

## Lesson 2-3/ 2-4L : Algebraic & Geometric Proofs -

### Agenda

- Check and Review Homework on Algebraic Proofs
- Mini Quiz #1
- Guided Notes - need pouches, notes, and your unit outline/lesson summaries/axioms pages


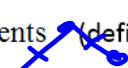
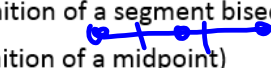
### HW

- **Worksheet 2-3/ 2-4L**

Geometry + LAB Name: \_\_\_\_\_ Date: \_\_\_\_\_ Section: \_\_\_\_\_

### 2-3R/2-4L Notes Algebraic + Geometric Proofs (Bisectors & Halves of Congruent Figures)

Refer to your lesson summaries and axiom pages for examples of & additional reasons used in proofs.

- Angle bisector  $\leftrightarrow 2 \cong$  adjacent angles  (definition of an angle bisector)
- Segment bisector  $\leftrightarrow 2 \cong$  adjacent collinear segments  (definition of a segment bisector)
- Midpoint  $\leftrightarrow 2 \cong$  adjacent collinear segments  (definition of a midpoint)
- Also: segment bisector  $\leftrightarrow$  midpoint of the segment
- Halves of Congruent Angles are Congruent / Halves of Congruent Segments are Congruent
- *Angle Addition Postulate/Segment Addition Postulate*
- *Reflexive, Transitive, Properties, Algebraic Properties & Substitution*

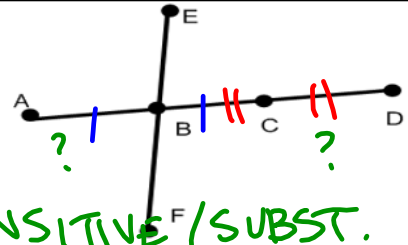
EX 1: Given Bisectors  $\rightarrow 2 \cong$  SEGS

Given:  $\overline{EF}$  bisects  $\overline{AC}$  at B;  $\overline{ABCD}$   
 C is the midpoint of  $\overline{BD}$

Prove:  $\overline{AB} \cong \overline{CD}$

$\rightarrow 2 \cong$  SEGS

PLAN: TRANSITIVE / SUBST.



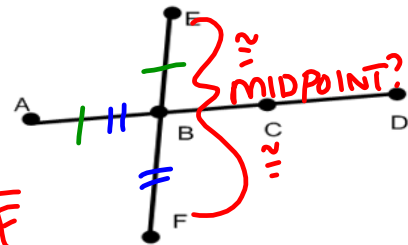
Statements	Reasons
1. $\overline{EF}$ BISECTS $\overline{AC}$ @ B, $\overline{ABCD}$	1. GIVEN
2. $\overline{AB} \cong \overline{BC}$	2. DEFN OF SEGMENT BISECTOR
3. C IS MIDPOINT OF $\overline{BD}$	3. GIVEN
4. $\overline{BC} \cong \overline{CD}$	4. DEFN OF MIDPOINT MIDPOINT $\rightarrow 2 \cong$ SEGS
5. $\overline{AB} \cong \overline{CD}$	5. TRANSITIVE PROP OF $\cong$

EX 2: Prove a Bisector

Given:  $\overline{BE} \cong \overline{AB}$ ;  $\overline{AB} \cong \overline{BF}$ ,  $\overline{EBF}$

Prove: B is the midpoint of  $\overline{EF}$

PLAN: TRANS  
 $\overline{EB} \cong \overline{BF}$



Statements	Reasons
1. $\overline{BE} \cong \overline{AB}$ $\overline{AB} \cong \overline{BF}$ $\overline{EBF}$	1. GIVEN
2. $\overline{EB} \cong \overline{BF}$	2. TRANSITIVE PROP
3. B IS MIDPOINT OF $\overline{EF}$	3. DEFN OF MIDPOINT

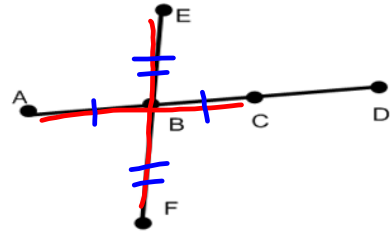
EX 3: Halves of Congruent Figures

$\rightarrow 2 \cong \text{SEGS}$

Given:  $\overline{AC} \cong \overline{EF}$ ,  $\overline{ABC}$ ,  $\overline{EBF}$ ; B bisects  $\overline{AC}$  and  $\overline{EF}$

Prove:  $\overline{AB} \cong \overline{EB}$

BIGS  $\cong$  ✓  
BISECTED ✓



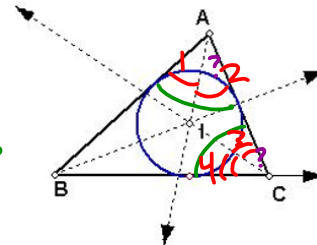
Statements	Reasons
1. B BISECTS $\overline{AC}$ , $\overline{ABC}$	1. GIVEN
2. $\overline{AB} \cong \overline{BC}$ HALVES	2. DEFN SEGMENT BISECTOR
3. B BISECTS $\overline{EF}$ , $\overline{EBF}$	3. GIVEN
4. $\overline{EB} \cong \overline{BF}$ HALVES	4. DEFN SEG BISECTOR
5. $\overline{AC} \cong \overline{EF} \cong \text{SEG}$	5. GIVEN
6. $\overline{AB} \cong \overline{EB}$	6. HALVES OF $\cong$ SEGMENTS ARE $\cong$

EX 4: Halves of Congruent Figures

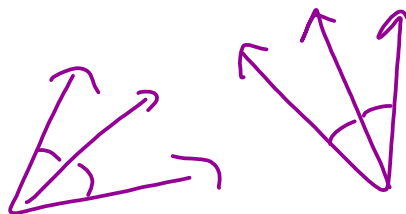
Given:  $\overline{AI}$  bisects  $\angle BAC$ ;  $\overline{CI}$  bisects  $\angle BCA$ ;  $\angle BAC \cong \angle BCA$

Prove:  $\angle IAC \cong \angle ICA$   
 $\angle 2 \cong \angle 3$

$\rightarrow 2 \cong \angle$ 'S ✓  
HALVES OF  $\cong \angle$ 'S



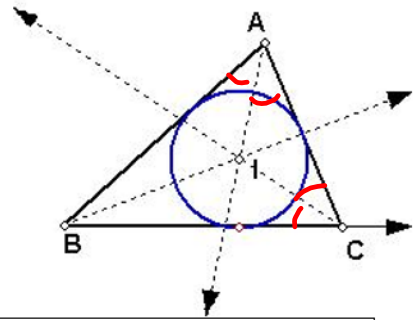
Statements	Reasons
1. $\overline{AI}$ BISECTS $\angle BAC$	1. GIVEN
2. $\overline{CI}$ BISECTS $\angle BCA$	2. DEFN OF $\angle$ BISECTOR
3. $\angle 1 \cong \angle 2$ , $\angle 3 \cong \angle 4$	3. GIVEN
4. $\angle BAC \cong \angle BCA$ $\angle 2 \cong \angle 3$	4. HALVES OF $\cong$ ANGLES ARE CONGRUENT



**EX 5: Halves of Congruent Figures**

**Given:**  $\angle BAI \cong \angle IAC \cong \angle BCI \cong \angle ICA$

**Prove:**  $\angle BAC \cong \angle BCA$



Statements	Reasons
1. $\angle BAI \cong \angle IAC \cong \angle BCI \cong \angle ICA$	1. GIVEN
2. $\vec{AI}$ BIS $\angle BAC$ ; $\vec{CI}$ BIS $\angle BCA$	2. DEFN OF $\angle$ BISECTOR
3. $\angle BAC \cong \angle BCA$	3. HALVES OF $\cong \angle$ 'S ARE $\cong$

Sum of Parts		
Conditional Statement	Diagram / Example	Stated as a Reason in a Proof
If point C is in the interior of $\angle AOB$ , then _____		
Given a sequence of $n$ consecutive adjacent angles whose interiors are all disjoint such that the angle formed by the first $n-1$ angles and the last angle are a linear pair, then the angle measures _____	( $\angle$ 's on a line)	Consecutive adjacent angles on a line sum to $180^\circ$
If the sum of the measures of all angles formed by three or more rays with the same vertex and whose interiors do not overlap, then the angle measures _____		Angles at a point sum to $360^\circ$
If points C and D are in the interior of $\angle AOB$ AND $\angle AOD \cong \angle BOC$ , then _____  <i>See lesson summaries for 3 step process (can also go <math>\cong</math> bigs <math>\rightarrow</math> <math>\cong</math> littles)</i>		Common Angle Theorem Or Overlapping Angles Theorem