Chapter 5 Notes – Properties of Triangles   Name ______________________________

Section 5.1 Perpendiculars and Bisectors

A segment, ray, line, or plane that is ________________ to a segment at its __________ is called a ________________ __________.

A point is ____________ from _____ points if its distance from each point is the same. The __________ from a ______ to a _____ is defined as the length of the ________________ segment from the point to the line.

When a point is the same distance from a line as it is from another line, then the point is ____________ from the _____ lines (or rays or segments).

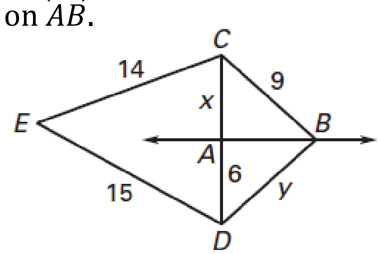
Perpendicular Bisector Theorem: If a point is on the perpendicular __________ of a segment, then it is ______________ from the endpoints of the segment.

Converse of the Perpendicular Bisector Theorem: If a point is ______________ from the endpoints of a segment, then it is on the perpendicular __________ of the segment.

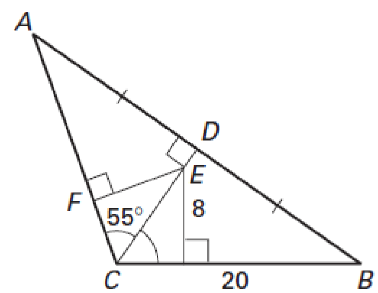
Angle Bisector Theorem: If a point is on the __________ of an angle, then it is ______________ from the two ______ of the angle.

Converse of the Angle Bisector Theorem: If a point is in the interior of an angle and is ______________ from the two ______ of the angle, then it lies on the __________ of the angle.

Example 1: Use the diagram shown. In the diagram, $\overleftrightarrow{AB}$ is the perpendicular bisector of $\overline{CD}$. Find the values of x and y. Determine whether or not point E is on $\overleftrightarrow{AB}$.



Example 2: Determine the correct measurement for ∠DCB, $\overline{FE}$, and $\overline{AC}$.



Section 5.2 Bisectors of a Triangle

A ________________ __________ of a triangle is a line (or ray or segment) that is ________________ to a side of the triangle at the __________ of the side.

When ______ or more lines (or rays or segments) intersect in the same ______, they are called ____________ lines (or rays or segments).

The point of intersection of ____________ lines is called the point of ____________.

An ______ __________ of a triangle is a __________ of an angle of the triangle.

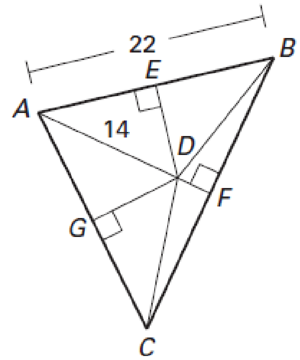
The point of ______________ of the angle bisectors is called the __________ of the triangle.

The point of ______________ of the perpendicular bisectors is called the __________________ of the Δ.

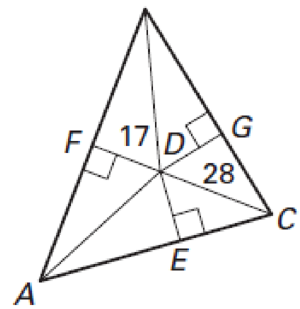
Concurrency of Perpendicular Bisectors of a Triangle Theorem: The perpendicular bisectors of a triangle ______________ at a point that is ___________________ from the _____________ of the triangle.

Concurrency of Angle Bisectors of a Triangle Theorem: The angle bisectors of a triangle ______________ at a point that is ___________________ from the ________ of the triangle.

Example 3: The perpendicular bisectors of ΔABC meet at point D.
Find DB and AE.



Example 4: The angle bisectors of ΔABC meet at point *D*.
Find DE.



Section 5.3 Medians and Altitudes of a Triangle

A __________ of a triangle is a segment whose endpoints are a vertex of the triangle and the __________ of the opposite side.

The point of _________________ of the three medians of a triangle is called the ____________ of the triangle.

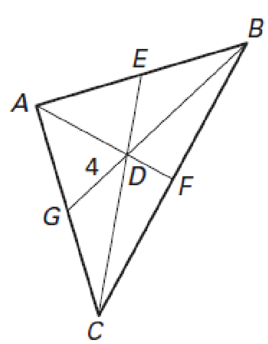
An ____________ of a triangle is the ____________________ segment from a vertex to the _____________ side or to the line that contains the _____________ side.

The lines containing the three ______________ are ________________ and intersect at a point called the __________________ of the triangle.

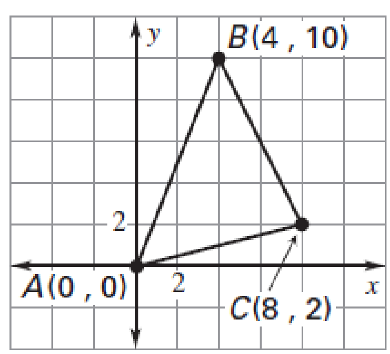
Concurrency of Medians of a Triangle Theorem - The ____________ of a triangle are ________________ at a point that is ________________ of the distance from each vertex to the midpoint of the opposite side.

Concurrency of Altitudes of a Triangle - The lines containing the _____________ of a triangle are concurrent.

Example 5: D is the centroid of ΔABC and DG = 4.
Find BG and BD.



Example 6: Find the coordinates of the centroid of ΔABC.

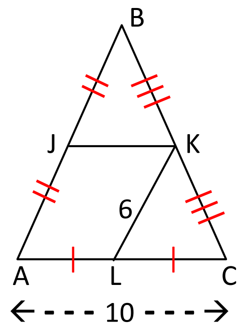


Section 5.4 Midsegment Theorem

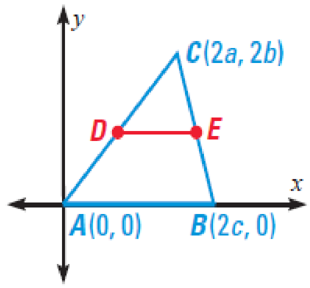
A ________________ of a triangle is a segment that connects the _____________ of two sides of a triangle.

Midsegment Theorem - The segment connecting the _____________ of two sides of a triangle is ___________ to the third side and is _____ as long.

Example 7: $\overline{JK}$ and $\overline{KL}$ are midsegments of $\triangle$ABC. Find JK and AB.



Example 8: $\overline{DE}$ is a midsegment of $\triangle$ABC. Find the coordinates of D and E and show that $\overline{DE}$ is parallel to $\overline{AB}$.



Section 5.5 Inequalities in One Triangle

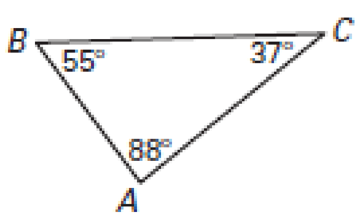
Theorem 5.10 – If one side of a triangle is ________ than another side, then the ________ opposite the longer side is _________ than the angle ____________ the shorter side.

Theorem 5.11 – If one angle of a triangle is ________ than another angle, then the ________ opposite the larger angle is _________ than the side ____________ the smaller angle.

Exterior Angle Inequality Theorem – The measure of an ____________ angle of a triangle is ___________ than the measure of ________ of the two nonadjacent ____________ angles.

Triangle Inequality Theorem – The sum of the lengths of any _____ ________ of a triangle is ___________ than the ________ of the third side.

Example 9: Write the measurements of $\triangle$ABC In order from least to greatest.



Example 10: A triangle has one side of 12 inches and another side of 16 Inches. Find the possible lengths of the third side.