GEOMETRY PROJECT
TRIANGLE POINTS OF CONCURRENCY

Due Date: January 27, 2015 **[Tuesday]**
Project should be in some type of folder and have a cover page with Name, Date, and Period.

LATE PROJECTS WILL BE PENALIZED **15 POINTS** FOR EACH DAY LATE. ON TIME MEANS YOU TURN IT IN AT THE **BEGINNING** OF THE PERIOD IT IS DUE.

PART I - CONSTRUCTIONS

Using a **compass and straight edge (ruler)** you will construct the angle bisectors and perpendicular bisectors for 4 different triangles; a Right Triangle, Acute Triangle, Obtuse Triangle, and an Equilateral Triangle.

Project Directions

1. You must use the triangles provided to you for this project.

2. Construct the 3 perpendicular bisectors and 3 angle bisectors for **each** type of triangle.

3. All construction marks should be left on the paper.

4. Identify each construction (angle bisectors – red and perpendicular bisectors – blue). Easiest if you use colored PENCILS to do this or go back over pencil lines with the appropriate color when drawings are accurate. Sharpen your pencils to a good point for best results.

5. All points of concurrency **clearly marked** and **labeled.** (for each triangle)

6. **All** congruent segments and congruent angles should be clearly marked as well as any right angles.

7. For **each** triangle, in the "Description":
   - Name and classify the triangle by **angles** and **side**s.
   - Name the points of concurrency of the perpendicular bisectors and angle bisectors for each triangle.
   - Describe the location of the intersection (inside, on, or outside the triangle).

8. All lines should be drawn with a ruler, and the vertices of the triangles should be labeled.

PART II – DETERMINE ORTHOCENTER USING ALGEBRA

Graphically and **algebraically** find the coordinates of the orthocenter. **Algebraically** verify that the orthocenter is on all three altitude lines.

Project Directions

1. You must use the coordinates provided to you for this project.

2. The triangle, altitudes for each side, and the orthocenter must be graphed on a coordinate grid. All points should be clearly marked and labeled.

3. All work should be shown for finding the equation for each altitude, including which vertex is being used and how the slope was determined.

4. All work should be shown for finding the point of concurrency. Students should identify which equations and which method was used to solve the system of equations.

5. The orthocenter should be clearly identified and verified algebraically.

PART III – CENTROID

You are working for a distribution company that needs to cover all of the area between three cities in the continental united states. You need to decide where to put your warehouse. Your warehouse will need to be able to deliver to all of the cities within the triangle formed by your three cities. In order to pick the best location for your warehouse, you should consider the centroid of the triangle formed by the three cities. Keep in mind you will be delivering by either truck or rail (not air).

Project Directions

You must use the worksheet provided to answer the following questions:

a) What is your company distributing?
b) What are the three cities you are going to distribute between?
c) What are the coordinates of the longitude and latitude of those cities?
d) What is the centroid of the triangle formed by those cities, using their longitude and latitude as the coordinates?
e) Where are you going to put your warehouse?
f) Give three reasons why you chose that location, be specific.

TRIANGLE POINTS OF CONCURRENCY PROJECT RUBRIC

Perpendicular and Angle Bisectors

Constructions

	Three constructions are correct **3**	Two constructions are correct **2**	One construction is correct **1**	None of the constructions are correct **0**	**SCORE**
Right Triangle					
⊥ Bisector					
∠ Bisector					
Acute Triangle					
⊥ Bisector					
∠ Bisector					
Obtuse Triangle					
⊥ Bisector					
∠ Bisector					
Equilateral Triangle					
⊥ Bisector					
∠ Bisector					
				TOTAL	/24

Descriptions

	Three of the following are correct: *(The triangle is correctly classified, the location of the intersection is given, and the intersection is correctly named)* **3**	Two of the following are correct: *(The triangle is correctly classified, the location of the intersection is given, and the intersection is correctly named)* **2**	One of the following is correct: *(The triangle is correctly classified, the location of the intersection is given, and the intersection is correctly named)* **1**	None of the following are given: *(The triangle is correctly classified, the location of the intersection is given, and the intersection is correctly named)* **0**	**SCORE**
Right Triangle					
Acute Triangle					
Obtuse Triangle					
Equilateral Triangle					
			TOTAL		/12

Notation/Organization/Neatness

	All lines are drawn with a ruler, all points are labeled, all congruent angles and segments are marked **4**	One of the following is missing: *(lines are drawn with a ruler, all points are labeled, all congruent angles* **3**	Two of the following are missing: *(lines are drawn with a ruler, all points are labeled, all congruent angles* **2**	Three of the following are missing: *(lines are drawn with a ruler, all points are labeled, all* **1**	Lines are not drawn with a ruler, all points are not labeled, all congruent angles and segments are not **0**	**SCORE**
Right Triangle						
Acute Triangle						
Obtuse Triangle						
Equilateral Triangle						
				TOTAL		/16

Orthocenter

Altitude Calculations

	ALL of the equations are correct.	Two of the equations are correct.	One of the equations is correct.	None of the following are correct.	
	6	**4**	**2**	**0**	**SCORE**
Equations of the altitudes					
			TOTAL		/6

System of Equations

	All accurate work is shown (3pts), method is identified (1 pt) and point of concurrency is accurate (1 pt).	Partial credit will be assigned to level of accuracy of work and whether method was identified and the point of concurrency is accurate.				No work is shown, no method is identified and point of concurrency is not accurate.	
	5	**4**	**3**	**2**	**1**	**0**	**SCORE**
Point of concurrency							
				TOTAL			/5

Notation/Organization/Neatness

	All lines are drawn with a ruler, all points are labeled, and all altitudes are accurate on the drawing.	One of the following is missing: *(lines are drawn with a ruler, all points are labeled, all altitudes are accurate on the*	Two of the following are missing: *(lines are drawn with a ruler, all points are labeled, all altitudes are accurate on the*	Three of the following are missing: *(lines are drawn with a ruler, all points are labeled, all altitudes are accurate on the*	Lines are not drawn with a ruler, all points are not labeled, *all altitudes are accurate on the drawing*	
	4	**3**	**2**	**1**	**0**	**SCORE**
Graph						
				TOTAL		/4

Centroid

Product Description

	Product being distributed is given.	Product being distributed is NOT listed.	
	1	**0**	**SCORE**
Product			
		TOTAL	/1

Names of Cities

	All 3 cities of distribution are listed.	One or more cities of distribution are not listed.	
	1	**0**	**SCORE**
3 Cities			
		TOTAL	/1

Latitude and Longitude of Cities

	All three cities have latitude and longitude listed as coordinates.	2 cities have latitude and longitude listed as coordinates	1 city has latitude and longitude listed as a coordinate.	No cities have latitude and longitude listed as coordinates.	
	3	**2**	**1**	**0**	**SCORE**
Latitude and Longitude					
			TOTAL		/3

Centroid Calculation

	Centroid is given and appropriate work is provided	1 of the following is missing *(centroid or supporting work)*	Both centroid and supporting work are missing	
	2	**1**	**0**	**SCORE**
Centroid				
		TOTAL		/2

Location of Warehouse

	Location of warehouse is listed.	Location of warehouse is not listed.	
	1	**0**	**SCORE**
Location			
		TOTAL	/1

Reasoning for Warehouse Location

	3 reasons for warehouse location are given.	2 reasons for warehouse location are given.	1 reason for warehouse location is given.	No reasons for warehouse location are given	
	3	**2**	**1**	**0**	**SCORE**
Reasoning					
			TOTAL		/3

Notation/Organization/Neatness

	All longitudes and latitudes are accurate and all questions are answered with best penmanship	One of the following is missing *(accurate longitudes and latitudes and best penmanship)*	All of the following are missing *(accurate longitudes and latitudes and best penmanship)*	
	2	**1**	**0**	**SCORE**
Worksheet				
		TOTAL		/2

PROJECT TOTAL: ____/78

_____ **Project is on time. (-15 each day if not)**