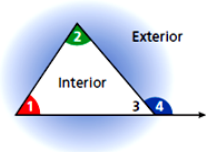
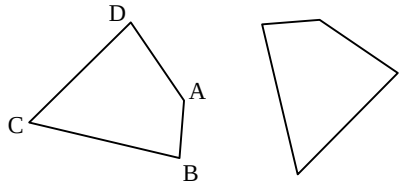
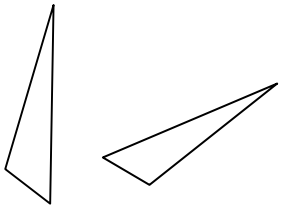
GEOMETRY
UNIT 4: CONGRUENT TRIANGLES

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 AND ANGLE RELATIONSHIPS IN TRIANGLES	4-1 4-2	G-CO.1	• P219 #12-19, 23-25 • P228 #17,19,21,23,36
Day 2	CORRESPONDING PARTS & CONGRUENT POLYGONS	4-3	G-CO.2 G-CO.6 G-CO.7	• P235-6 #13-18, 31 WRITE OUT PROOFS #20,27
Day 3	TRIANGLE CONGRUENCE BY SAS W/RIGID MOTION AND PROOFS	4-4	G-CO.8 Module 1 Lesson 22	• Problem Set in Notes
Day 4	ISOSCELES TRIANGLES	4-8	Module 1 Lesson 23	• Problem Set in Notes • P277 #13,14,16,20,26
Day 5	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 • P257 #11,12,17
Day 6	TRIANGLE CONGRUENCE BY AAS & HL W/RIGID MOTION AND PROOFS	4-5	G-CO.8 Module 1 Lesson 25	• Problem Set in Notes
Day 7	QUIZ MIXED PROOF PRACTICE		Module 1 Lesson 26	• Problem Set in Notes
Day 8	CPCTC	4-6	G-SRT.5 Module 1 Lessons 26 & 27	• P263 #7-11
Day 9	SEQUENCE OF RIGID MOTION PROOFS		Module 1 Lessons 22-24	• Problem Set in Notes
Day 10	CONGRUENT TRIANGLES W/RIGID MOTION ON THE COORDINATE PLANE • SLOPE • DISTANCE • MIDPOINT	4-7	G-CO.2 G-GPE.4	• P270 #10,13.24 • P265 #35-37
Day 11	CONSTRUCTIONS: EQUILATERAL, ISOSCELES, AND CONGRUENT TRIANGLES		G.CO.12 G.CO.13	• Worksheet 3-11
Day 12	REVIEW			Complete Review Packet
Day 13	TEST			• Cumulative Review #4 • Bridge to Unit 5 due next class

HOLT 2016-17

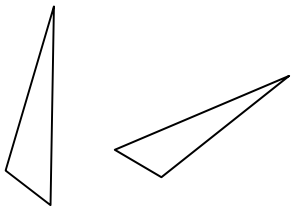
Lesson Summaries for Unit 4 **Name** _____

DAY	MAIN POINTS / FORMULAS TO REMEMBER	QUESTIONS AFTER DOING HOMEWORK
4-1	Classifying Triangles By Angle 1) _____ 2) _____ 3) _____ 4) _____ (each angle = _____) By Side 1) _____ (3 ≅) 2) _____ (2 ≅) 3) _____ (0 ≅) • 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 _____.	
4-2	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.	
4-3	**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? _____	
4-4	**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.	

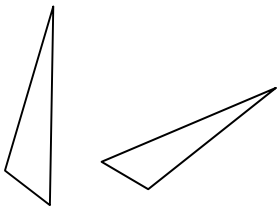
4-5

Mark the criteria on the triangles

ASA ≅ ASA Criteria:



SSS ≅ SSS Criteria:

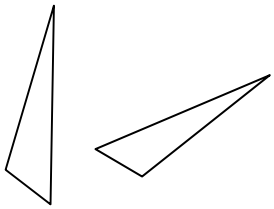


The side must be _____ between the angles for ASA ≅ ASA.

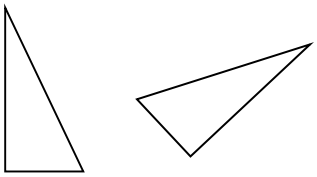
4-6

Mark the criteria on the triangles

AAS ≅ AAS Criteria:



RΔHL ≅ RΔHL Criteria:



Note: must be right triangles!

4-7

Ways to look for congruent pairs of

ANGLES

-
-
-
-
-
-
-
-
-
-

SIDES

-
-
-
-
-
-
-

Ways you know you have a right triangle

-
-

4-8

Using Corresponding Parts of Congruent Triangles are Congruent:

Δ ≅ Δ by _____

Part ≅ Part by _____

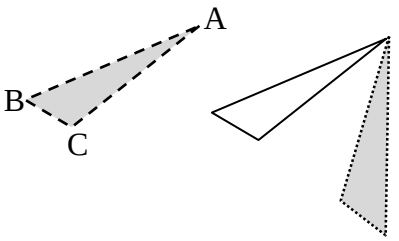
(or ≅ Δ's → corresponding angles congruent)

4-9

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

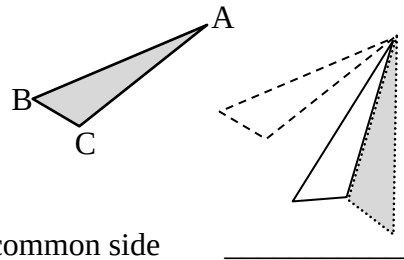
1st _____ to corresponding vertex _____

Draw the vector & label the corresponding vertices



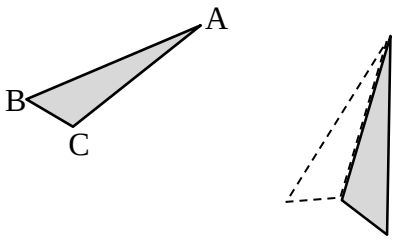
2nd _____ to get a common side _____

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).

4-10

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

4-11

Δ **Constructions** based on side lengths use _____ a segment. Ex:

Equilateral Triangle Isosceles Triangle

Legs

_____ _____
Base

Constructing congruent triangles requires using a congruency _____ such as *SSS* ≅ *SSS*.

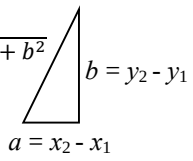
Review

Commonly Used Reasons in Proofs

Right ∡s	• ⊥ lines → right ∡s • All right ∡s are ≅ • DEFN: Right angle measures 90° • Right ∡s → Right Δ's • Defn: A triangle with 1 right ∡ is a right Δ
Angle Pairs	• DEFN of Complementary Angles: 2 ∡s whose measures add to 90 ↔ complementary ∡s • DEFN of Supplementary Angles: 2 ∡s whose measures add to 180 ↔ supplementary ∡s • Definition of Linear Pair • Linear pair → supplementary angles • 2 ≅ Supp ∡s → right angles • ≅ Linear pair → ⊥ lines • Congruent Complements Theorem OR Complements of the same angle (or ≅ ∡s) are ≅ • Congruent Supplements Theorem OR Supplements of the same angle (or ≅ ∡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) • ⊥ Bisector→ Right Angles AND ⊥ 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 ∡s	• DEFN: Non-adjacent ∡s formed by intersecting lines are vertical ∡s • Vertical ∡s are ≅ (theorem)
Properties	• Reflexive property of equality/congruence • Symmetric property of equality/congruence • Transitive property of equality/congruence • Substitution • Addition/subtraction prop of equality • Multiplication/Division prop 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 → ≅ Δ*s* • SAS ≅ SAS → ≅ Δ*s* • ASA ≅ ASA → ≅ Δ*s* • AAS ≅ AAS → ≅ Δ*s* • RtΔ HL ≅ RtΔ HL → ≅ Δ*s* After proving ≅ Δ*s*, • CPCTC • ≅ Δ*s* ⟶ corresponding angles ≅ • ≅ Δ*s* ⟶ 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: base ∡'s in a Δ ≅ → the opposite sides are ≅ • Equilateral triangle ↔ Equiangular triangle

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/ALTITUDE	$\frac{Rise}{Run}$	$\boldsymbol{m} = \frac{\triangle \boldsymbol{y}}{\triangle \boldsymbol{x}} = \frac{\boldsymbol{y}_2 - \boldsymbol{y}_1}{\boldsymbol{x}_2 - \boldsymbol{x}_1}$
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 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