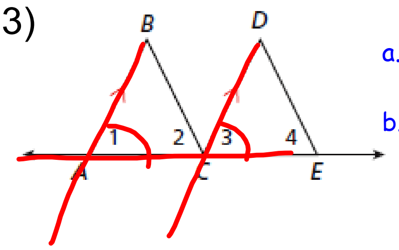
2)



a. Name a pair of alternate interior angles: ∡2 & ∡3

b. Name a pair of vertical angles: ∡6 ≅ ∡5

3)

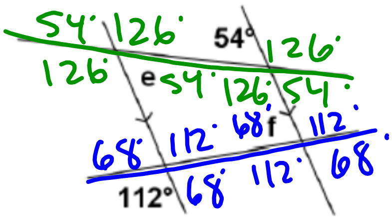


a. Name a pair of congruent corresponding angles:

∡1 ≅ ∡3

b. Name a pair of corresponding angles:

∡2 & ∡4



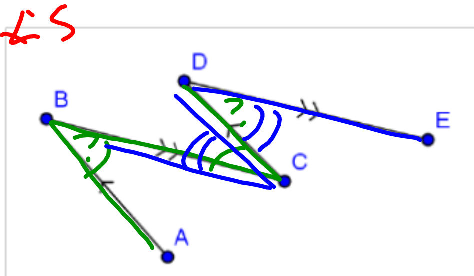
$m\angle e =$ 54°

$m\angle f =$ 68°

≅ OR SUPP ∡'S

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

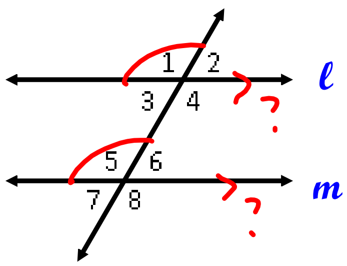
Prove: $\measuredangle ABC \cong \measuredangle CDE$



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

CONJUNCTION: ∡TYPE + ≅/SUPP

Theorem 3-3-1 Converse of Corresponding Angles Theorem

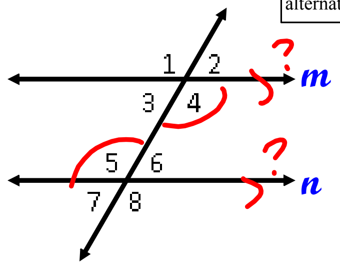


If 2 coplanar lines are cut by a transversal such that corresponding angles are congruent, then the lines are parallel.

STATEMENTS	REASONS
1) $\measuredangle 1 \cong \measuredangle 5$	1) Given
2) $\measuredangle 1$ and $\measuredangle 5$ are corresponding angles	2) Definition of corresponding angles
3) $l \parallel m$	3) Congruent corresponding angles → ∥ lines

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

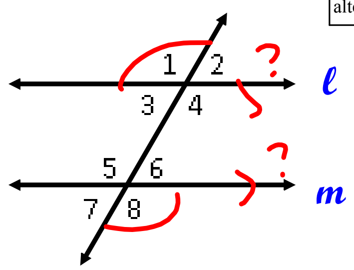
If 2 coplanar lines are cut by a transversal such that alternate interior angles are congruent, then the lines are parallel.



STATEMENTS	REASONS
1) $\measuredangle 4 \cong \measuredangle 5$	1) Given
2) ∡4 & ∡5 ARE ALT INT ∡'S	2) DEFN OF ALT INT ∡'S
3) $m \parallel n$	3) ALT INT ∡'S ≅ → ∥ LINES

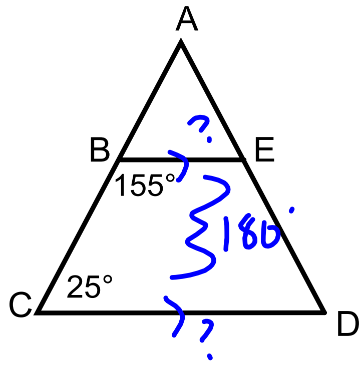
Theorem 3-3-4 Converse of Alt Ext Angles Theorem

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

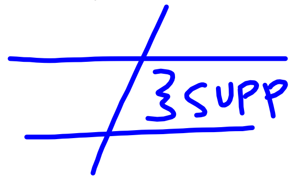


STATEMENTS	REASONS
1) $\measuredangle 1 \cong \measuredangle 8$	1) Given
2) ∡1 & ∡8 ARE ALT EXT ∡'S	2) DEFN OF ALT EXT ∡'S
3) $\ell \parallel m$	3) ALT EXT ∡'S ≅ → ∥ LINES

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) $m\measuredangle EBC + m\measuredangle BCD = 180°$	1) Given
2) ∠EBC SUPP ∠BCD	2) DEFN OF SUPP ∠'S
3) ∠EBC & ∠BCD ARE SAME SIDE INT	3) DEFN OF SAME SIDE INT ∠'S
4) $\overline{BE} \parallel \overline{CD}$	4) SUPP SAME SIDE INT ∠'S → ∥ LINES

PRACTICE 1 → ∠'S

Given: ℓ ∥ m, ∠1 ≅ ∠3

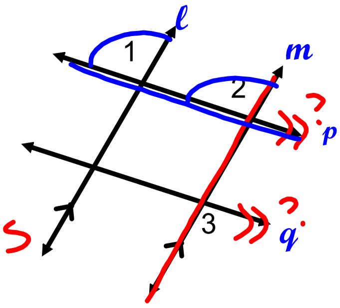
Prove: q ∥ p

∠1 ≅ ∠2 CORR

SUBSTITUTION

∠2 ≅ ∠3 → ∥ LINES

≅ ALT EXT



WHICH ∠ PAIR WILL PROVE ∥?

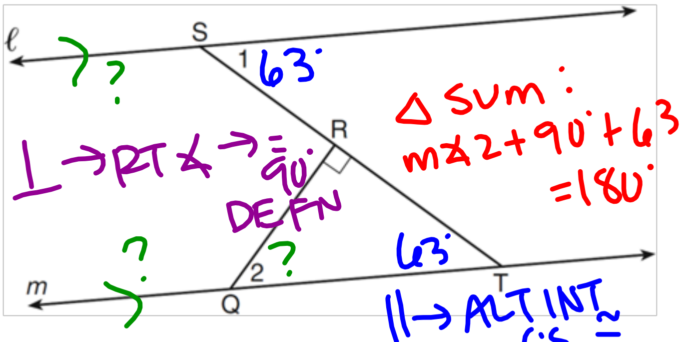
STAY ON TRANSVERSAL

STATEMENTS	REASONS
1. ℓ ∥ m	1. GIVEN
2. ∠1 & ∠2 CORRESP ∠'S	2. DEFN OF CORRESP ∠'S
3. ∠1 ≅ ∠2	3. ∥ LINES → CORRESP ∠'S ≅
4. ∠1 ≅ ∠3	4. GIVEN
5. ∠2 ≅ ∠3	5. SUBSTITUTION (STEP 3 INTO 4)
6. ∠2 & ∠3 ALT EXT ∠'S	6. DEFN OF ALT EXT ∠'S
7. q ∥ p	7. ≅ ALT EXT ∠'S → ∥ LINES

PRACTICE 2

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

Explain your reasoning:



IF m∡2=27°, THEN ℓ∥m.

PRACTICE 3

Based on the diagram, which statement is true?

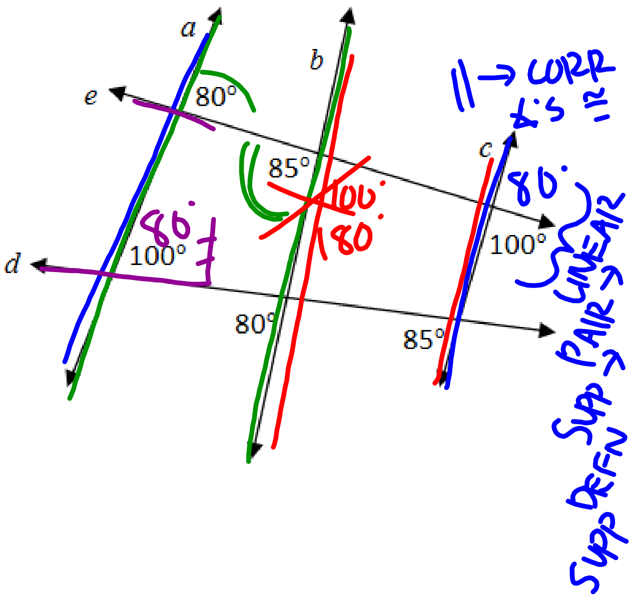
1) ~~$a \parallel b$~~ ALT INT ∡'S NOT ≅

2) $a \parallel c$

3) $b \parallel c$

4) $d \parallel e$

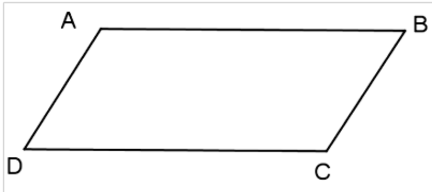
Explain your reasoning behind your choice:



PRACTICE 4

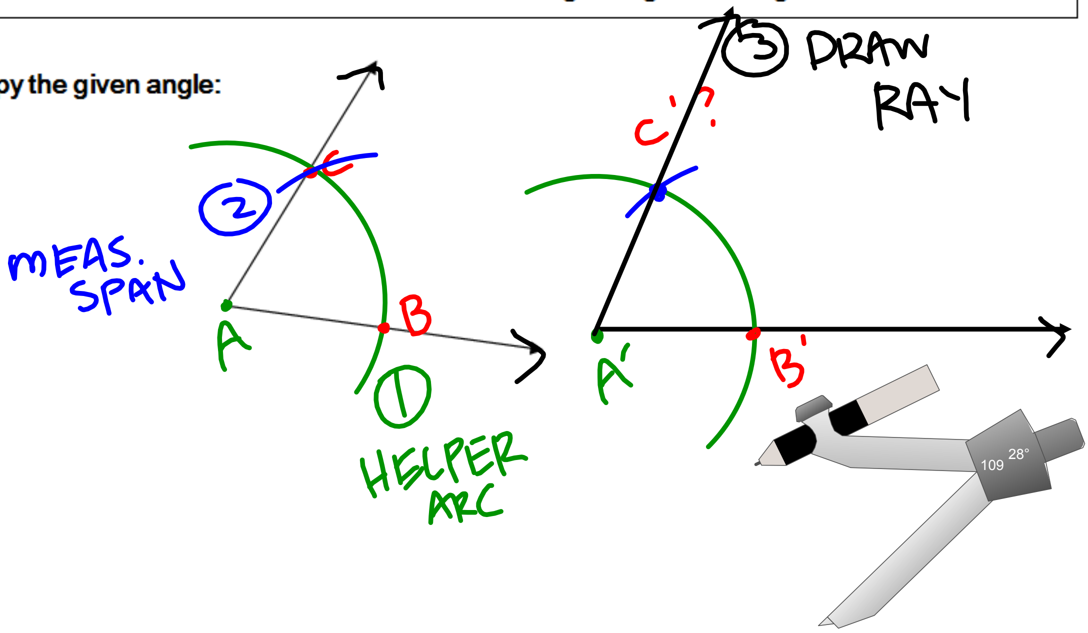
Given: $\measuredangle B$ and $\measuredangle C$ are supplementary angles; $m\measuredangle A = m\measuredangle C$

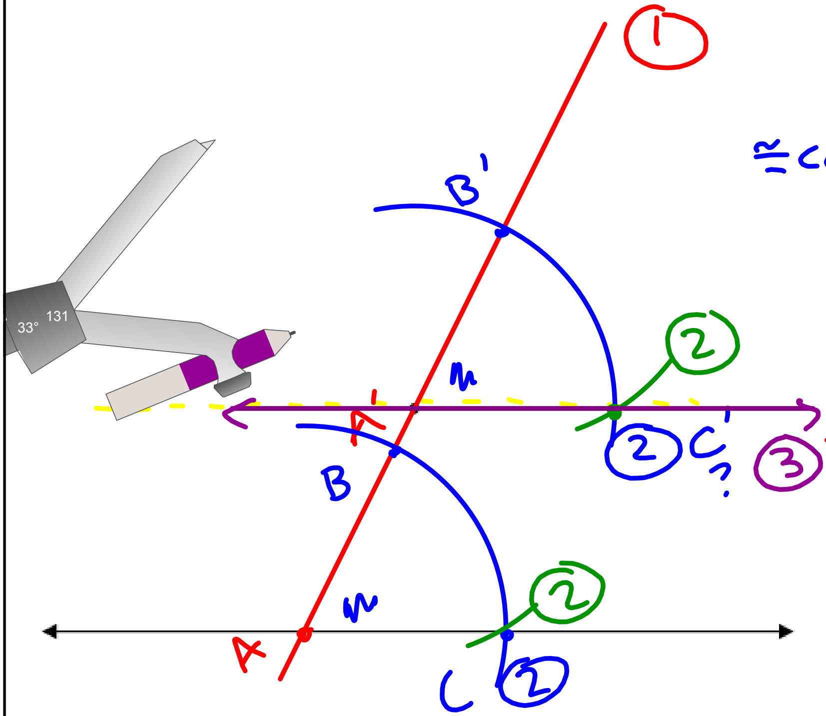
Prove: $\overline{AD} \parallel \overline{BC}$



Construction of a Parallel Line Using Congruent Angles

Review: Copy the given angle:





≅ CORR ∡'S → ∥ LINES

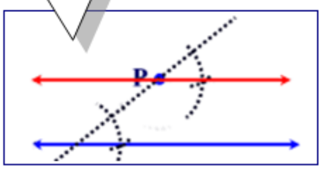
KEY STEPS TO SKILL:

1. DRAW TRANSVERSAL THRU PT & LINE
2. COPY ≅ CORR ∡
3. DRAW ∥ LINE

Extend: Construct a Parallel Line through a Given Point

Directions:

This is what I look like if I am the answer to a multiple choice question on the Regents!



1. With your straightedge, draw a transversal through point *P*. This is simply a straight line which runs through *P* and intersects the given line.

2. Using your knowledge of the construction COPY AN ANGLE, construct a copy of the angle formed by the transversal and the given line such that the copy is located UP at point *P*. The vertex of your copied angle will be point P.

3. When the copy of the angle is complete, you will have two parallel lines.

This new line is parallel to the given line.

Explanation of construction: Since we used the construction to copy an angle, we now have two angles of equal measure in our diagram. In relation to parallel lines, these two equal angles are positioned in such a manner that they are called corresponding angles. A theorem relating to parallel lines tells us that if two lines are cut by a transversal and the corresponding angles are congruent (equal), then the lines are parallel.

Attachments

3-2 Worksheet 2014-15.pdf