Exploring
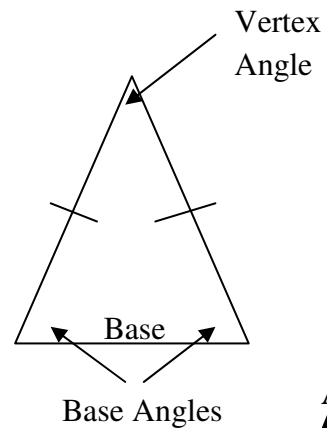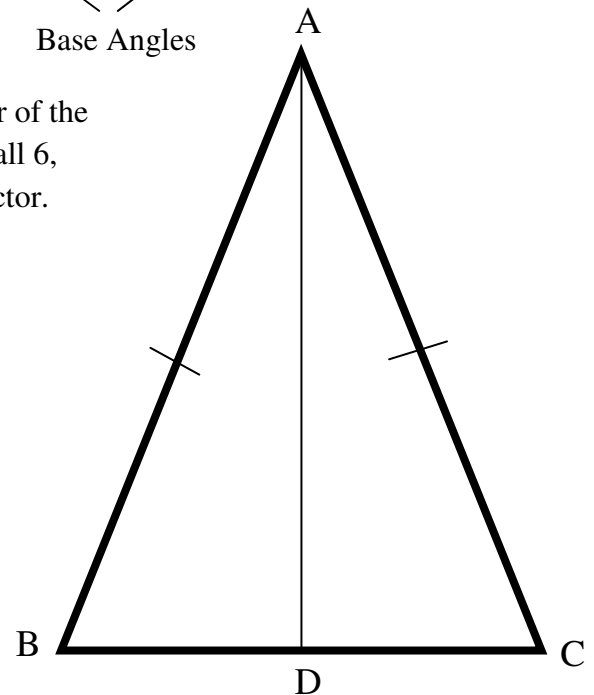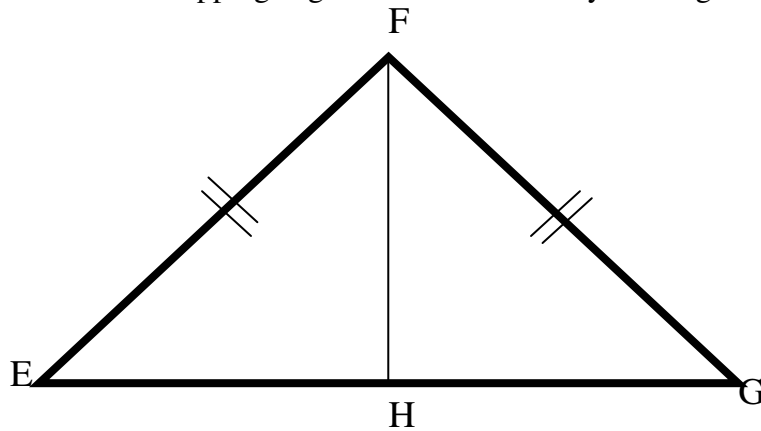
iSOSCeleS TriangleS

In this activity, you will investigate some useful properties of Isosceles and Equilateral Triangles.

Part 1: **Isosceles Angle Bisector**

Vertex
Angle

Every isosceles triangle has two
Base angles that are opposite of the
Congruent sides.
The third angle connecting the
congruent angles I s called the vertex
angle

Base

Base Angles

1. In each of the isosceles triangles below, the angle bisector of the
   vertex angle is drawn in. Use your protractor to measure all 6,
   non-overlapping angles that are created by this angle bisector.

2. How do m∠B and m∠C compare?
   How do m∠E and m∠G compare?

   From this observation, complete this theorem:

   <u>**Theorem 4-3**</u> **Isosceles Triangle Theorem :** If two _____ of a triangle are
   congruent, then the _____ opposite those sides are congruent. (p. 211)

3. With the given information, how can you prove that ΔABD≅ΔACD?

4. Since ΔABD≅ΔACD,
   a. how do the lengths of $\overline{BD}$ and $\overline{DC}$ compare?

   b. how does the segment $\overline{AD}$ relate to side $\overline{BC}$?

   Base off of these observations, complete this theorem

   Theorem 4-5 **Isosceles Bisector Theorem:**The angle bisector of the vertex

   angle of an isosceles triangle is the _____ _____
   of the base. (p. 211)

5. On the line segment below, use your protractor to
   a. draw a 30° angle at *P* and a 30° angle at *Q* to form a triangle.
   What type of triangle do you get?

   b. Now draw a 50° angle at *P* and a 50° angle at *Q* to form a triangle (on top of the first).
   What type of triangle do you get?

P

Q

Observing the triangles you just drew, complete the theorem
   Theorem 4-4 **Converse of the Isosceles Triangle Theorem:** If two _____

   of a triangle are congruent, then the_____ opposite the angles are congruent. (p. 211)

   Corollary: If a triangle is equiangular, then the triangle is equilateral. (p. 212)

6. Finally, check all of your theorems in your book using the given page numbers.