GEOMETRY HONORS CH 8
ANALYTIC GEOMETRY/COORDINATE GEOMETRY WS

Do all work on a separate sheet, preferable graph paper. For each problem include a figure plotted on the coordinate plane with all vertices labeled.

1. The vertices of a rectangle are (-3, 1), (-1,3), (3, -1) and (1, -3). Find the area of the rectangle.

2. The vertices of a parallelogram are (2, 4), (5, 9), (14, 9) and (11, 4). Find the lengths of the diagonals.

3. Show that the points (-3, 1), (9, -4), (12, 0), and (0, 5) are the vertices of a parallelogram.

4. Show that the points (-1, 3), (3, 6), (6, 2) and (2, -1) are the vertices of a square.

5. Three vertices of a parallelogram are (-2, -1), (-1, -4) and (5, 1). Find the coordinates of the fourth vertex. (There are three possibilities).

Problems 6-12 and the Super Challenge are to be proved using coordinate proofs. For each problem include a figure plotted on the coordinate plane with all vertices labeled. Work should be organized and neat, appropriate explanation should accompany worked out formulas.

6. Given rectangle ABCD, prove that $\overline{AC} \cong \overline{BD}$. That is, prove that the diagonals of a rectangle are congruent.

7. Given rectangle ABCD, prove that the diagonals of a rectangle bisect each other.

8. Prove the diagonals of a square are perpendicular and congruent.

9. Prove the midsegment of a trapezoid is equal in length to one half the sum of the length of the parallel sides.

10. Prove the diagonals of a parallelogram bisect each other.

11. The midsegment of a trapezoid is parallel to the bases of the trapezoid.

12. The sum of the squares of the four sides of a parallelogram is equal to the sum of the squares of the diagonals.

SUPER CHALLENGE: Prove the lines joining midpoints of successive sides of any quadrilateral form a parallelogram. (This may be extra credit up to 2 pts)