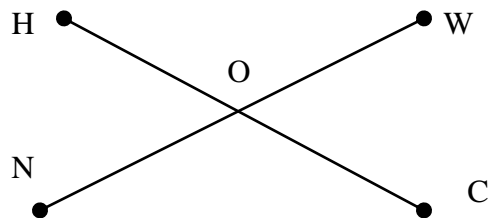


S-G Geometry Session 8 7/2

Given: O is the midpoint of \overline{NW} ;

$$\overline{NO} \cong \overline{OC}$$

Prove: $\overline{OC} \cong \overline{OW}$



Statements	Reasons
1. O is the <u>midpoint</u> of \overline{NW}	1. Given
2. $\overline{NO} \cong \overline{OW}$	2. Def of midpoint
3. $\overline{NO} \cong \overline{OC}$	3. Given
4. $\overline{OC} \cong \overline{OW}$	4. Substitute/Syllogism

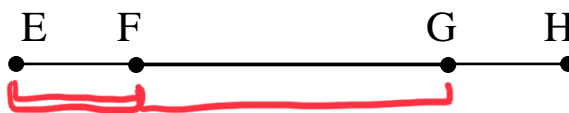
$$\overline{NO} = \overline{OW} \quad \overline{NO} = \overline{OC}$$

$$\overline{OC} = \overline{OW}$$

$$A \rightarrow B \quad B \rightarrow C \quad A \rightarrow C$$

Given: $\overline{EF} \cong \overline{GH}$

Prove: $\overline{EG} \cong \overline{FH}$



Statements	Reasons
1. $\overline{EF} \cong \overline{GH}$	1. Given
2. $EF = GH$	2. Def of congruency $\cong \rightarrow =$
3. $EF + FG = GH + FG$	3. Add POE
4. $EF + FG = EG$; $GH + FG = FH$	4. Segment Add Post
5. $EG = FH$	5. Substitution
6. $\overline{EG} \cong \overline{FH}$	6. Def of congruency

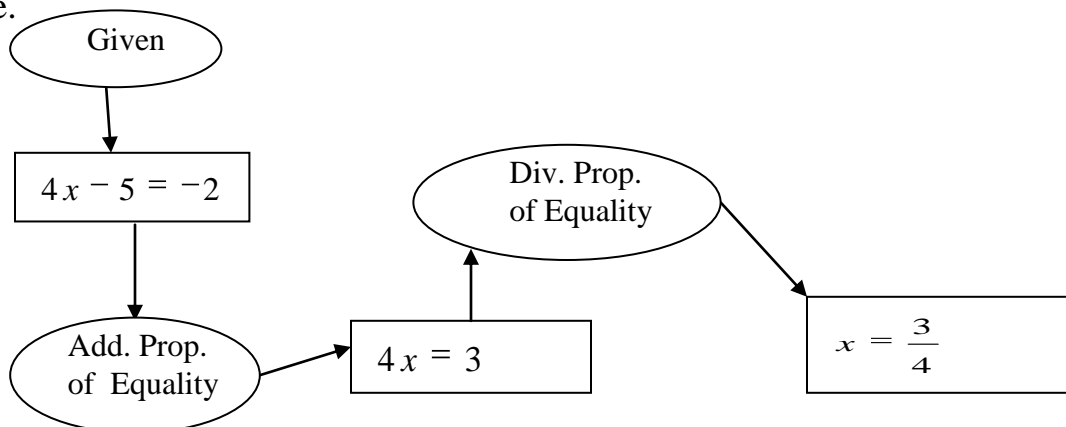
Flow Proofs

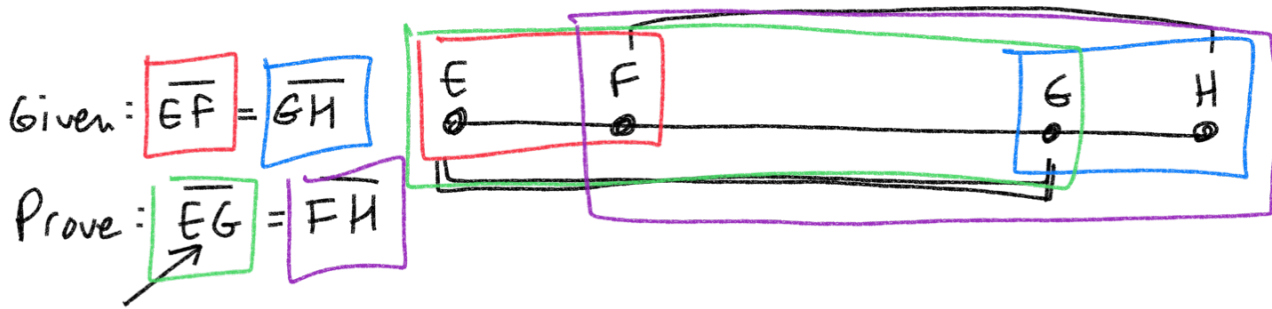
Proofs do not always come in two-column format. Sometimes they are more visual, as you will see in this example.

Flow Proof

Given: $4x - 5 = -2$

Prove: $x = \frac{3}{4}$





Statement

$$\overline{EF} = \overline{GH}$$

$$\overline{EF} + \overline{FG} = \overline{EG}$$

$$\overline{GH} + \overline{FG} = \overline{FH}$$

$$\overline{EF} + \overline{FG} = \overline{FH}$$

$$\overline{EG} = \overline{FH}$$

Reason

Given

Seg Add Post

Seg Add Post

Substitution

Substitution

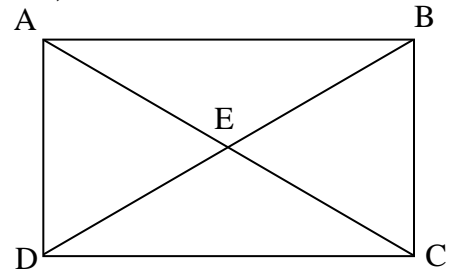
DEFINITIONS AND POSTULATES REGARDING SEGMENTS	
SEGMENT ADDITION POSTULATE	If C is between A and B , then $AC + CB = AB$
DEFINITION OF SEGMENT CONGRUENCE	If $\overline{AB} \cong \overline{CD}$, then $AB = CD$
DEFINITION OF A SEGMENT BISECTOR	A geometric figure that divides a segment in to two congruent halves
DEFINITION OF A MIDPOINT	A point that bisects a segment
DEFINITIONS AND POSTULATES REGARDING ANGLES	
ANGLE ADDITION POSTULATE	If C is on the interior of $\angle ABD$, then $m\angle ABC + m\angle CBD = m\angle ABD$
DEFINITION OF ANGLE CONGRUENCE	If $\angle A \cong \angle B$, then $m\angle A = m\angle B$
DEFINITION OF AN ANGLE BISECTOR	A geometric figure that divides a angle in to two congruent halves

Proofs with Pictures

It is often much easier to plan and finish a proof if there is a visual aid. Use the picture to help you plan and finish the proof. Be sure that as you write each statement, you make the picture match your proof by inserting marks, measures, etc.

Given: E is the midpoint
of \overline{AC} and \overline{BD} ; $\overline{ED} \cong \overline{EC}$

Prove: $\overline{AE} \cong \overline{BE}$



Statements	Reasons
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E is the midpoint of \overline{AC}
and \overline{BD}

Given

$$\overline{AE} = \overline{EC}$$

$$\overline{BE} = \overline{ED}$$

Def of Midpoint
Def of Midpoint

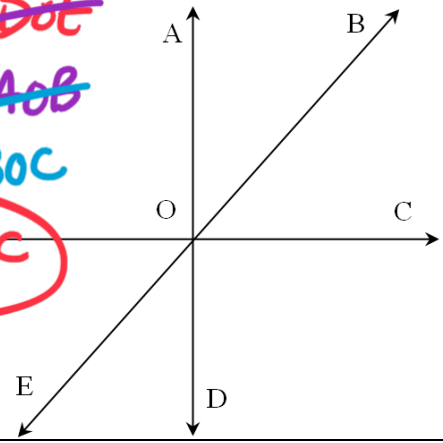
$$\overline{ED} = \overline{EC}$$

Given

$$\overline{AE} = \overline{BE}$$

Substitution / syllogism

Given: \overline{OB} bisects $\angle AOC$; $\angle EOF = \angle DOE$
 \overline{OE} bisects $\angle DOF$; $\angle AOB \cong \angle DOE$
 Prove: $\angle EOF \cong \angle BOC$

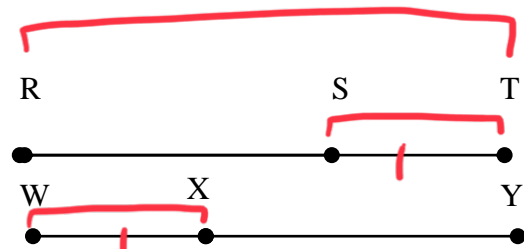


Statements	Reasons
1 \overline{OB} bisects $\angle AOC$	Given
2 $\angle AOB = \angle BOC$	Def of bisector
3 \overline{OE} bisects $\angle DOF$	Given
4 $\angle EOF = \angle DOE$	Def of bisector
5 $\angle AOB = \angle DOE$	Given
$\angle EOF = \angle BOC$	Substitution / syllogism

Elementary Geometric Proofs

Segments

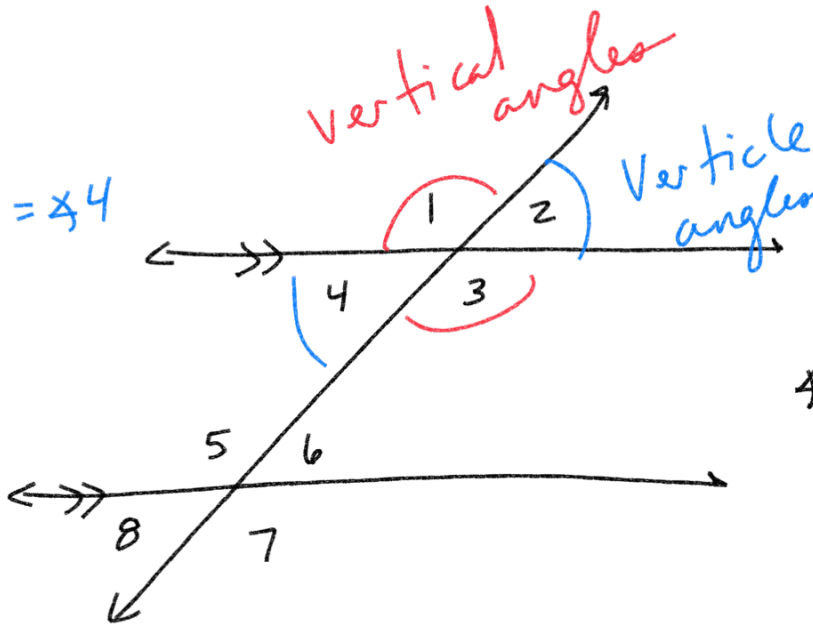
Given: $\overline{RT} \cong \overline{WY}$; $\overline{ST} \cong \overline{WX}$
 Prove: $\overline{RS} \cong \overline{XY}$



Statements	Reasons
$\overline{RT} = \overline{WY}$	Given
$\overline{ST} = \overline{WX}$	Given
$\overline{RS} + \overline{ST} = \overline{RT}$	Seg Add Post
$\overline{WX} + \overline{XY} = \overline{WY}$	Seg Add Post
$\overline{RS} + \overline{ST} = \overline{WX} + \overline{XY}$	Substitution
$\overline{RS} + \overline{WX} = \overline{WX} + \overline{XY}$	Substitution
$\overline{RS} = \overline{XY}$	Sub POE

Chapter 3 (Not on Test 2)

$\angle 2 = \angle 4$



Vertical angles

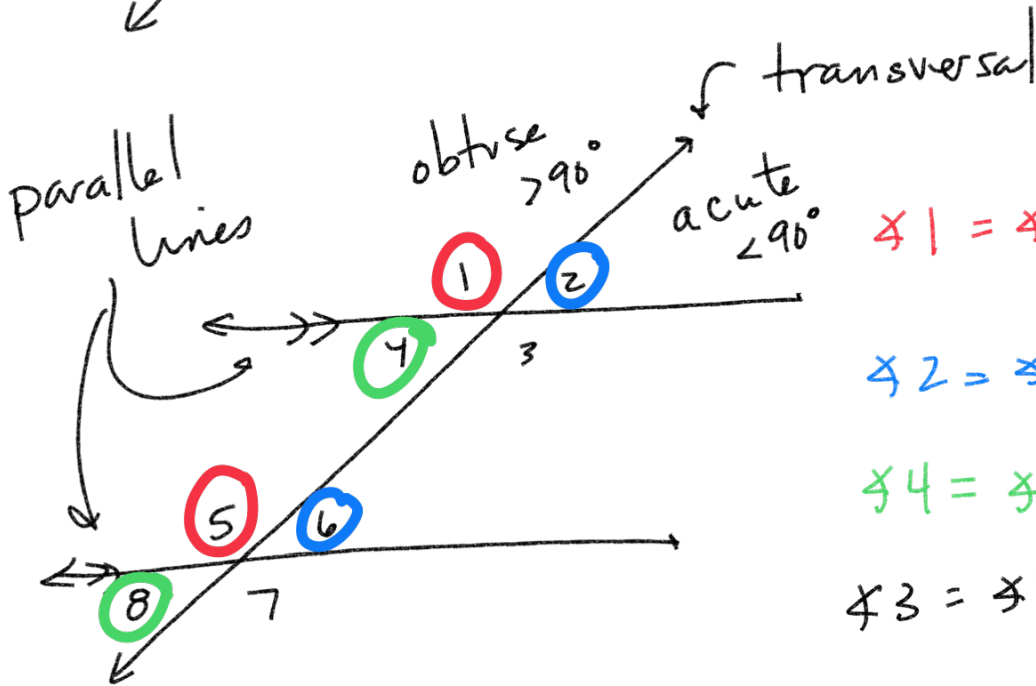
Vertical angles

$\angle 1 + \angle 2 = 180^\circ$ Supplemental or linear pairs

$\angle 2 + \angle 3 = 180^\circ$ Supplemental or linear pairs

$\angle 1 + \angle 2 = \angle 2 + \angle 3$ substitution
 $-\angle 2 - \angle 2$

$\angle 1 = \angle 3$ Sub PoF



Parallel lines

obtuse $> 90^\circ$

acute $< 90^\circ$

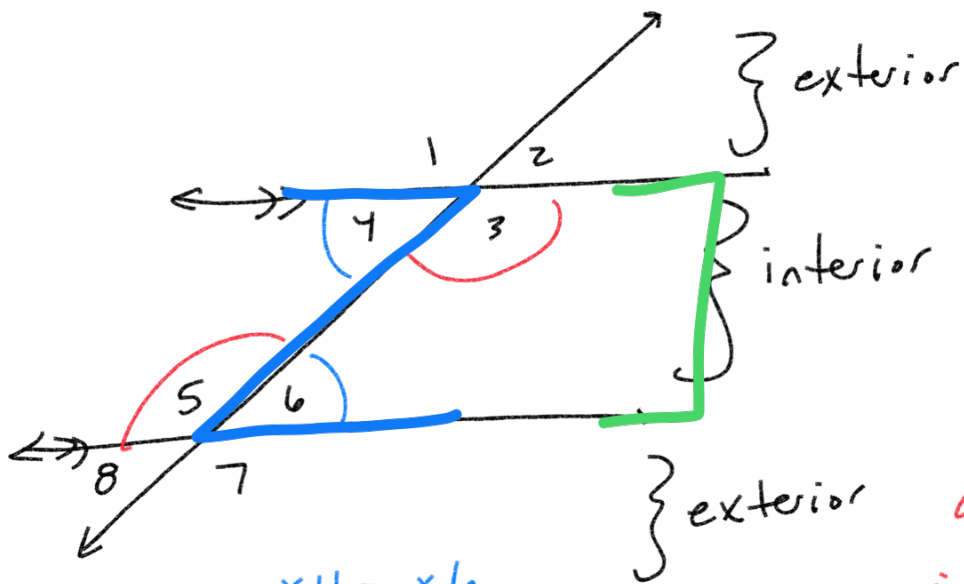
transversal

$\angle 1 = \angle 5$ corresponding angles

$\angle 2 = \angle 6$ corresponding

$\angle 4 = \angle 8$ corresponding

$\angle 3 = \angle 7$

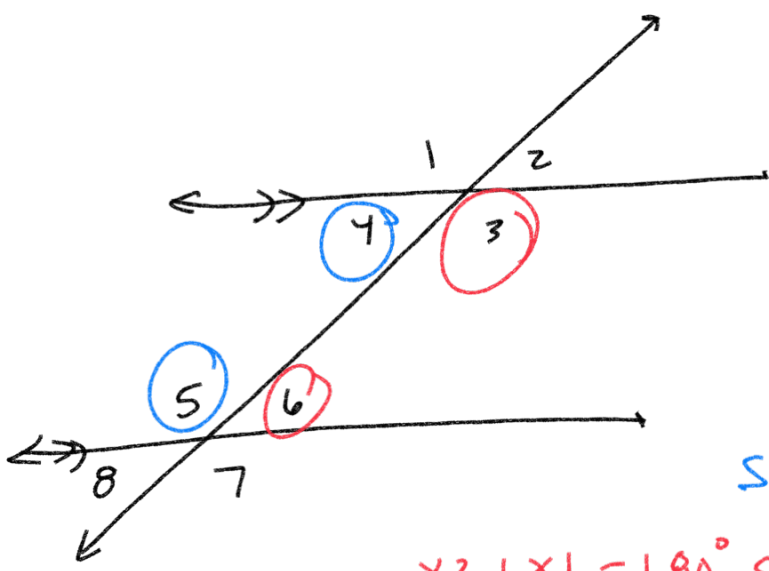


$\angle 1 = \angle 3$ Vertical
 $\angle 1 = \angle 5$ Correspond
 $\angle 3 = \angle 5$ substitution

$\angle 4 = \angle 6$

Alternate Interior Angles

alternate interior angles



$\angle 4 = \angle 8$ corresponding

$\angle 5 + \angle 8 = 180^\circ$ linear pairs



$\angle 5 + \angle 4 = 180^\circ$ substitution

same side interior

$\angle 3 + \angle 6 = 180^\circ$ same side interior