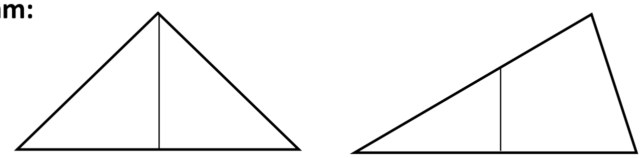
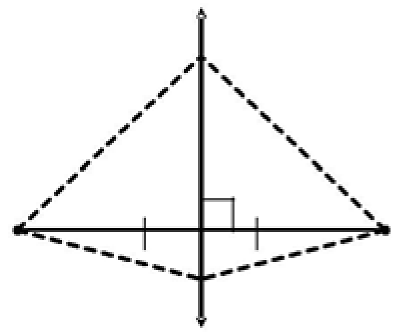
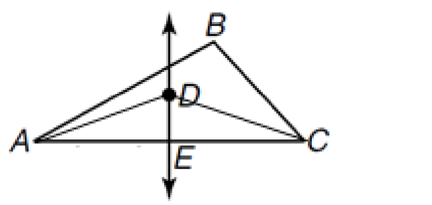
Notes 5.1	
Perpendicular Bisectors Definition: Special Properties:	**Diagram:** 
Theorem: Any point on the perpendicular bisector of a segment is <u>equidistant</u> from the endpoints of the segment. **Converse of that Theorem:** Any point equidistant from the endpoints of a segments lies on the perpendicular bisector of the segment.	**Diagram:** 

Ex1:

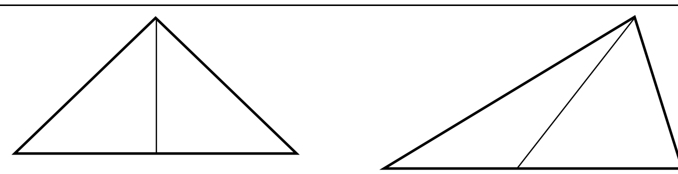
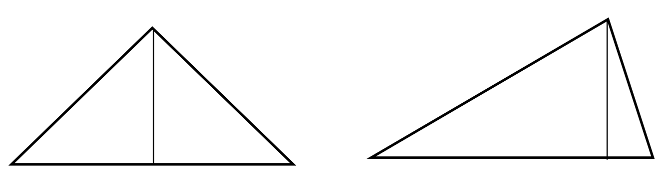
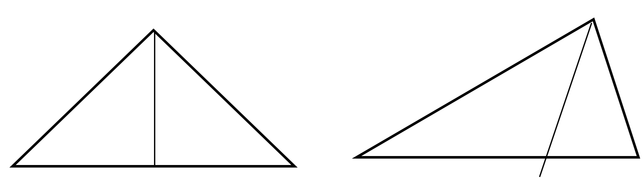


$\overleftrightarrow{DE}$ is the perpendicular bisector of $\overline{AC}$.

a. AE = 7x + 2, CE = 5x + 10. Find x.

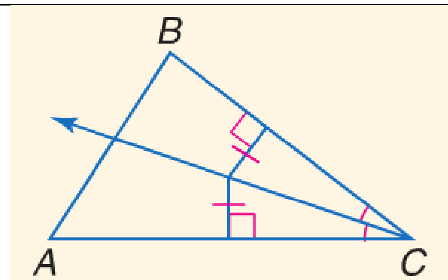
b. DC = 15, AD = 2x. Find AD.

c. Find y if m<AED = 10y

A **median** of a triangle is a segment that starts at a vertex and ends at the midpoint of the opposite side.	
An **altitude** of a triangle is a segment that starts at a vertex and is perpendicular to the opposite side.	
An **angle bisector** is a line that divides an angle into two congruent angles.	

Theorem: Any point on the angle bisector is equidistant from the sides of the angle.

Converse: Any point equidistant from the sides of an angle lies on the angle bisector.



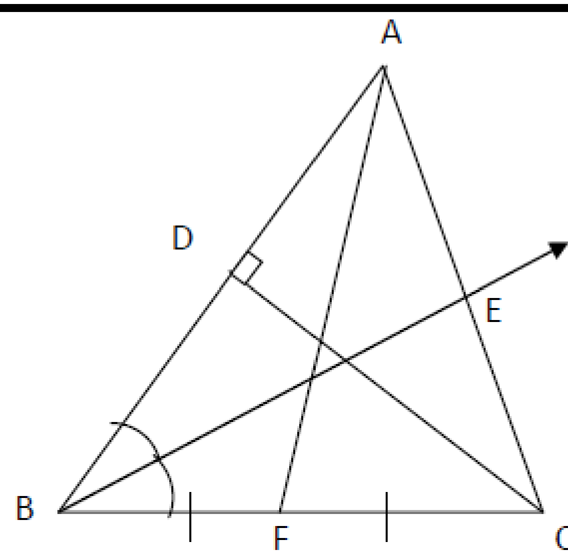
Ex2: Name a(n)…

a. Altitude: ____

b. Angle bisector: ____

c. Perpendicular bisector: ____

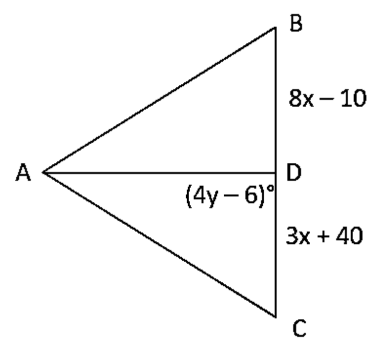
d. Median : ____



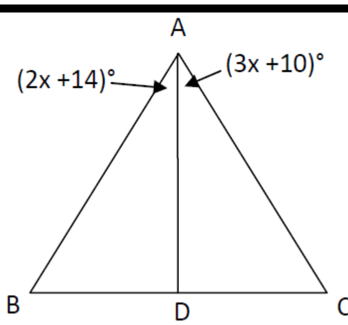
Ex3)

a. Find the value of *x*, if *AD* is a median of *BC* .

b. Find the value of *y*, if *AD* is an altitude of *BC* .



Ex4) AD is an angle bisector. Find x.

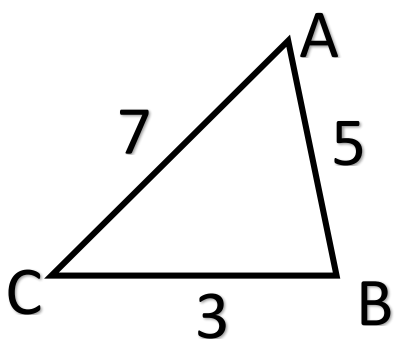


Lesson 5.2

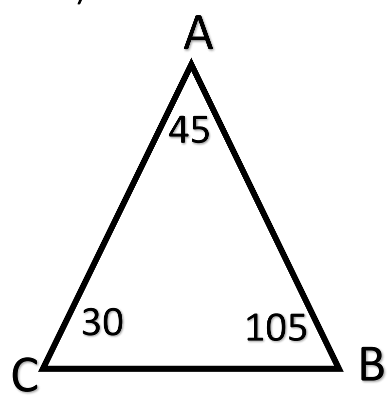
Theorem: Is one side of a triangle is longer than another side, then the angle opposite the longer side has a greater measure than the angle opposite the shorter side.

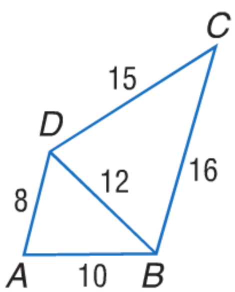
In other words… **larger sides -> larger opposite angles**
The **Converse** works too**….larger angles -> larger opposite sides**

Ex1) List all the angles from largest to smallest.



Ex 2) List all the sides from largest to smallest.

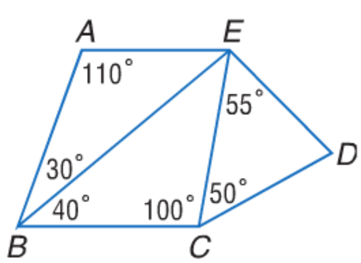




Ex3) Determine the relationship between the measures of the given angles.

a. ∠ADB, ∠DBA

b. ∠CDA, ∠CBA



Ex4) Determine the relationship between the given sides.

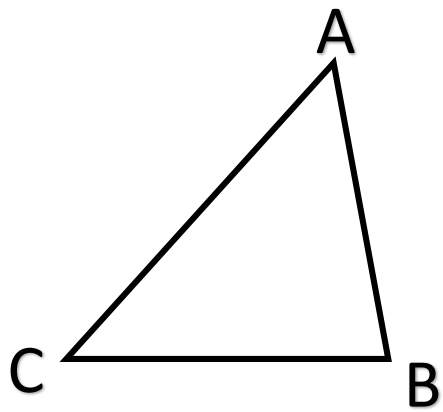
a. BE and ED

b. BC and EC.

Lesson 5.4

Theorem:
The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

AB + BC > AC
BC + AC > AB
AC + AB > BC



Ex1) Determine whether the given measures can be the lengths of the sides of a triangle.

a) 2, 4, 5

b) 6, 8, 14

c) 8, 15, 17

Ex2) In ΔPQR, *PQ* = 7.2 and *QR* = 5.2. Which measure **cannot** be *PR*?

A. 7 B. 9 C.11 D.13

Ex3) If two sides of a triangle measure 2 and 6, what is the range of possible measures for the third side, x?

Ex4) Find the range for the measures of the third side of a triangle given the measures of the two sides.

a. 6 and 19

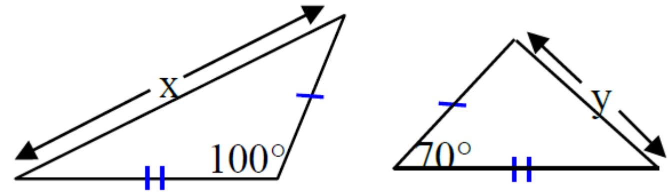
b. 18 and 23

Lesson 5.5

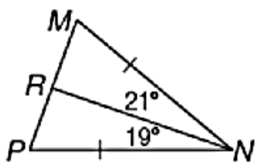
SAS Inequality/Hinge Theorem

Given that two corresponding sides of two triangles are congruent…

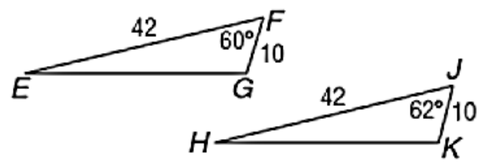
If the included angle of triangle 1 is bigger than the included and of triangle 2, then the third side of triangle 1 is also bigger than the third side of triangle 2.



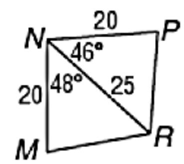
Ex1)



MR, *RP*



EG, *HK*

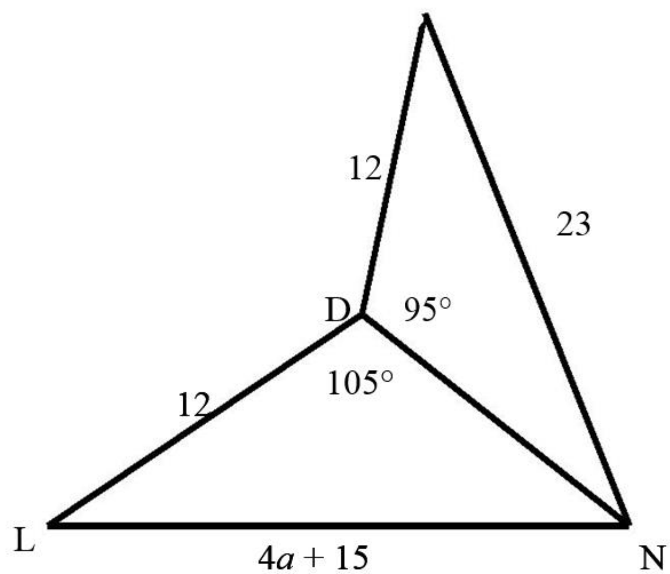


MR, *PR*

Ex2)

a) Write an inequality comparing LN to AN

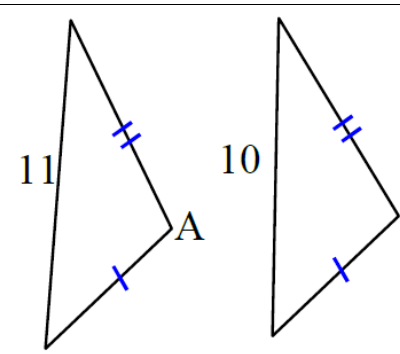
b) Write an inequality to describe the possible values of a.



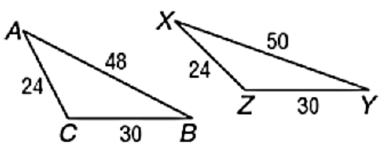
SSS Inequality Theorem

Given that two corresponding sides of two triangles are congruent…

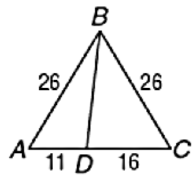
If the third side of triangle 1 is bigger than the third side of triangle 2, then the included angle of triangle 1 is also bigger than the included angle of triangle 2.



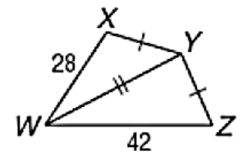
Ex3) Write an inequality for the given pair of angle measures.



$m\angle C, m\angle Z$

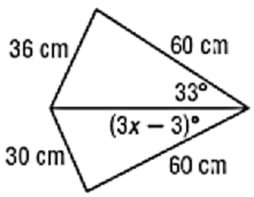


$m\angle ABD, m\angle CBD$



$m\angle XYW, m\angle WYZ$

Ex4) Write an inequality to describe the possible values of x.



Proof!

Given: G is the midpoint of DF

$m\angle 1 > m\angle 2$

Prove: ED > EF