

**ROBINSON SECONDARY
SUMMER '09 ASSIGNMENT**

Pre-IB ADVANCED GEOMETRY

The Pre-IB Advanced Geometry course goes beyond the regular geometry course, examining the state geometry standards of learning in more depth. Much time is spent developing analytical thinking skills along with conceptual development. This class provides the prerequisite skills for Pre-IB Advanced Algebra 2 with Trigonometry.

Purpose: This assignment is designed to demonstrate connections that exist between algebra and geometry. Students will use Algebra 1 concepts and apply them to concepts of Geometry, clearly defined in the assignment. Pre-IB Geometry teachers expect students to make these kinds of associations and use these links often.

Directions:

1. Show all work on a separate sheet of notebook paper. Your work must be neatly labeled and well organized, so that it is easy to follow. The diagram must be on graph paper.
2. All linear equations should be written in slope-intercept form ($y = mx + b$).
3. If you do not show all steps and computations, you will not receive credit for this assignment. All answers must be exact; no decimal approximations.
4. Write your name and your final answers in the appropriate spaces on this sheet.
5. Attach all work and your diagram to this assignment sheet.

Assessment: This assignment will be worth 25 points. Late assignments will be worth a maximum of 12.5 points.

Due Date: The assignment is due on the first day that you have class.

Name: _____ **Score:** _____

Problems:

1. Use a ruler to draw a coordinate plane on a piece of graph paper. Label the **x** and **y** axes. Draw and label points **A(-6, 4)**, **B(6, 10)**, and **C(10, 4)**. Use a ruler to connect the points, forming $\triangle ABC$.
2. Find the slope (m) for the segments which form the sides of the triangle. Show all work.

a) $m_{\overline{AB}} =$ _____ b) $m_{\overline{BC}} =$ _____ c) $m_{\overline{AC}} =$ _____

3. Lines whose slopes are negative reciprocals of each other are perpendicular. Negative reciprocals are numbers that when multiplied together give a product of -1 .

For example, the fraction $\frac{2}{3}$ has a negative reciprocal of $\frac{-3}{2}$ because $\left(\frac{2}{3}\right)\left(\frac{-3}{2}\right) = -1$. The negative reciprocal of -4 would be $1/4$. Find the slopes of the lines that are perpendicular to \overline{AB} and \overline{BC} .

a) m of line perpendicular to \overline{AB} _____ b) m of line perpendicular to \overline{BC} _____

4. Use the information obtained in steps 1 and 2 above to write the equations for the lines that contain the sides of $\triangle ABC$. Be sure to show all work.

a) line AB _____ b) line BC _____ c) line AC _____

5. The formula to find the ordered pair representing the midpoint of a segment is $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$ where (x_1, y_1) and (x_2, y_2) are the endpoints of the segment. Use the formula to find the midpoints of the sides of $\triangle ABC$. Let **D** be the midpoint of \overline{AB} , **E** be the midpoint of \overline{BC} , and **F** be the midpoint of \overline{AC} .

a) **D** = _____ b) **E** = _____ c) **F** = _____

6. Label the midpoints of the sides of $\triangle ABC$ in your diagram.

7. A median of a triangle is a segment that starts at a vertex and ends at the midpoint of the opposite side of the triangle. Use your diagram and information from questions 1 and 5 to write the equations for the lines that contain the medians of $\triangle ABC$.

a) Equation for median from **A**: _____

b) Equation for median from **B**: _____

c) Equation for median from **C**: _____

8. An altitude starts at a vertex of a triangle and is perpendicular to the line that contains the opposite side. Use information from questions 1 and 3 to write the equations for the lines containing the 3 altitudes of $\triangle ABC$.

a) Equation for altitude from **A**: _____

b) Equation for altitude from **B**: _____

c) Equation for altitude from **C**: _____

9. A midsegment of a triangle connects the midpoints of two sides. Use information from question 5 to write equations for the lines containing the midsegments of $\triangle ABC$.

a) Equation for midsegment \overline{DE} : _____

b) Equation for midsegment \overline{EF} : _____

c) Equation for midsegment \overline{DF} : _____

10. The distance (length) from one point to another can be found by using the distance formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \quad \text{where } (x_1, y_1) \text{ and } (x_2, y_2) \text{ are the endpoints of the segment.}$$

Find the lengths of the three sides of $\triangle ABC$. Simplify your answers. Do not write answers in decimal form.

a) $AB =$ _____ b) $BC =$ _____ c) $AC =$ _____

Contact: Mrs. Hardy, via e-mail: Janet.Hardy@fcps.edu

Note: You may use any resources (textbooks, websites, etc.) as necessary to complete this assignment. Examples of websites: www.glencoe.com; www.algebra1.com; www.mathforum.com