Geometry—Chapter 5

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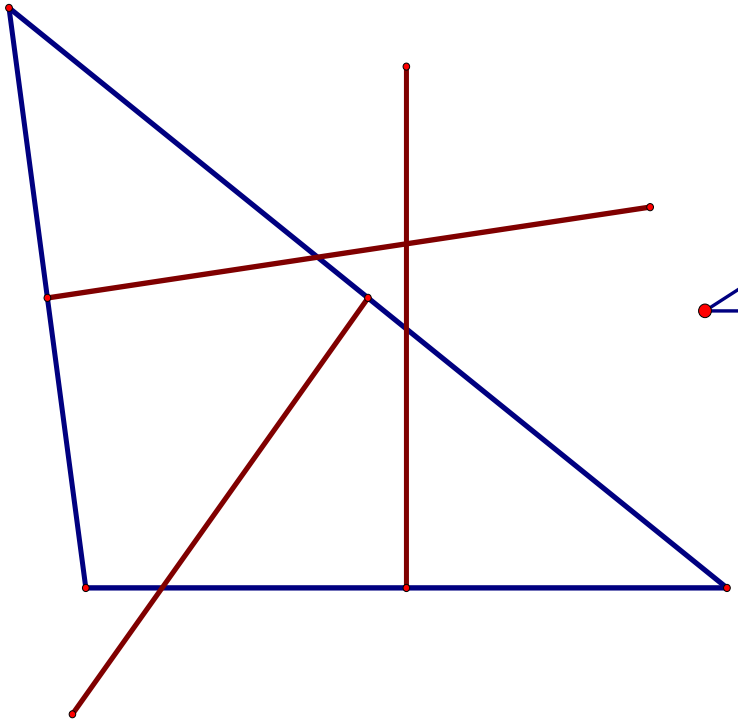
Geometry—Chapter 5-1

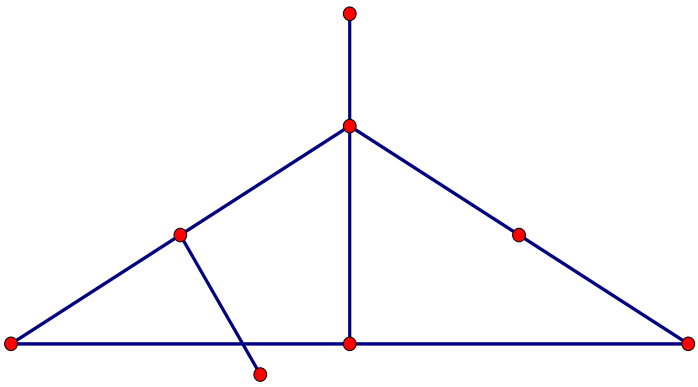
Special Segments in Triangles--------

All of the following segments/lines/rays are defined within a triangle. There are 4 Special "Segments":

1. Perpendicular Bisector
2. Median
3. Altitude
4. Angle Bisector

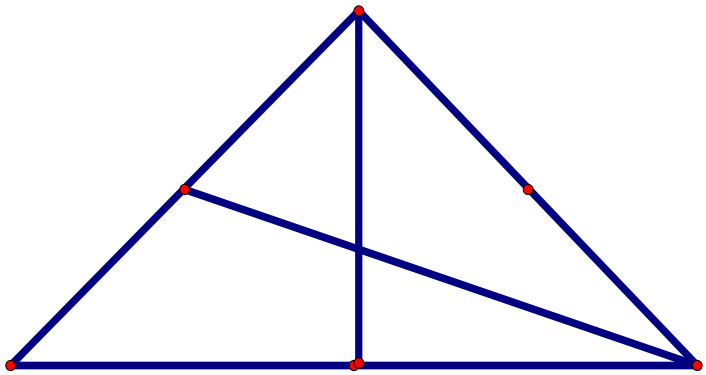
Perpendicular Bisector→a segment/line/ray that passes through the midpoint of one side and also is perpendicular to that side. (Note: 3 can be drawn)

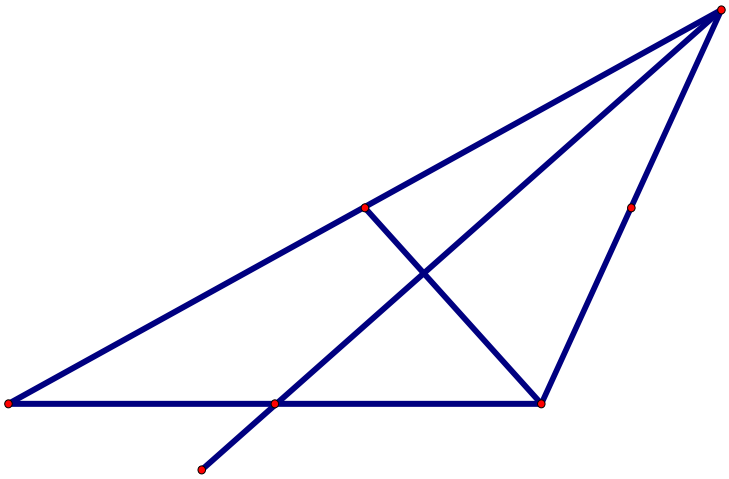




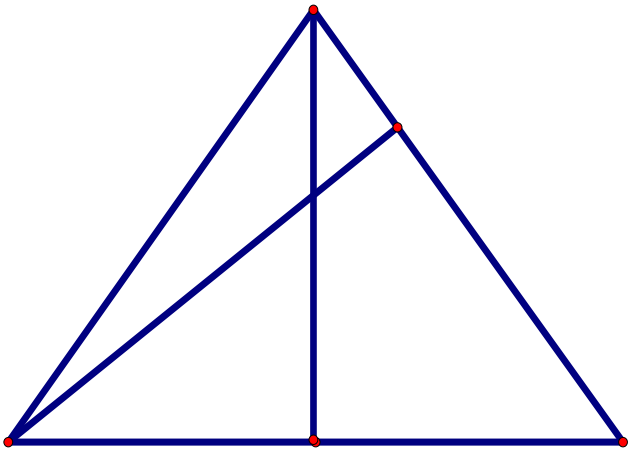
Example: Perpendicular Bisectors

Median→a segment/line/ray that connects a vertex of a triangle to the **midpoint** of the opposite side. (Note: 3 can be drawn)

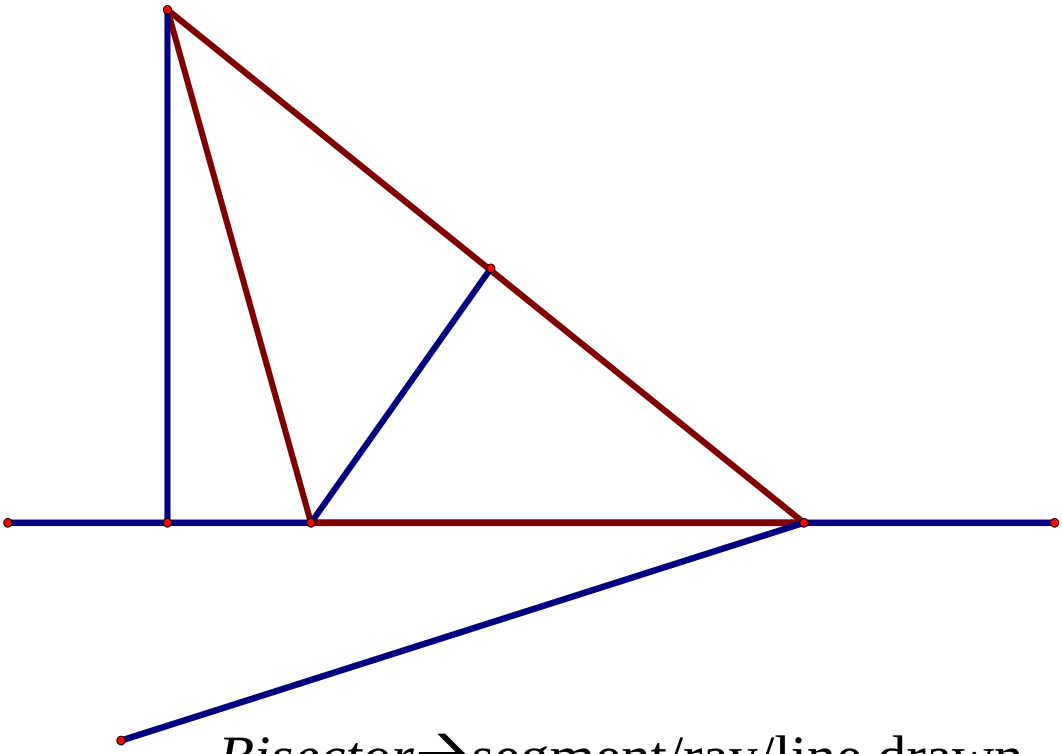




Altitude→a segment/line/ray that is drawn from or through a vertex of a triangle **perpendicular** to the opposite side.
Imp: does not have to bisect the opposite side but in some triangles that situation may occur. (Note: 3 can be drawn)



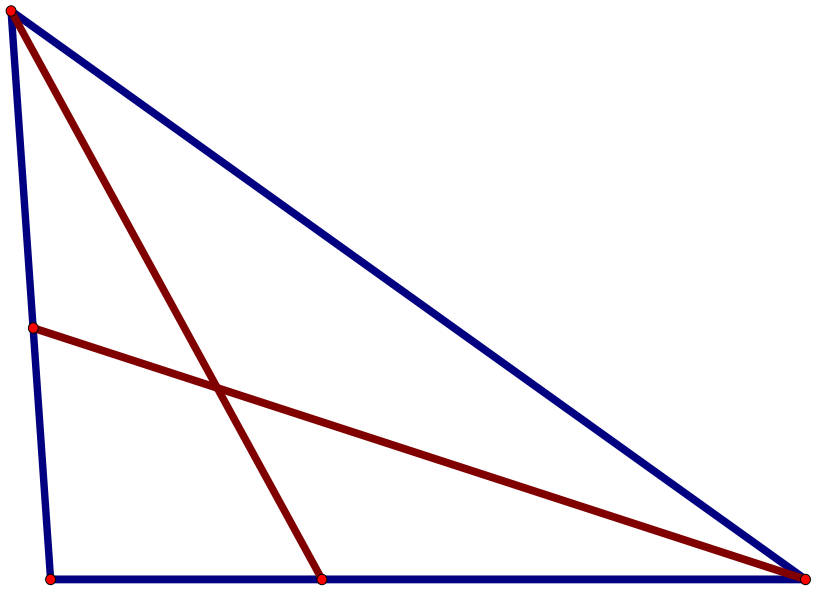
Example: Altitudes in Triangles



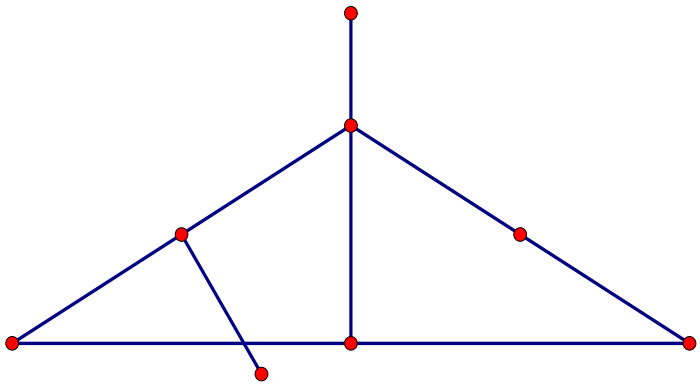
Angle *Bisector*→segment/ray/line drawn

from or through a vertex of a triangle and the segment/line/ray bisects that angle. (Note: 3 can be drawn)

Example of Angle Bisectors



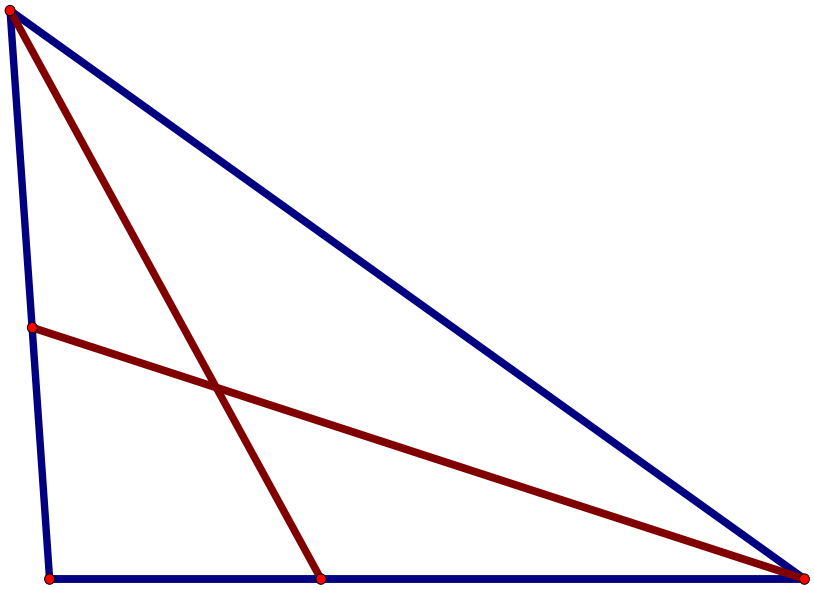
Thm: Any pt on the perpendicular bisector of a segment is equidistant from the endpts of the segment.



Thm: **(**Converse)

Any point equidistant from the endpts of a segment lies on the perpendicular bisector of the segment.

Thm: Any pt on the bisector of an angle is equidistant from the sides of the angle.



Thm: (Converse) Any pt on or in the interior of an angle and equidistant from the sides of an angle lies on the bisector of the angle

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Geometry—Chapter 5-4

Inequalities for Sides and Angles of a Triangle

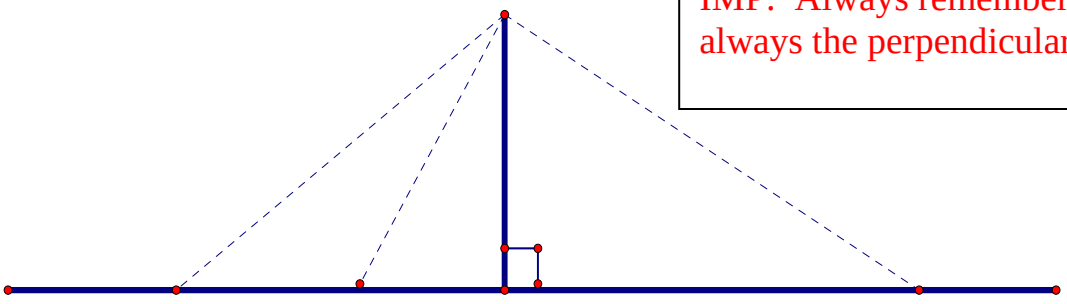
Thm: The side opposite the greatest angle is the largest side in a triangle. The side opposite the smallest angle is the smallest side in the triangle.

Thm: The angle opposite the greatest side is the largest angle in the triangle. The angle opposite the smallest side is the smallest angle in the triangle.

Example: Inequalities for Sides & Angles in a triangle

Thm: The perpendicular segment from a point to a line is the shortest segment from the point to the line.

IMP: Always remember that distance is always the perpendicular distance….



Finally—A Corollary

The perpendicular segment from a point to a plane is the shortest segment from the point to the plane.

Geometry—Chapter 5-5

The Triangle Inequality

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

In other words—any 3 segments will not necessary form a triangle…….

Example: 3 Segments and a Triangle

Questions:
Given the length of 3 segments, how do you determine whether those 3 segments will form triangle?

What if all 3 segments are the same length?

What if the length of two segments sum up to equal the 3rd?

Given the length of 2 segments, how would you determine between what 2 numbers must the length of the 3rd side be.