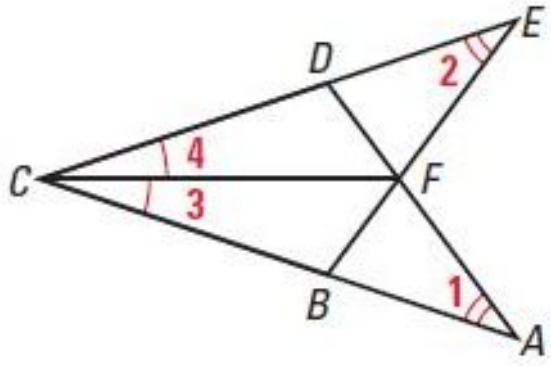
SchoolNova, Math 5c
Homework 22
Triangles - Part V (Challenge Problems)
April 5, 2020

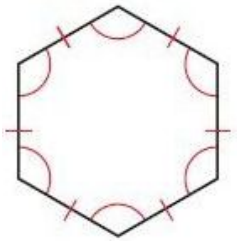
1. Write a summary of the results you have studied so far in geometry, for example

   - Vertical Angles
   - Linear Pair
   - Distance Formula
   - Parallel Lines and Traversals
   - Parallel Lines in Coordinate Plane
   - Slope of a line
   - Equation of a line in slope-intercept form
   - Types of Triangles
   - Triangle Sum Theorem
   - Pythagoras Theorem
   - Postulates for Congruence of Triangles

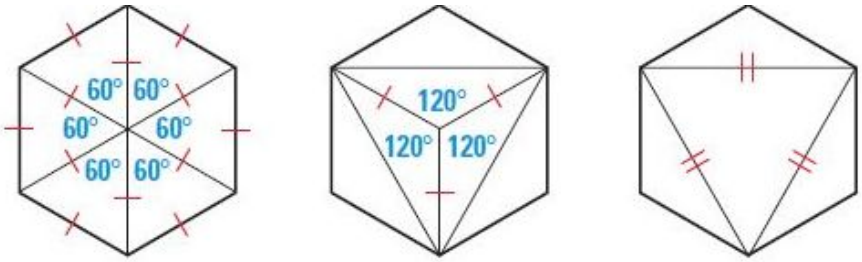
2. Given $\angle 1 \cong \angle 2$ and $\angle 3 \cong \angle 4$, show that $\triangle AFB \cong \triangle EFD$.



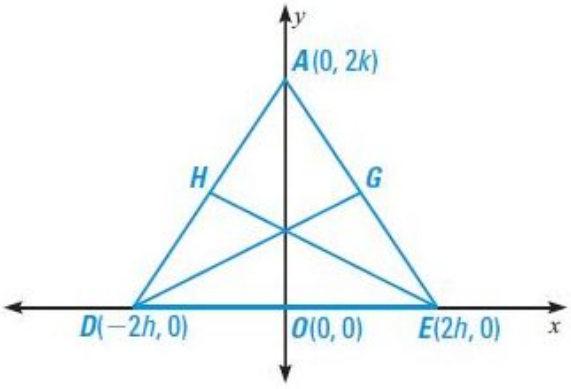
3. A regular hexagon has six congruent sides and six congruent interior angles.



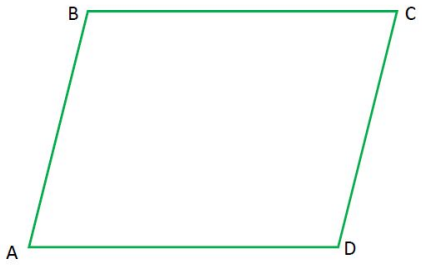
Explain how the following series of figures from left to right suggest a proof that when a triangle is formed by connecting every other vertex of a regular hexagon (rightmost figure), the result is an equilateral triangle.



4. You are given the following figure with coordinates. H is the midpoint of $\overline{AD}$ and G is the midpoint of AE. Prove that $\overline{DG} \cong \overline{EH}$.



5. A parallelogram is a quadrilateral, in which opposite sides are parallel.



   (a) Show that in a parallelogram, diagonally opposite angles are equal, that is, $\angle A \cong \angle C$ and $\angle B \cong \angle D$.

   (b) Show that opposite sides are equal, that is $\overline{AB} \cong \overline{CD}$, and $\overline{BC} \cong \overline{AD}$. (Hint: Use the properties of triangles)

6. Given trapezoid $ABCD$ with parallel sides $\overline{AD}$ and $\overline{BC}$, and not isosceles, which triangle is equal in area to $\triangle ABD$?