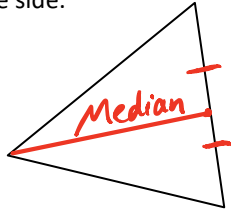


# Applying Congruent Triangles – Bisectors, Medians and Altitudes

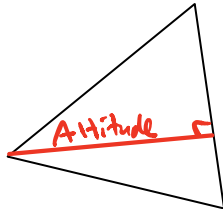
Notes Section 5.1

Name \_\_\_\_\_

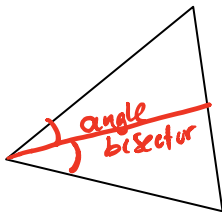
**Median:** a segment in a triangle that connects a vertex to the midpoint of the opposite side.



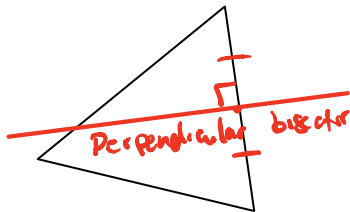
**Altitude:** a segment in a triangle that connects a vertex to the side opposite forming a perpendicular.



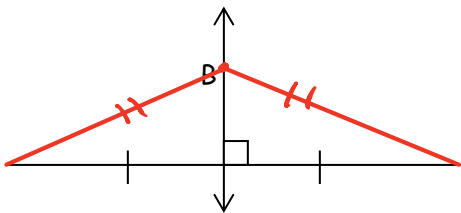
**Angle Bisector:** a segment that bisects an angle in a triangle and connects a vertex to the opposite side.



**Perpendicular Bisector:** a segment in a triangle that passes through the midpoint of a side and is perpendicular to that side.

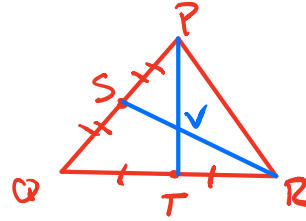


**Theorem 5-1.2:** A point is on the perpendicular bisector IFF it is equidistant from the endpoints of the segment.

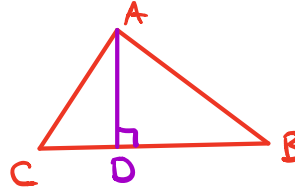


Draw and label a figure to illustrate each situation.

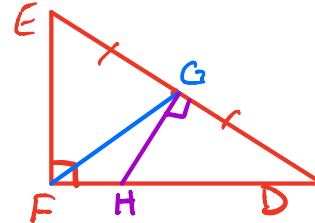
#1)  $\overline{PT}$  and  $\overline{RS}$  are medians of triangle  $\Delta PQR$  and intersect at  $V$ .



#2)  $\overline{AD}$  is a median and an altitude of  $\Delta ABC$ .

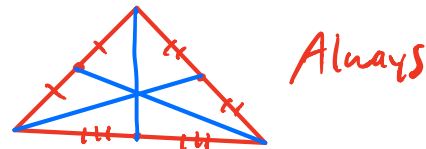


#3)  $\Delta DEF$  is a right triangle with right angle at  $F$ .  $\overline{FG}$  is a median of  $\Delta DEF$  and  $\overline{GH}$  is the perpendicular bisector of  $\overline{DE}$ .

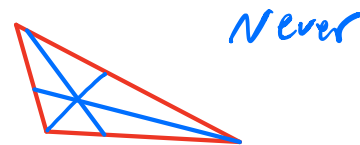


State whether each sentence is always, sometimes, or never true.

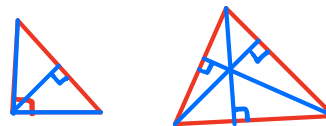
#4) Three medians of a triangle intersect at a point inside the triangle.



#5) The three angle bisectors of a triangle intersect at a point outside the triangle.



#6) The three altitudes of a triangle intersect at a vertex of the triangle.



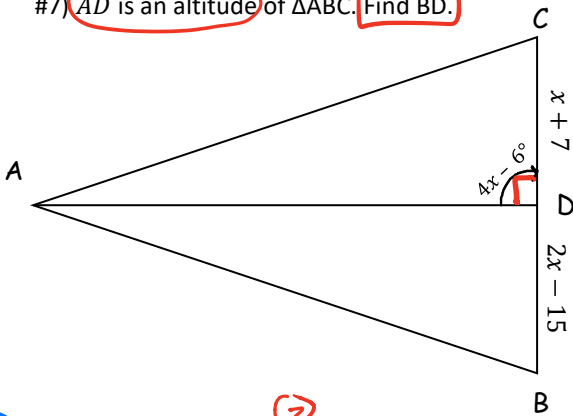
Handwritten word 'Sometimes' in blue.

# Applying Congruent Triangles – Bisectors, Medians and Altitudes

Notes Section 5.1

Name \_\_\_\_\_

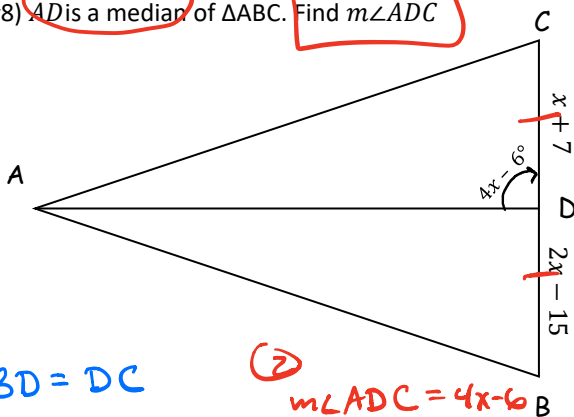
#7)  $\overline{AD}$  is an altitude of  $\triangle ABC$ . Find  $BD$ .



①  $4x - 6 = 90$   
 $4x = 96$   
 $x = 24$

②  $BD = 2x - 15$   
 $= 2(24) - 15$   
 $= 48 - 15$   
 $BD = 33$

#8)  $\overline{AD}$  is a median of  $\triangle ABC$ . Find  $m\angle ADC$ .



①  $BD = DC$   
 $2x - 15 = x + 7$   
 $x - 15 = 7$   
 $x = 22$

②  $m\angle ADC = 4x - 6$   
 $= 4(22) - 6$   
 $= 88 - 6$   
 $m\angle ADC = 82$

#9) Find the midpoint of  $A(2, 4)$  and  $B(-5, 8)$

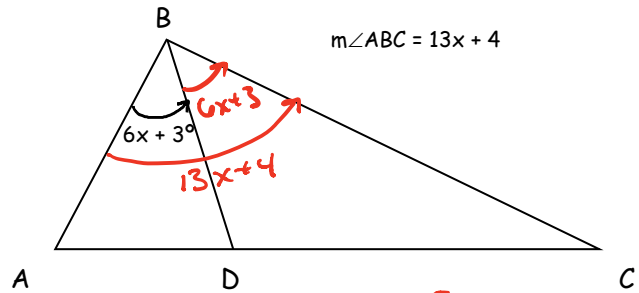
$M = \left( \frac{\sum x}{2}, \frac{\sum y}{2} \right)$

$M = \left( \frac{(2) + (-5)}{2}, \frac{(4) + (8)}{2} \right)$

$M = \left( -\frac{3}{2}, \frac{12}{2} \right)$

$M = \left( -\frac{3}{2}, 6 \right)$

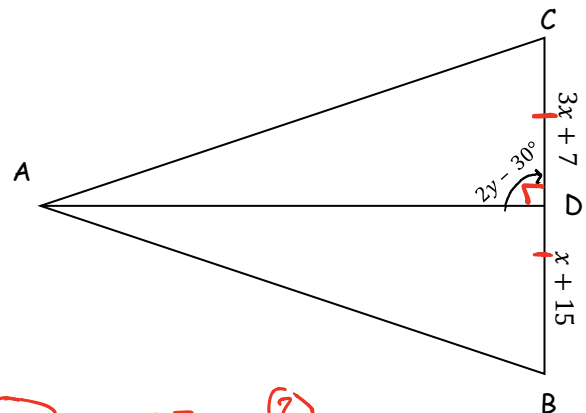
#10) Find  $m\angle ABC$  if  $\overline{BD}$  is an angle bisector of  $\triangle ABC$ .



①  $m\angle ABD + m\angle DBC = m\angle ABC$   
 $(6x + 3) + (6x + 3) = 13x + 4$   
 $12x + 6 = 13x + 4$   
 $6 = x + 4$   
 $2 = x$

②  $m\angle ABC = 13x + 4$   
 $= 13(2) + 4$   
 $= 26 + 4$   
 $m\angle ABC = 30^\circ$

#11)  $\overline{AD}$  is a perpendicular bisector of  $\overline{BC}$ . Find  $x$  and  $y$ .



①  $CD = DB$   
 $3x + 7 = x + 15$   
 $2x + 7 = 15$   
 $2x = 8$   
 $x = 4$

②  $2y - 30 = 90$   
 $2y = 120$   
 $y = 60$