***Exploring***

*Isosceles Triangles*

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

Vertex Angle

Base Angles

**Part 1**: **Isosceles Angle Bisector**

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

A

C

D

B

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.

E

H

F

G

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

From this observation, complete this theorem:

**Theorem 4-3 Isosceles Triangle Theorem :** If two \_\_\_\_\_\_\_\_\_\_\_ of a triangle are congruent, then the \_\_\_\_\_\_\_\_\_\_\_\_ opposite those sides are congruent. (p. 211)

1. With the given information, how can you prove that ∆ABD≅∆ACD?
2. Since ∆ABD≅∆ACD,
	1. how do the lengths of $\overbar{BD}$ and $\overbar{DC}$ compare?
	2. how does the segment $\overbar{AD}$ relate to side $\overbar{BC}$?

	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)

1. On the line segment below, use your protractor to
	1. draw a 30° angle at *P* and a 30° angle at *Q* to form a triangle.
	What type of triangle do you get?
	2. 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)

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