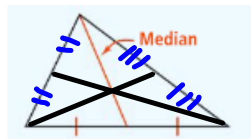
November 17, 2014

5-4 Medians and Altitudes

Content Standards
G.CO.10 Prove theorems about triangles . . . the medians of a triangle meet at a point.
Also G.SRT.5

Objective To identify properties of medians and altitudes of a triangle

medians. A **median of a triangle** is a segment whose endpoints are a vertex and the midpoint of the opposite side.



Essential Understanding A triangle's three medians are always concurrent.

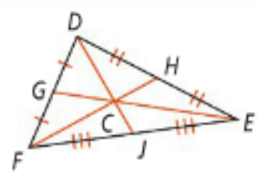
In a triangle, the point of concurrency of the medians is the **centroid of the triangle.** The point is also called the *center of gravity* of a triangle because it is the point where a triangular shape will balance. For any triangle, the centroid is always inside the triangle.

take note

Theorem 5-8 Concurrency of Medians Theorem

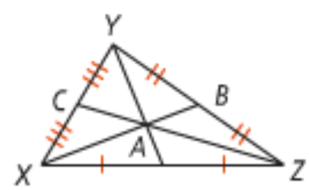
The medians of a triangle are concurrent at a point that is two thirds the distance from each vertex to the midpoint of the opposite side.

$DC = \frac{2}{3}DJ$ $\quad EC = \frac{2}{3}EG$ $\quad FC = \frac{2}{3}FH$



You will prove Theorem 5-8 in Lesson 6-9.

Got It? **1. a.** In the diagram for Problem 1, $ZA = 9$. What is the length of $\overline{ZC}$?



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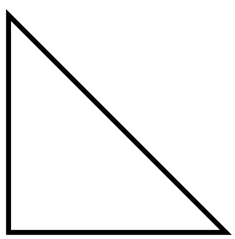
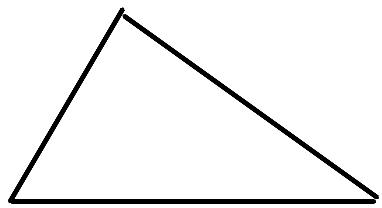
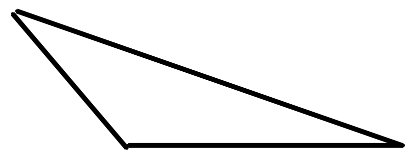
An **altitude of a triangle** is the perpendicular segment from a vertex of the triangle to the line containing the opposite side. An altitude of a triangle can be inside or outside the triangle, or it can be a side of the triangle.

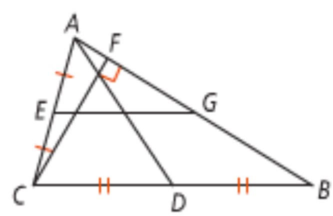






Got It? 2. For $\triangle ABC$, is each segment a *median*, an *altitude*, or *neither*? Explain.

a. $\overline{AD}$ **b.** $\overline{EG}$ **c.** $\overline{CF}$



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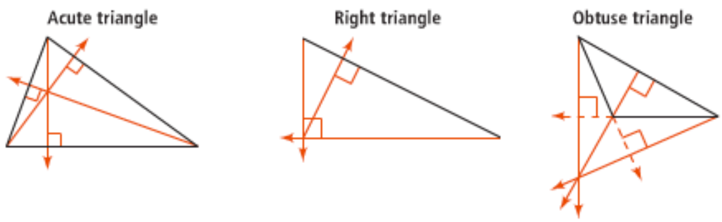
take note

Theorem 5-9 Concurrency of Altitudes Theorem

The lines that contain the altitudes of a triangle are concurrent.

You will prove Theorem 5-9 in Lesson 6-9.

The lines that contain the altitudes of a triangle are concurrent at the **orthocenter of the triangle**. The orthocenter of a triangle can be inside, on, or outside the triangle.



take note

Concept Summary Special Segments and Lines in Triangles

Perpendicular Bisectors	Angle Bisectors	Medians	Altitudes