



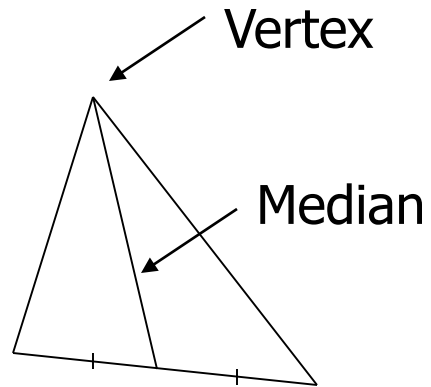
## Median and Altitude of a Triangle

Goal:

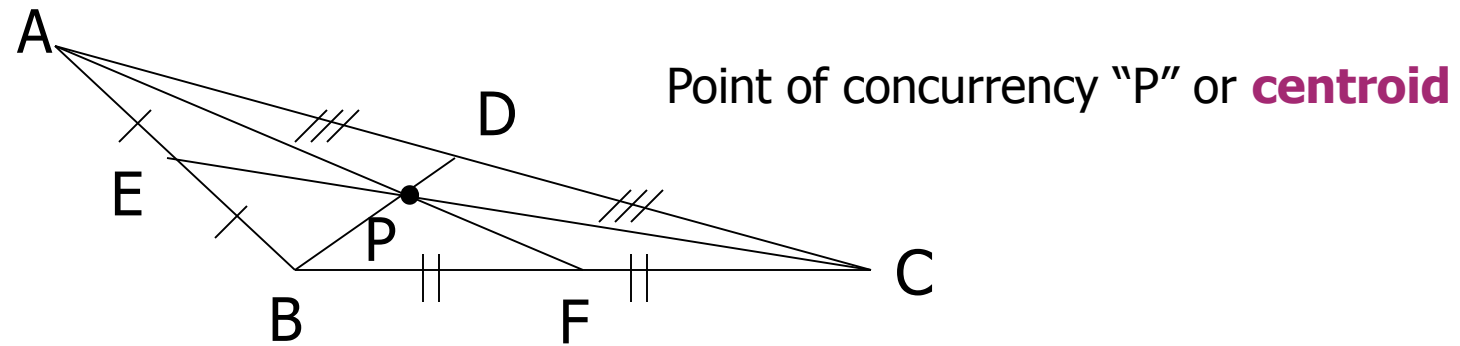
- To use properties of the medians of a triangle.
- To use properties of the altitudes of a triangle.

# Median of a Triangle

Median of a Triangle – a segment whose endpoints are the vertex of a triangle and the midpoint of the opposite side.

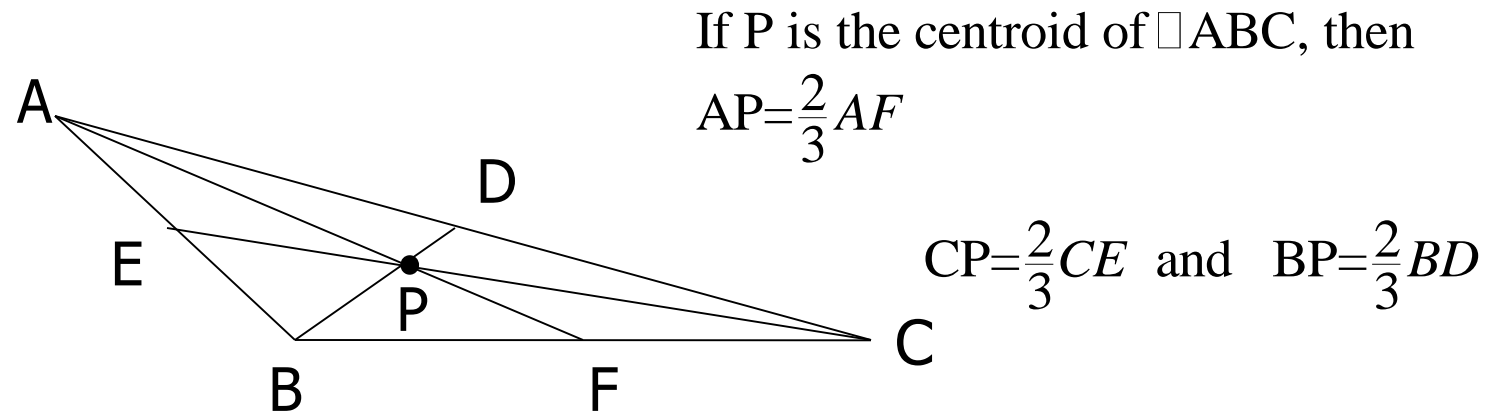


# Median of an Obtuse Triangle



## Medians of a Triangle

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

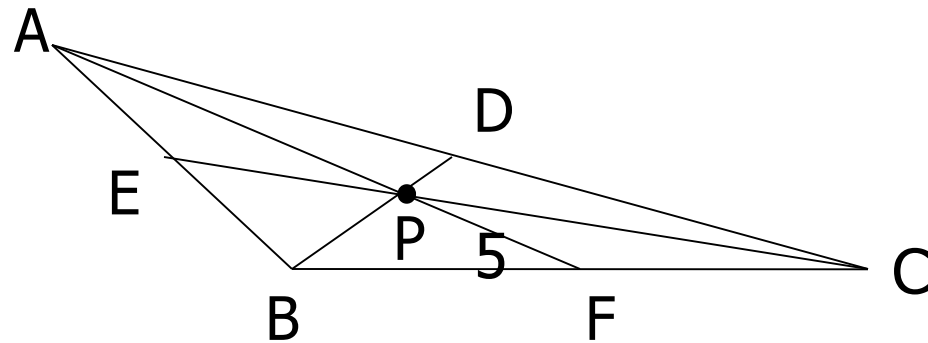


## Example - Medians of a Triangle

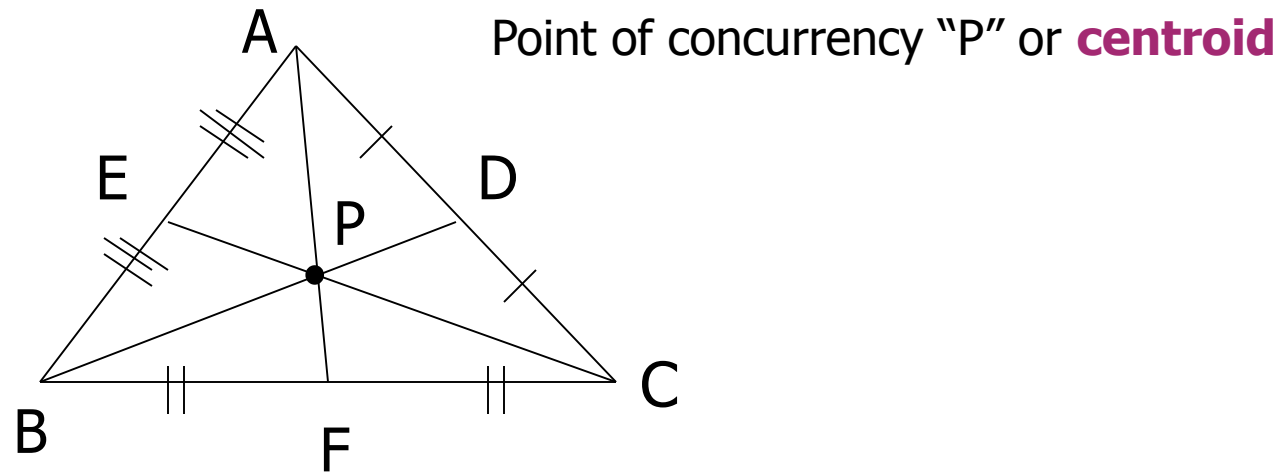
*P is the centroid of  $\triangle ABC$ .*

$$PF = 5$$

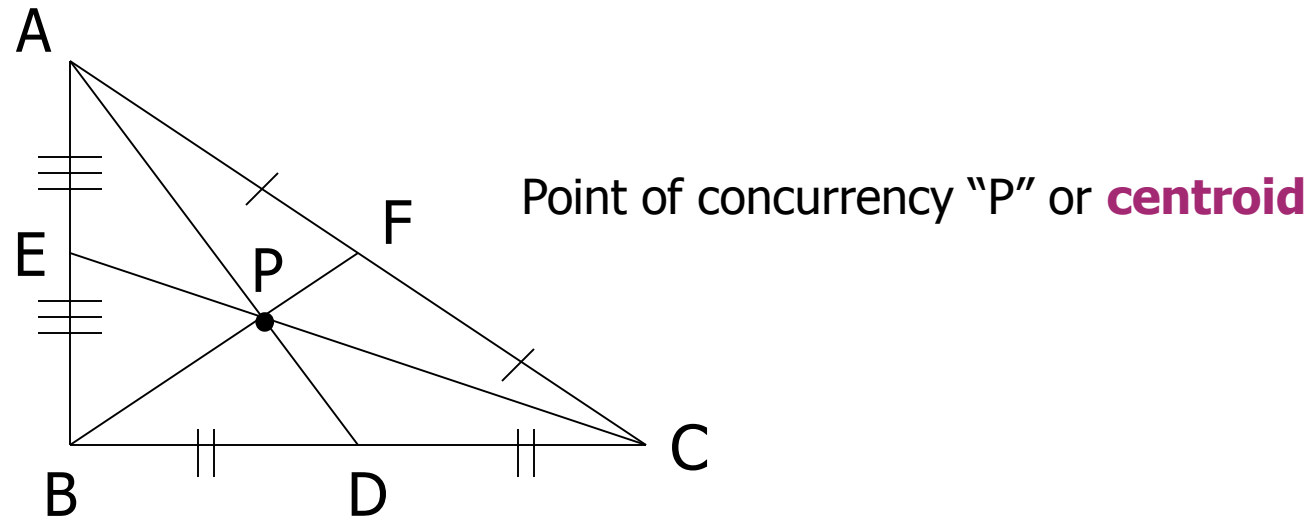
*Find AF and AP*



# Median of an Acute Triangle



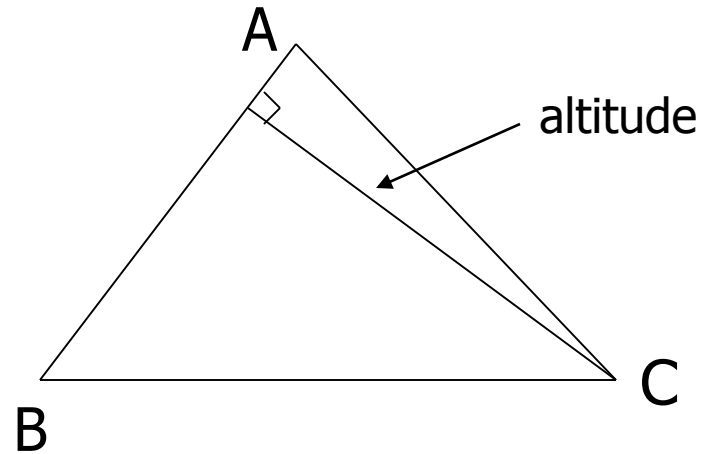
## Median of a Right Triangle



The three medians of an obtuse, acute, and a right triangle always meet inside the triangle.

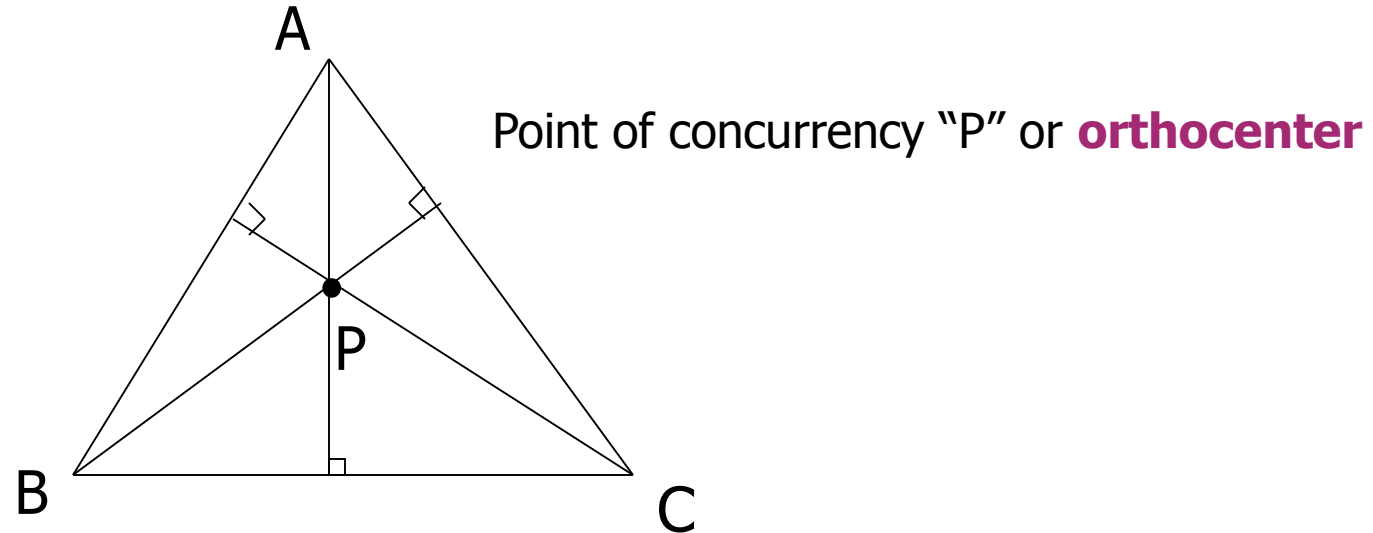
## Altitude of a Triangle

Altitude of a triangle – the perpendicular segment from the vertex to the opposite side **or** to the line that contains the opposite side





# Altitude of an Acute Triangle

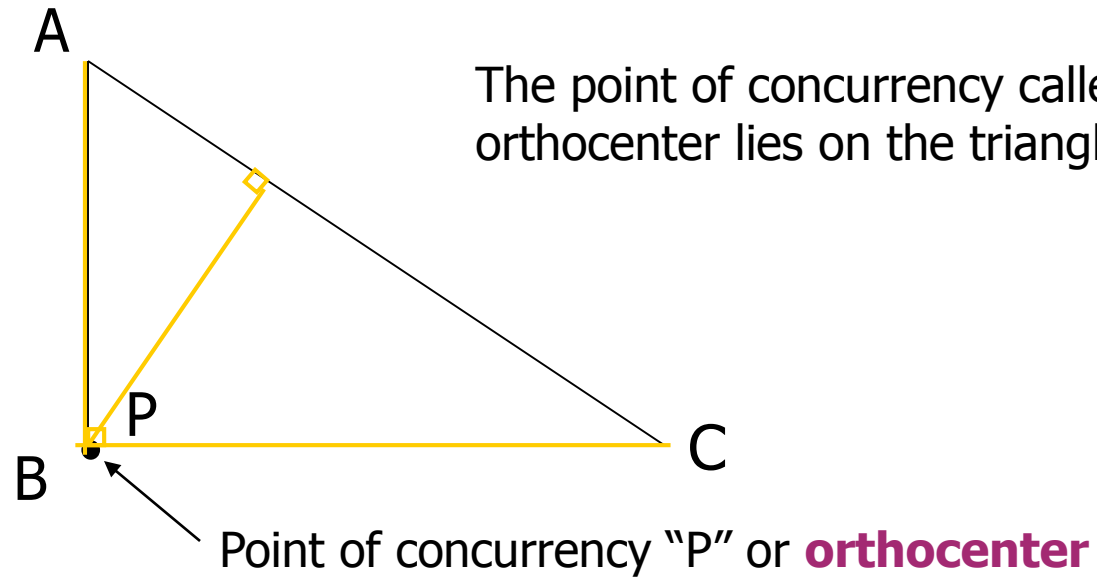


The point of concurrency called the orthocenter lies inside the triangle.

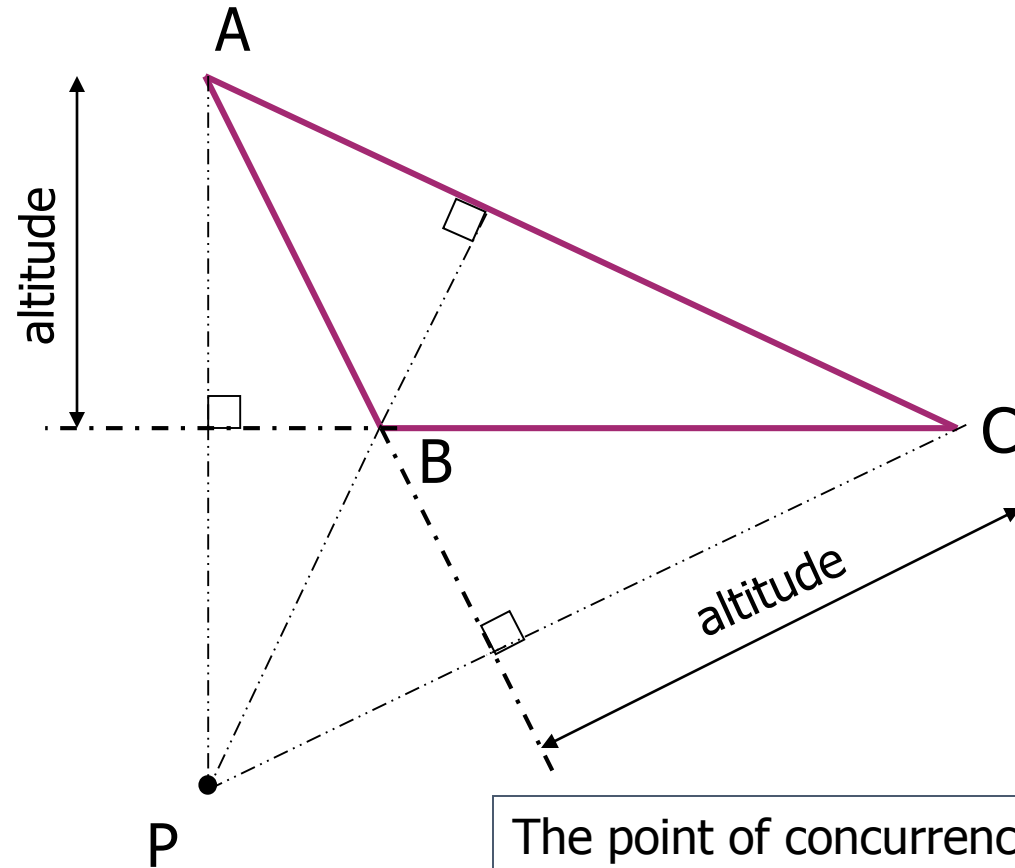
# Altitude of a Right Triangle

The two legs are the altitudes

The point of concurrency called the orthocenter lies on the triangle.



## Altitude of an Obtuse Triangle

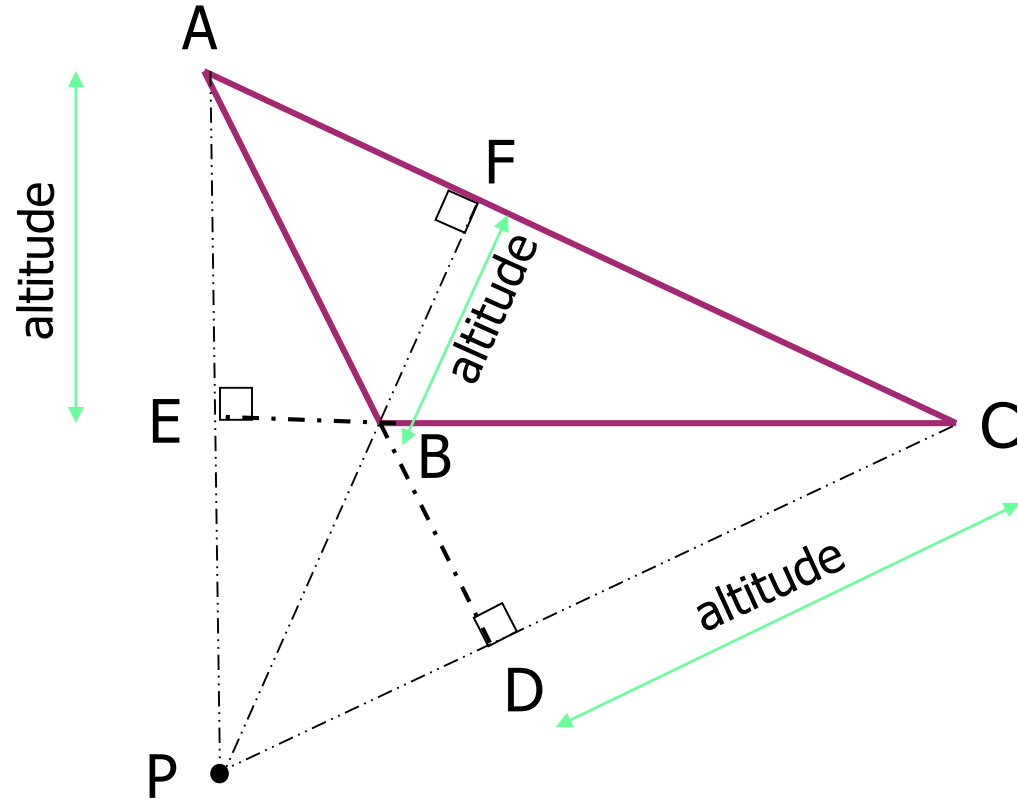


The point of concurrency lies outside the triangle.

The point of concurrency of the three altitudes is called the **orthocenter**

## Altitudes of a Triangle

The lines containing the altitudes of a triangle are concurrent.



*If  $\overline{AE}$ ,  $\overline{BF}$ , and  $\overline{CD}$  are the altitudes of  $\triangle ABC$ ,  
then the lines  $\overline{AE}$ ,  $\overline{BF}$ , and  $\overline{CD}$  intersect at  $P$ .*

# Example

Determine if  $EG$  is a perpendicular bisector, and angle bisector, a median, or an altitude of triangle  $DEF$  given that:

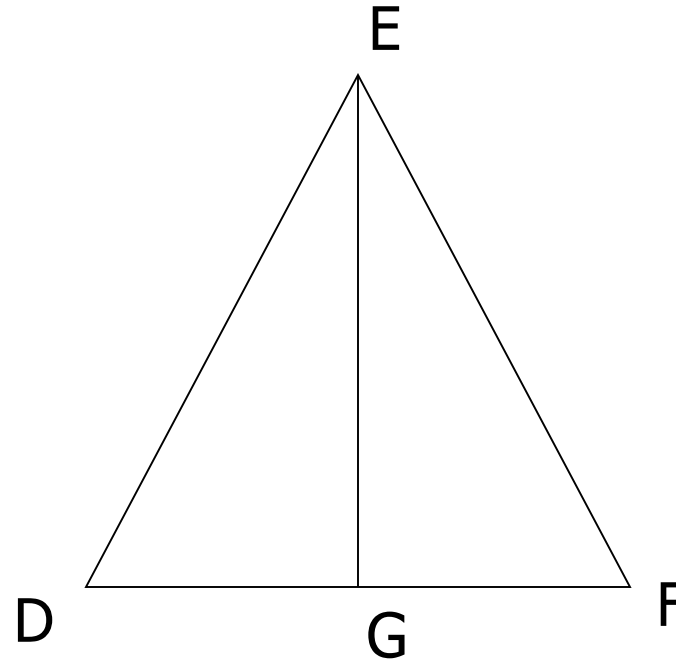
a.  $\overline{DG} \cong \overline{FG}$

b.  $\overline{EG} \perp \overline{DF}$

c.  $\angle DEG \cong \angle FEG$

d.  $\overline{EG} \perp \overline{DF}$  and  $\overline{DG} \cong \overline{FG}$

e.  $\triangle DEG \cong \triangle FGE$





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# Review

## Properties / Points of Concurrency

Median -- Centroid

Altitude -- Orthocenter

Perpendicular Bisector -- Circumcenter

Angle Bisector -- Incenter