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| **Grade Level** \*9 | **Teacher/Room**: LPayne \* / \*181 **Course(s)/ Period(s):** \*Acc Coordinate Alg **/ 3&4 Week of:** 9/29-10/3\* | | | | |
| **Unit Vocabulary:** \*See attached list | | | | | |
| **Instructional Strategies Used:** \* | | | | | |
| **Day 1** | | **Day 2** | **Day 3** | **Day 4** | **Day 5** |
| **Common Core Standard(s)**:   * All from Unit 6 | | **Common Core Standard(s)**:  **MCC9-12.G.SRT.2** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.  **MCC9-12.G.SRT.3** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.  **MCC9-12.G.SRT.4** Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity  **MCC9-12.G.SRT.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures | **Common Core Standard(s)**:  **MCC9-12.G.SRT.2** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.  **MCC9-12.G.SRT.3** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.  **MCC9-12.G.SRT.4** Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity  **MCC9-12.G.SRT.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures | **Common Core Standard(s)**:  **MCC9-12.G.SRT.2** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.  **MCC9-12.G.SRT.3** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.  **MCC9-12.G.SRT.4** Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity  **MCC9-12.G.SRT.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures | **Common Core Standard(s)**:  **MCC9-12.G.SRT.2** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.  **MCC9-12.G.SRT.3** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.  **MCC9-12.G.SRT.4** Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity  **MCC9-12.G.SRT.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures |
| **EQ Question:**   * Have you mastered the midpoint formula, distance formula, and partition of a line? | | **EQ Question:**  1. What strategies can I use to determine missing side lengths and areas of similar figures?  2. Under what conditions are similar figures congruent? | **EQ Question:**  How do I know which method to use to prove two triangles similar? | **EQ Question:**   * How do I know which method to use to prove two triangles similar? | **EQ Question:**   * How do I know which method to use to prove two triangles similar? |
| **Mini Lesson:**   * Review   **Activating Strategies:**  Justify steps to solve an equation  **Lesson:**   * TEST-Unit 6   **Resource/Materials:**   * TEST * calculator * graph paper * ruler * answer sheet | | **Mini Lesson:**   * check homework   **Activating Strategies:**  \*[similar triangles](http://www.regentsprep.org/Regents/math/geometry/GP11/Lsimilar.htm)  **Lesson:**   * [More about similar figure](http://www.regentsprep.org/Regents/math/geometry/GP11/LMoresimilar.htm) * [Proofs with similar triangles](http://www.regentsprep.org/Regents/math/geometry/GP11/LsimilarProof.htm) * [Strategies dealing with similar triangles](http://www.regentsprep.org/Regents/math/geometry/GP11/Lstrategy.htm)   **Resource/Materials:**  Task: similar triangles  Shadow Math | **Mini Lesson:**   * Check homework   **Activating Strategies:**  Similar figures- regent activity  **Lesson:**   * Doe task * Proving similar triangles * Pythagorean theorem using triangle similarity   **Resource/Materials:**  Task and WS | **Mini Lesson:**   * Check homework   **Activating Strategies:**  \*Challenges from ancient Greece  **Lesson:**   * Review similarity   **Resource/Materials:**   * All task   Review | **Mini Lesson:**   * Check homework   **Activating Strategies:**  \*review  **Lesson:**   * TEST – Triangle Similarity   **Resource/Materials:**  Test  Triangle congruent worksheet |
| **Differentiation:**  ***Content/Process/Product:***   * Student may use graphpaper, formula, paddy paper, to help find answers   ***Grouping Strategy:***   * \*   ***Assessment:***   * *Student work* | | **Differentiation:**  ***Content/Process/Product:***   * \*   ***Grouping Strategy:***   * \*   ***Assessment:***   * *Student work* | **Differentiation:**  ***Content/Process/Product:***   * \*   ***Grouping Strategy:***   * \*   ***Assessment:***   * *Student work* | **Differentiation:**  ***Content/Process/Product:***   * How students answer task   ***Grouping Strategy:***   * \*   ***Assessment:***   * *Student work* | **Differentiation:**  ***Content/Process/Product:***  ***Grouping Strategy:***   * \*   ***Assessment:***   * *\** |
| **Assessment :**  ***Pre-Test:***  ***Post-Test:***  ***Summative: TEST***  ***Performance Based:*** | | **Assessment :**  ***Pre-Test:***  ***Post-Test:***  ***Summative:***  ***Performance Based:*** homework | **Assessment :**  ***Pre-Test:***  ***Post-Test:***  ***Summative:***  ***Performance Based:*** homework | **Assessment :**  ***Pre-Test:***  ***Post-Test:***  ***Summative:***  ***Performance Based:*** homework | **Assessment :**  ***Pre-Test:***  ***Post-Test:***  ***Summative: TEST***  ***Performance Based:*** |
| **Homework: Justifying steps of solving equations WS** | | **Homework: 1.** [**Practice with similarity**](http://www.regentsprep.org/Regents/math/geometry/GP11/PracSim.htm)  2. [Practice with similarity proofs](http://www.regentsprep.org/Regents/math/geometry/GP11/PracSimPfs.htm) | **Homework: Task** | **Homework: Task** | **Homework: Triangles congruent ws** |

Resources and Reflective Notes:

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| **Unit 7 Vocabulary** | |
| **Adjacent Angles** | Angles in the same plane that have a common vertex and a common side, but no common interior points |
| **Alternate Exterior Angles** | Alternate exterior angles are pairs of angles formed when a third line (a transversal) crosses two other lines. These angles are on opposite sides of the transversal and are outside the other two lines. When the two other lines are parallel, the alternate exterior angles are equal. |
| **Alternate Interior Angles** | Alternate interior angles are pairs of angles formed when a third line (a transversal) crosses two other lines. These angles are on opposite sides of the transversal and are in between the other two lines. When the two other lines are parallel, the alternate interior angles are equal. |
| **Angle** | Angles are created by two distinct rays that share a common endpoint (also known as a vertex). ∠ABC or ∠B denote angles with vertex B. |
| **Bisector** | A bisector divides a segment or angle into two equal parts |
| **Centroid** | The point of concurrency of the medians of a triangle |
| **Circumcenter** | The point of concurrency of the perpendicular bisectors of the sides of a triangle. |
| **Coincidental** | Two equivalent linear equations overlap when graphed |
| **Complementary Angles** | Two angles whose sum is 90 degrees |
| **Congruent** | Having the same size, shape and measure. Two figures are congruent if all of their corresponding measures are equal |
| **Congruent Figures** | Figures that have the same size and shape. |
| **Corresponding Angles** | Angles that have the same relative positions in geometric figures. |
| **Corresponding Sides** | Sides that have the same relative positions in geometric figures |
| **Dilation** | Transformation that changes the size of a figure, but not the shape. |
| **Endpoints** | The points at an end of a line segment |
| **Equiangular** | The property of a polygon whose angles are all congruent |
| **Equilateral** | The property of a polygon whose sides are all congruent |
| **Exterior Angle of a Polygon** | an angle that forms a linear pair with one of the angles of the polygon. |
| **Incenter** | The point of concurrency of the bisectors of the angles of a triangle |
| **Intersecting Lines** | Two lines in a plane that cross each other. Unless two lines are coincidental, parallel, or skew, they will intersect at one point |
| **Intersection** | The point at which two or more lines intersect or cross |
| **Line** | One of the basic undefined terms of geometry. Traditionally thought of as a set of points that has no thickness but its length goes on forever in two opposite directions.  denotes a line that passes through point A and B. |
| **Line Segment or Segment** | The part of a line between two points on the line.  denotes a line segment between the points A and B |
| **Linear Pair** | Adjacent, supplementary angles. Excluding their common side, a linear pair forms a straight line |
| **Measure of each Interior Angle of a Regular n-gon** |  |
| **Orthocenter** | The point of concurrency of the altitudes of a triangle |
| **Parallel Lines** | Two lines are parallel if they lie in the same plane and they do not intersect. |
| **Perpendicular Lines** | Two lines are perpendicular if they intersect at a right angle. |
| **Plane** | One of the basic undefined terms of geometry. Traditionally thought of as going on forever in all directions (in two-dimensions) and is flat (i.e., it has no thickness). |
| **Point** | One of the basic undefined terms of geometry. Traditionally thought of as having no length, width, or thickness, and often a dot is used to represent |
| **Proportion** | An equation which states that two ratios are equal |
| **Ratio** | Comparison of two quantities by division and may be written as r/s, r:s, or r to s. |
| **Ray** | A ray begins at a point and goes on forever in one direction |
| **Reflection** | A transformation that "flips" a figure over a line of reflection |
| **Reflection Line** | A line that is the perpendicular bisector of the segment with endpoints at a pre-image point and the image of that point after a reflection. |
| **Regular Polygon** | A polygon that is both equilateral and equiangular. |
| **Remote Interior Angles of a Triangle** | the two angles non-adjacent to the exterior angle. |
| **Rotation** | A transformation that turns a figure about a fixed point through a given angle and a given direction |
| **Same-Side Interior Angles** | Pairs of angles formed when a third line (a transversal) crosses two other lines. These angles are on the same side of the transversal and are between the other two lines. When the two other lines are parallel, same-side interior angles are supplementary. |
| **Same-Side Exterior Angles** | Pairs of angles formed when a third line (a transversal) crosses two other lines. These angles are on the same side of the transversal and are outside the other two lines. When the two other lines are parallel, same-side exterior angles are supplementary |
| **Scale Factor** | The ratio of any two corresponding lengths of the sides of two similar figures. |
| **Similar Figures** | Figures that have the same shape but not necessarily the same size. |
| **Skew Lines** | Two lines that do not lie in the same plane (therefore, they cannot be parallel or intersect) |
| **Sum of the Measures of the Interior Angles of a Convex Polygon** | 180º(n – 2) |
| **Supplementary Angles** | Two angles whose sum is 180 degrees |
| **Transformation** | The mapping, or movement, of all the points of a figure in a plane according to a common operation |
| **Translation** | A transformation that "slides" each point of a figure the same distance in the same direction |
| **Transversal** | A line that crosses two or more lines |
| **Vertical Angles** | Two nonadjacent angles formed by intersecting lines or segments. Also called opposite angles |

# Unit 7 - ESSENTIAL QUESTIONS

1. What is a dilation and how does this transformation affect a figure in the coordinate plane?
2. What strategies can I use to determine missing side lengths and areas of similar figures?
3. Under what conditions are similar figures congruent?
4. How do I know which method to use to prove two triangles congruent?
5. How do I know which method to use to prove two triangles similar?
6. How do I prove geometric theorems involving lines, angles, triangles, and parallelograms?
7. In what ways can I use congruent triangles to justify many geometric constructions?
8. How do I make geometric constructions?

## Unit 7- KEY STANDARDS

**Understand similarity in terms of similarity transformations**

**MCC9-12.G.SRT.1** Verify experimentally the properties of dilations given by a center and a scale factor:

1. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
2. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

**MCC9-12.G.SRT.2** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

**MCC9-12.G.SRT.3** Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

**Prove theorems involving similarity**

**MCC9-12.G.SRT.4** Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

**MCC9-12.G.SRT.5** Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

**Understand congruence in terms of rigid motions**

**MCC9-12.G.CO.6** Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

**MCC9-12.G.CO.7** Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

**MCC9-12.G.CO.8** Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

**Prove geometric theorems**

**MCC9-12.G.CO.9** Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment’s endpoints.

**MCC9-12.G.CO.10** Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180 degrees; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

**MCC9-12.G.CO.11** Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

**Make geometric constructions**

**MCC9-12.G.CO.12** Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

**MCC9-12.G.CO.13** Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

# Unit 7 - OVERVIEW

In this unit students will:

1. verify experimentally with dilations in the coordinate plane.
2. use the idea of dilation transformations to develop the definition of similarity.
3. determine whether two figures are similar.
4. use the properties of similarity transformations to develop the criteria for proving similar triangles.
5. use AA, SAS, SSS similarity theorems to prove triangles are similar.
6. use triangle similarity to prove other theorems about triangles.
7. using similarity theorems to prove that two triangles are congruent.
8. prove geometric figures, other than triangles, are similar and/or congruent.
9. use descriptions of rigid motion and transformed geometric figures to predict the effects rigid motion has on figures in the coordinate plane.
10. know that rigid transformations preserve size and shape or distance and angle; use this fact to connect the idea of congruency and develop the definition of congruent.
11. use the definition of congruence, based on rigid motion, to show two triangles are congruent if and only if their corresponding sides and corresponding angles are congruent.
12. use the definition of congruence, based on rigid motion, to develop and explain the triangle congruence criteria; ASA, SSS, and SAS.
13. prove theorems pertaining to lines and angles.
14. prove theorems pertaining to triangles.
15. prove theorems pertaining to parallelograms.
16. make formal geometric constructions with a variety of tools and methods.
17. construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

