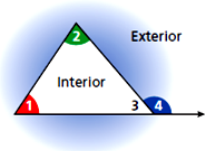
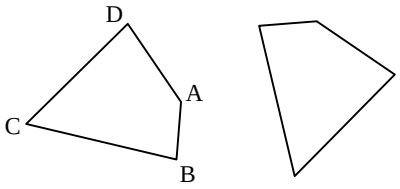
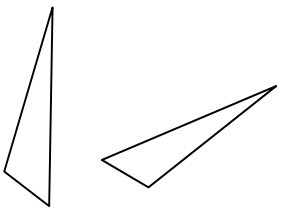
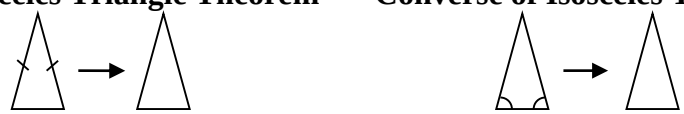
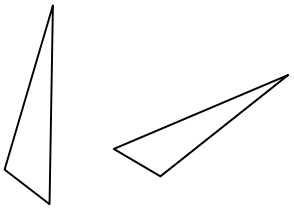
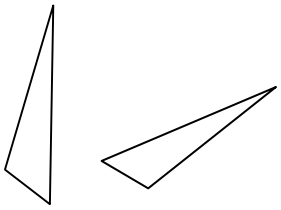
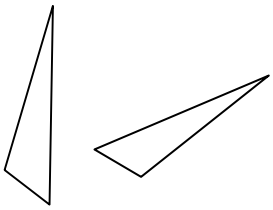
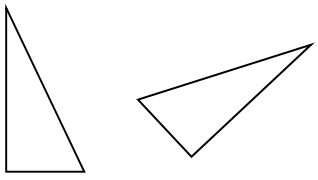
GEOMETRY LAB
UNIT 4: CONGRUENT TRIANGLES

WRITE OUT ALL PROOFS COMPLETELY – INCLUDE THE DRAWING AND YOUR CHOICE OF PROOF FORMAT (2-COLUMN, PARAGRAPH, FLOWCHART)

LESSON	TOPIC	Book/ Video	Common Core LS	Assignment
DAY 1	CLASSIFYING TRIANGLES	4-1	G-CO.1	• P219 #12-19, 23-25
Day 2	ANGLE RELATIONSHIPS IN TRIANGLES	4-2	G-CO.1	• P228 #17,19,21,23,29-32
Day 3	CORRESPONDING PARTS & CONGRUENT POLYGONS	4-3	G-CO.2 G-CO.6 G-CO.7	• P235-6 #13-18, 31 WRITE OUT PROOF #20
Day 4	TRIANGLE CONGRUENCE BY SAS W/RIGID MOTION AND PROOFS	4-4	G-CO.8 Module 1 Lesson 22	• Problem Set in Notes
Day 5	ISOSCELES TRIANGLES	4-8	Module 1 Lesson 23	• Problem Set in Notes • P277 #13,14,16,20,26
Day 6	FINDING CONGRUENT SIDES AND ANGLES IN TRIANGLES			• Problem Set in Notes
Day 7	TRIANGLE CONGRUENCE BY ASA & SSS W/RIGID MOTION AND PROOFS	4-4 4-5	G-CO.8 Module 1 Lesson 24	• Problem Set in Notes
Day 8	TRIANGLE CONGRUENCE BY AAS & HL W/RIGID MOTION AND PROOFS	4-5	G-CO.8 Module 1 Lesson 25	• Problem Set in Notes
Day 9	MIXED PROOF PRACTICE		Module 1 Lesson 26	• Problem Set in Notes
Day 10	REVIEW QUIZ		Module 1 Lesson 26	• Worksheet 4-10
Day 11	CPCTC	4-6	G-SRT.5 Module 1 Lessons 26 & 27	• P263 #7-11
Day 12	SEQUENCE OF RIGID MOTION PROOFS		Module 1 Lessons 22-24	• Problem Set in Notes
Day 13	SEQUENCE OF RIGID MOTION PROOFS		Module 1 Lessons 22-24	• Problem Set in Notes
Day 14	GEOMETRIC CONCLUSIONS IN THE COORDINATE PLANE USING: • SLOPE • DISTANCE • MIDPOINT	4-7	G-CO.2 G-GPE.4	• Worksheet 4-14
Day 15	CONGRUENT TRIANGLES W/RIGID MOTIONS IN THE COORDINATE PLANE	4-7	G-CO.2 G-GPE.4	• P270 #10,24 • P265 #12,35-37
Day 16	CONSTRUCTIONS: EQUILATERAL, ISOSCELES, AND CONGRUENT TRIANGLES		G.CO.12 G.CO.13	• Worksheet 3-16
Day 17	REVIEW			Complete Review Packet
Day 18	TEST			• Cumulative Review #4 • Bridge to Unit 5 due next class

Lesson Summaries for Unit 4 **Name** _____

DAY	MAIN POINTS / FORMULAS TO REMEMBER	HOMEWORK QUESTIONS
4-1	Classifying Triangles By Angle 1) _____ 2) _____ 3) _____ 4) _____ (each angle = _____) By Side 1) _____ (3 ≅) 2) _____ (2 ≅) 3) _____ (0 ≅)	
4-2	• Triangle Sum Theorem: The sum of the angles in a triangle equals _____. - Always start with the _____ using all 3 angles! - Acute angles in a right triangle are _____ • Exterior Angle Theorem: The measure of an exterior angle equals the sum of the remote interior angle measures.  Equation: _____ • Third Angle Theorem: If two pairs of corresponding angles in two triangles are congruent, then the third pair of angles are _____.	
4-3	Polygons are named in _____ order of their vertices. **Correspondence -** COLOR FIRST! Given that $ABCD \cong EFGH$, label the corresponding vertices and color the corresponding side and angle pairs:  Rigid motions must map pre-image vertices to their _____ image vertices. **Definition of Congruent Polygons:** To prove two polygons are congruent by definition of congruent polygons, all pairs of corresponding _____ and corresponding _____ must be congruent.	
4-4	**SAS ≅ SAS Triangle Congruency Criteria:** Mark the criteria on the triangles  The angle must be _____ between the two sides. What criteria using two sides and an angle is not valid? _____	
4-5	**Isosceles Triangle Theorem** **Converse of Isosceles Triangle Theorem**  When doing proofs with lots of triangles, check to see if your sides or angles are in the _____ triangle or 2 different triangles.	

4-6	Ways to look for congruent pairs of ANGLES ● ● ● ● ● ● ● ● ● ● SIDES ● ● ● ● ● ● ● Ways you know you have a right triangle ● ●	
4-7	Mark the criteria on the triangles **ASA ≅ ASA Criteria:**  **SSS ≅ SSS Criteria:**  The side must be _____ between the angles for ASA ≅ ASA.	
4-8	Mark the criteria on the triangles **AAS ≅ AAS Criteria:**  **RΔHL ≅ RΔHL Criteria:**  Note: must be right triangles!	
4-9 & 4-10	Mixed Proof Practice Notes (Individual):	4-9 4-10

4-11

Using Corresponding Parts of Congruent Triangles are Congruent:

$\Delta \cong \Delta$ by _____

Part $\cong$ Part by _____

(or $\cong \Delta$'s $\rightarrow$ corresponding angles congruent)

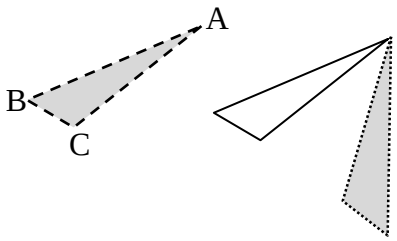
4-11

4-12 & 4-13

Sequence of rigid motions to follow: The specific rigid motion:

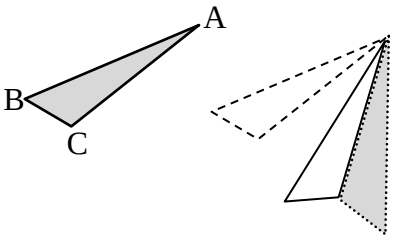
1st _____ to corresponding vertex _____

Draw the vector & label the corresponding vertices



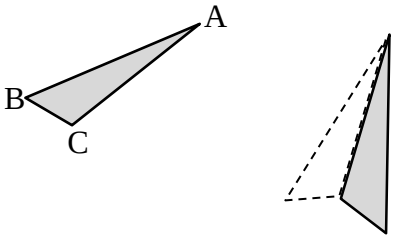
2nd _____ to get a common side _____

Label the corresponding vertices & draw an arrow to show the rotation



3rd _____ over the common side _____

Label the corresponding vertices & draw the line of reflection



If proving through a sequence of rigid motions, you must identify the **specific** rigid motion(s) and then state that these motion(s) preserve _____ and _____ (hence isometry).

4-12

4-13

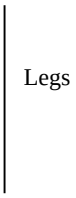
4-14 & 4-15

Coordinate plane proofs use

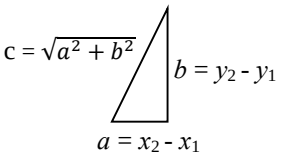
1) A _____ on the coordinate plane
2) Coordinate plane tools to make calculations. Then use the numbers to make geometric conclusions.
   - Slope → _____
     Ex: prove a triangle is a _____ triangle
   - Distance → _____
     Ex: prove a triangle is a _____ triangle
   - Midpoint → _____
     Ex: prove a segment is a _____ of a triangle

4-14

4-15

4-16	Δ **Constructions** based on side lengths use _____ a segment. Ex: Equilateral Triangle Isosceles Triangle  _____ _____ Base **Constructing congruent triangles** requires using a congruency _____ such as $SSS \cong SSS$.	
Review		

Algebraic tools used in Coordinate Proofs:

	PURPOSE & IMPLICATION(S)	CONCEPT	FORMULA
SLOPE FORMULA	• PROVE LINES/SEGMENTS ARE PARALLEL: $m_1 = m_2$ → ESTABLISH CORR/ALT INT/ ALT EXT ANGLES ARE CONGRUENT • PROVE LINES/SEGMENTS ARE PERPENDICULAR: $m_1 \bullet m_2 = -1$ → GET RIGHT ANGLES/ALTITUDES	$\frac{Rise}{Run}$	$\boldsymbol{m} = \frac{\triangle \boldsymbol{y}}{\triangle \boldsymbol{x}} = \frac{\boldsymbol{y}_2 - \boldsymbol{y}_1}{\boldsymbol{x}_2 - \boldsymbol{x}_1}$
DISTANCE FORMULA	FIND THE LENGTHS OF SEGMENTS → CONCLUDE CONGRUENT SEGMENTS OR SIDES	PYTHAGOREAN THEOREM HYPOTENUSE LENGTH = DISTANCE  	$\boldsymbol{d} = \sqrt{(\boldsymbol{x}_2 - \boldsymbol{x}_1)^2 + (\boldsymbol{y}_2 - \boldsymbol{y}_1)^2}$
MIDPOINT FORMULA	FIND THE COORDINATES OF THE MIDPOINT OF A SEGMENT →USE MIDPOINT OR →ESTABLISH A MIDSEGMENT	(AVG *X* VALUES, AVG *Y* VALUES)	$\boldsymbol{mdpt} = \left(\frac{\boldsymbol{x}_1 + \boldsymbol{x}_2}{2}, \frac{\boldsymbol{y}_1 + \boldsymbol{y}_2}{2} \right)$

Point-Slope Equation of a line:	$y - y_1 = m(x - x_1)$	where (x_1, y_1) is a point on the line
Slope-Intercept Equation of a line:	$y = mx + b$	where $(0, b)$ is the y-intercept

Commonly Used Reasons in Proofs

Right $\measuredangle s$

- $\perp$ lines → right $\measuredangle$s
- All right $\measuredangle$s are ≅
- DEFN: Right angle measures 90°
- Right $\measuredangle$s → Right Δ's
- Defn: A triangle with 1 right $\measuredangle$ is a right Δ

Angle Pairs

- DEFN of Complementary Angles: 2 $\measuredangle$s whose measures add to 90 ↔ complementary $\measuredangle$s
- DEFN of Supplementary Angles: 2 $\measuredangle$s whose measures add to 180 ↔ supplementary $\measuredangle$s
- Definition of Linear Pair
- Linear pair → supplementary angles
- 2 ≅ Supp $\measuredangle$s → right angles
- ≅ Linear pair → $\perp$ lines
- Congruent Complements Theorem OR Complements of the same angle (or ≅ $\measuredangle$s) are ≅
- Congruent Supplements Theorem OR Supplements of the same angle (or ≅ $\measuredangle$s) are ≅
- Third Angle Theorem
- Overlapping Segment Theorem *(remember to state reflexive piece)*
- Overlapping Angle Theorem *(remember to state reflexive piece)*

Bisectors

- Midpoint↔ 2 ≅ collinear segments (Defn of Midpoint)
- Segment Bisector ↔ 2 ≅ collinear segments (Defn of segment bisector)
- Angle Bisector↔ 2 ≅ adjacent angles (Defn of angle bisector)
- $\perp$ Bisector→ Right Angles AND $\perp$ Bisector → Midpoint or Seg Bisector
- DEFN: A median is a segment from a vertex to the midpoint of the opposite side
- DEFN: A midsegment is a segment whose endpoints are the midpoints of two sides in a Δ
- Halves of Congruent Segments are Congruent
- Halves of Congruent Angles are Congruent

≅ ↔ =

- ≅ segments ↔ segments with = measure
- ≅ angles ↔ angles with = measure

Vertical $\measuredangle s$

- DEFN: Non-adjacent $\measuredangle s$ formed by intersecting lines are vertical $\measuredangle s$
- Vertical $\measuredangle s$ are ≅ (theorem)

Properties

- Reflexive property of equality/congruence
- Symmetric property of equality/congruence
- Transitive property of equality/congruence
- Substitution
- Addition/subtraction property of equality
- Multiplication/Division property of equality

Note: Algebraic Proofs may also contain:

- *Addition or Subtraction*
- *Simplification*

Sum of parts	• Segment addition postulate • ∡ addition postulate • Consecutive adjacent angles on a line sum to 180° • Angles at a point sum to 360° • Triangle Sum Theorem (the angles in a triangles sum to 180°)
∥ lines	• ∥ lines ↔ ≅ corresponding ∡s • ∥ lines ↔ ≅ alternate interior ∡s • ∥ lines ↔ ≅ alternate exterior ∡s • ∥ lines ↔ supplementary same side interior ∡s • Midsegment of a Δ → ½ the length of the side it is parallel to
⊥ lines	• A line ⊥ to 1 of 2 ∥ lines → ⊥ to the other (Perpendicular Transversal Theorem) • 2 lines ⊥ to the same line → ∥ lines } *Parallel lines are perpendicular to the same line* • DEFN: An altitude is ⊥ from a vertex to the opposite side • ⊥ lines ↔ right ∡s • ≅ Linear pair → ⊥ lines
Δ congruence	• SSS ≅ SSS → ≅ Δs • SAS ≅ SAS → ≅ Δs • ASA ≅ ASA → ≅ Δs • AAS ≅ AAS → ≅ Δs • RtΔ HL ≅ RtΔ HL → ≅ Δs After proving ≅ Δs, • CPCTC • ≅ Δs ⟶ corresponding angles ≅ • ≅ Δs ⟶ corresponding sides ≅
Isosceles & Equilateral Triangles	• DEFN of an Isosceles Triangle (Isosceles triangle ↔ 2 ≅ sides in a triangle) • Isosceles triangle → 2 ≅ base angles (Isosceles Triangle Theorem) • Converse of the Isosceles Triangle Thm: if 2 ∡'s in a Δ are ≅ → their opposite sides are ≅ • Equilateral triangle ↔ Equiangular triangle