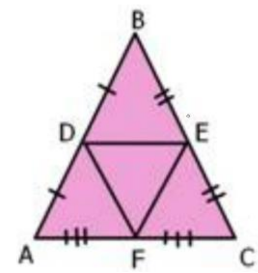
Math 3 Honors Unit 4 Day 3 – Midsegments & Points of Concurrency

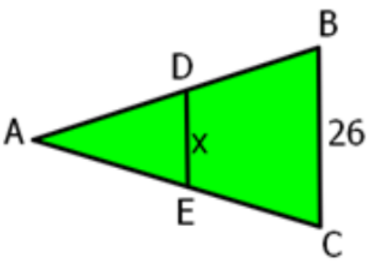
A ______________________ is a segment that connects the midpoints of two sides of a triangle; every triangle has three.



Midsegment Theorem – The segment connecting the midpoints of two sides of a triangle is ______________ to the third side and is _________ as long as that side.

Examples: $\overline{DE}$ is a midsegment of ΔABC. Find the value of x.

1)



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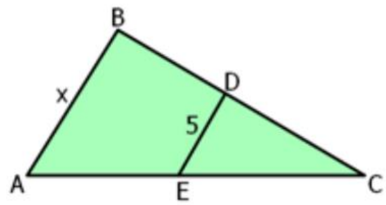

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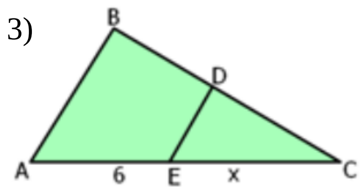
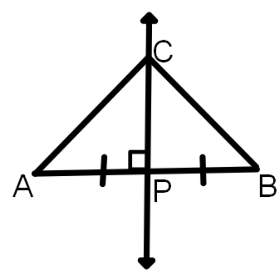


A **perpendicular bisector** is perpendicular to a segment at the ______________________. A perpendicular bisector can be a segment, ray, line, or plane.

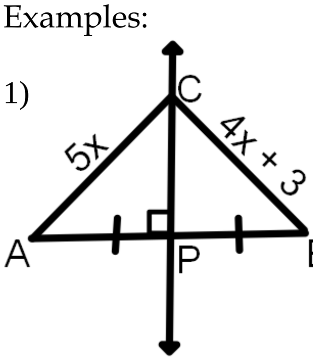
Perpendicular Bisector Theorem: a point on the perpendicular bisector of a segment is always ___________________________ to the endpoints of that segment.



Converse of the Perpendicular Bisector Theorem – In a plane, if a point is equidistant from the endpoints of a segment, then it is on the ____________________________________ of the segment.

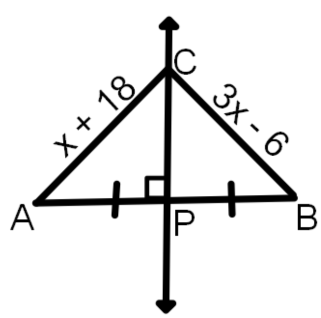
Examples:

1)



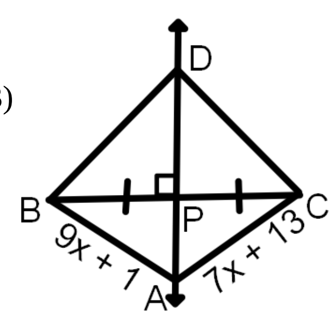
Find x and CB.

2)



Find x and AC.

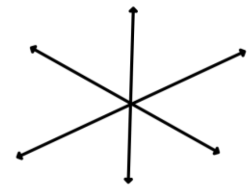
3)



Find x and AB.

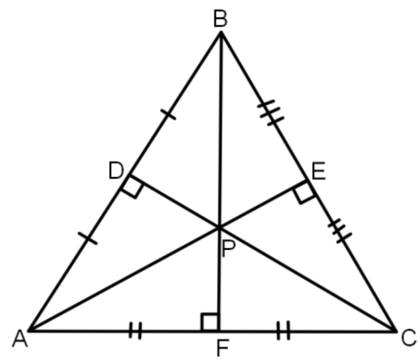
______________________ – When three or more lines, rays, or segments intersect in the same point.

<u>Point of Concurrency</u> – The point of _________________of concurrent lines, rays or segments.

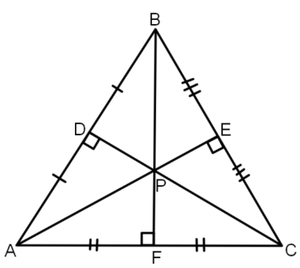


The point of concurrency of <u>three perpendicular bisectors</u> of a triangle is called a ___________________________; it is _______________________ from the vertices of the triangle.

- _____, ______, ______ are the vertices.
- Point _____ is the _____________________________.

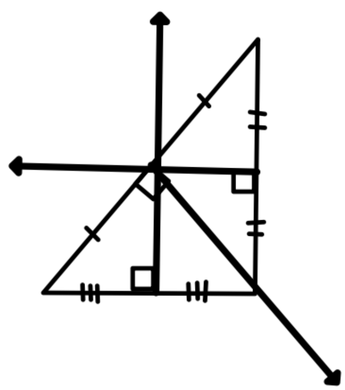


Acute Triangles



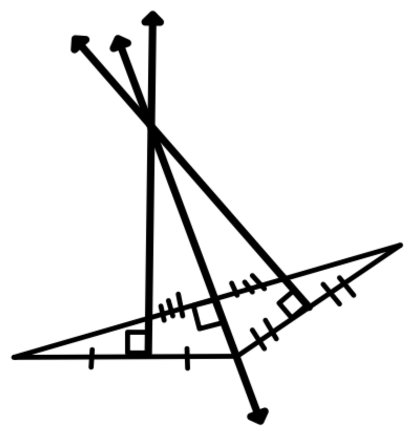
Circumcenter
inside triangle

Right Triangles



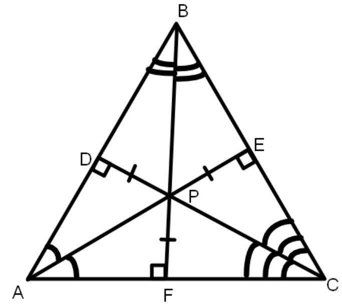
Circumcenter
on triangle

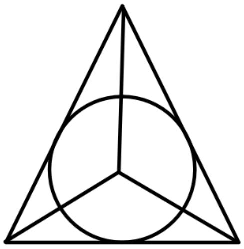
Obtuse Triangles



Circumcenter
outside triangle

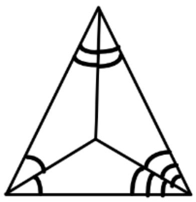
The point of concurrency of <u>three angle bisectors</u> of a triangle is called an ________________________; it is _________________________ from the sides of the triangle; it is *always* in the ________________ of the triangle, regardless of triangle type.

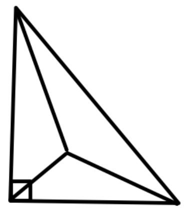


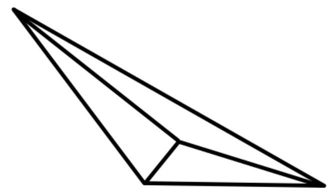


** Because the incenter is ____________________ from the three sides of the triangle, a _______________ can be **<u>inscribed</u>** within the triangle using the incenter as the center of the circle.

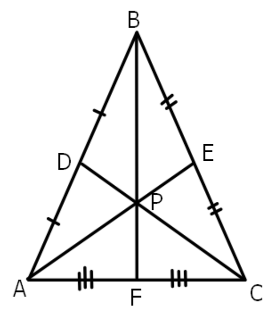
Acute Triangles *Right Triangles* *Obtuse Triangles*





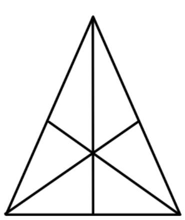


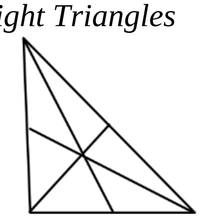
<u>Median</u> <u>of a Triangle</u> – A segment from a vertex to the _______________ of the opposite side. The three medians are concurrent at Point _____.

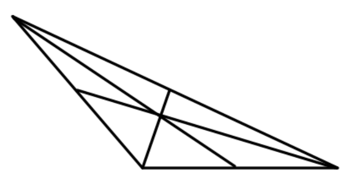


The point of concurrency of <u>three medians</u> of a triangle is called a __________________________; Centroids are *always* _________________ the triangle, regardless of triangle type.

Acute Triangles *Right Triangles* *Obtuse Triangles*



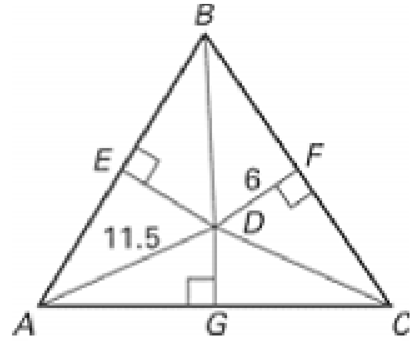




<u>Concurrency of Medians of a Triangle</u> – the medians of a triangle intersect at a point that is ___________ of the distance from each vertex to the midpoint of the opposite side.

Points of Concurrency Examples:

Point *D* is the *incenter* of ∆*ABC*. Find the following.



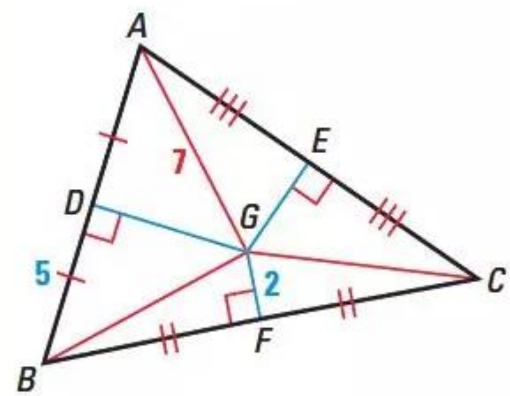
1. ED = __________

2. If DF = (2x – 4), then x = _________

3. If m∠DAB = 48º, then m∠DAC = __________

4. If m∠ABC = 65º, then m∠ABD = __________

In the diagram, the perpendicular bisectors (shown with dashed segments) of ΔABC meet at point *G*—the *circumcenter*. Find the indicated measure. Round to the tenths place when necessary.

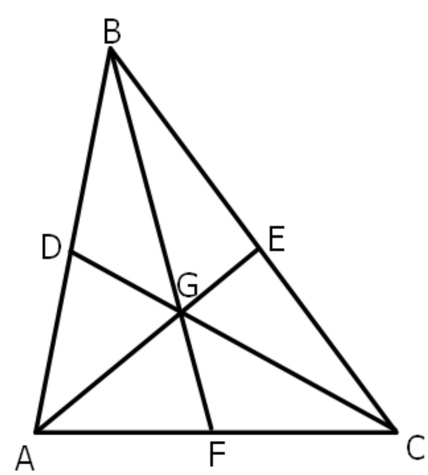


1. GC = ___________ 3. BC = __________

2. AD = __________ 4. m∠BDG = __________

5. If BG = 2x, then x= _________

Point G is the centroid of ∆ABC, $BG = 6$, $AF = 12$, & $AE = 15$. **Find the length of the segments.**



1. $\overline{FC}$

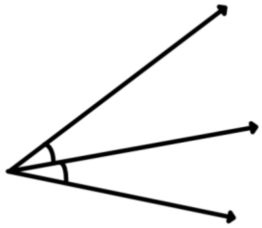
2. $\overline{BF}$

3. $\overline{AG}$

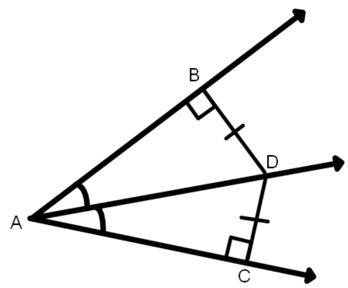
4. $\overline{GE}$

Math 3 Honors Unit 4 Days 4 – Angle Bisectors & Altitude

An **angle bisector** is a ray that dives an angle into ____.



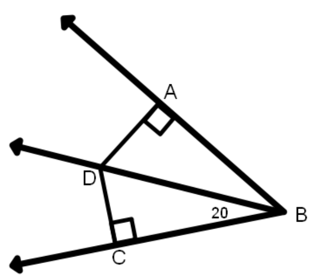
Angle Bisector Theorem – If a point is on the bisector of an angle, then it is ___________________ from the two sides of the angle.



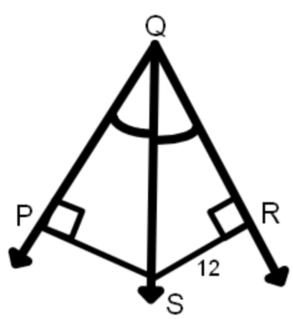
Converse of the Angle Bisector Theorem – If a point is in the interior of an angle and is ____________________ from the sides of the angle, then it lies on the _______________ of the angle.

Examples:

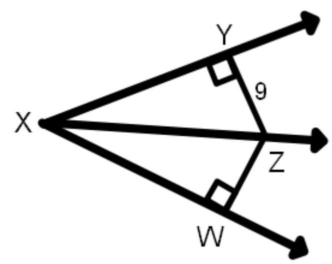
1) Find $m\angle ABD$



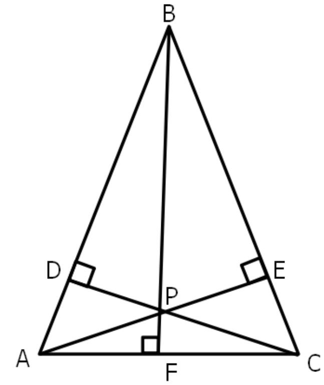
2) Find PS



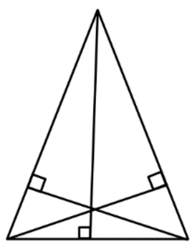
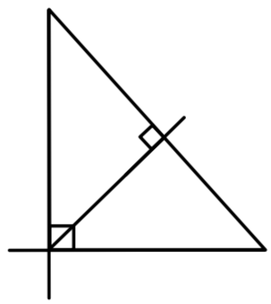
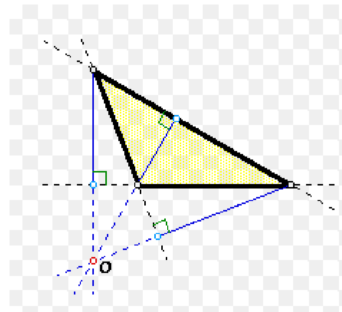
3) $m\angle YXW = 60°$
Find WZ



______________________ – a perpendicular segment from a vertex to the opposite side.



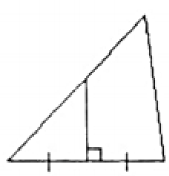
The point of the concurrency of <u>three altitudes</u> of a triangle is called the __________________________; it *always* makes a right angle with the opposite side.

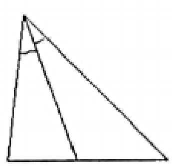
Acute Triangles	*Right Triangles*	*Obtuse Triangles*
		
Orthocenter *inside triangle*	*Orthocenter* *on right angle*	*Orthocenter* *outside triangle*

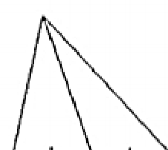
The orthocenter of a right triangle always falls on the _________________ __________________ of a triangle.

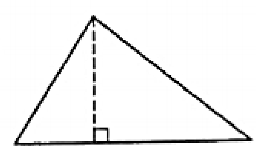
Match the following with the correct terms from the Word Bank.

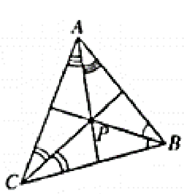
Circumcenter	**Perpendicular Bisector**	**Incenter**	**Centroid**	**Orthocenter**
Angle Bisector		**Altitude**	**Median**	

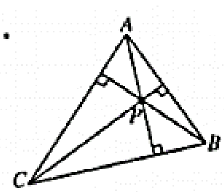
a. 

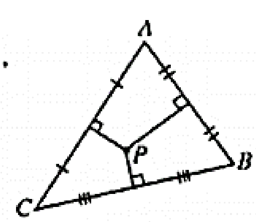
b. 

c. 

d. 

a. 

b. 

c. 

d.