Geometry Part I 6.9 - Coordinate Proofs pg. 416 - 418 Even Solutions

4. a. $EG = \sqrt{(b-(-a))^2 + (c-0)^2} = \sqrt{(a+b)^2 + c^2}$

b. $FH = \sqrt{(-b-a)^2 + (c-0)^2} = \sqrt{(a+b)^2 + c^2}$

c. Since their distances are equal, they are congruent by the definition of congruence.

12. Yes, by proving that slopes are opposite reciprocals, and therefore perpendicular.

18. Yes, you could prove this by writing the equations for each segment, then by solving the system, and showing that all three lines intersect in the same point.

24. Using the points *A (0, 0), B (b, c), C (0 , d)* and *D (-b, c),* first prove that the figure is a kite, by showing two pairs of consecutive sides congruent (but not all sides congruent):

Length of each side: AB = $\sqrt{(0-b)^2 + (0-c)^2} = \sqrt{b^2 + c^2}$;

BC = $\sqrt{(b-0)^2 + (c-d)^2} = \sqrt{b^2 + (c-d)^2}$; CD = $\sqrt{(-b-0)^2 + (c-d)^2} = \sqrt{b^2 + (c-d)^2}$;

AD = $\sqrt{(0-(-b))^2 + (0-c)^2} = \sqrt{b^2 + c^2}$;

Then If you draw the diagonal from A to C, AC is a side of two triangles so it is equal to itself; We have shown that AB = AD and BC = CD, so the triangles are congruent by SSS. Therefore the diagonal divides the kite into two congruent triangles.

28. a. C = (a, 0)

b. B = (-b, a) and D = (-b, 0)

c. Slope of BO = $\frac{a-0}{-b-0} = \frac{a}{-b}$; Slope of AO = $\frac{b-0}{a-0} = \frac{b}{a}$; The product of the slopes is

$\frac{a}{-b} * \frac{b}{a} = \frac{ab}{-ab} = -1$

32. *m<A + m<B + m<C = 180, so using substitution: 55 + m<B +2(55) = 180. Using subtraction, m<B = 15 degrees.*