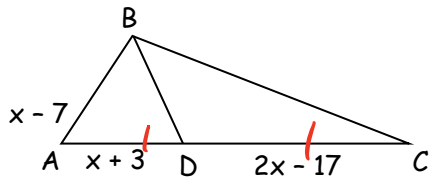


Applying Congruent Triangles – Medians, Altitudes and Bisectors

Homework Section 5.1b

Name _____

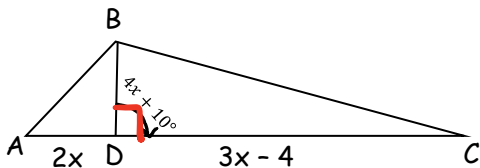
#1) Find AB if \overline{BD} is a median of $\triangle ABC$.



① $AD = DC$
 $x+3 = 2x-17$
 $3 = x-17$
 $20 = x$

② $AB = x-7$
 $AB = (20)-7$
 $AB = 13$

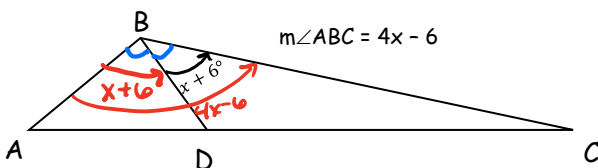
#2) Find AC if \overline{BD} is an altitude of $\triangle ABC$.



① $m\angle BDC = 90$
 $4x+10 = 90$
 $4x = 80$
 $x = 20$

② $AC = AD + DC$
 $= (2x) + (3x-4)$
 $= 5x-4$
 $= 5(20)-4$
 $= 100-4$
 $AC = 96$

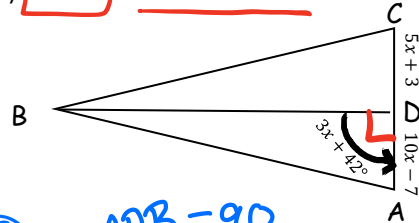
#3) Find $m\angle ABC$ if \overline{BD} is an angle bisector of $\triangle ABC$.



① $m\angle ABD + m\angle DBC = m\angle ABC$
 $(x+6) + (x+6) = 4x-6$
 $2x+12 = 4x-6$
 $12 = 2x-6$
 $18 = 2x$
 $9 = x$

② $m\angle ABC = 4x-6$
 $= 4(9)-6$
 $= 36-6$
 $m\angle ABC = 30$

#4) Find AC if \overline{BD} is an altitude of $\triangle ABC$.



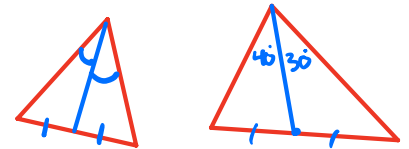
① $m\angle ADB = 90$
 $3x+42 = 90$
 $3x = 48$
 $x = 16$

② $AC = AD + DC$
 $= (5x+3) + (10x-7)$
 $= 15x-4$
 $= 15(16)-4$
 $= 240-4$
 $AC = 236$

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

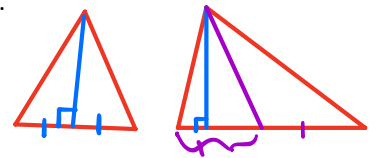
#5) A median is an angle bisector.

Sometimes



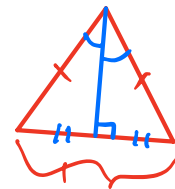
#6) A median is an altitude.

Sometimes



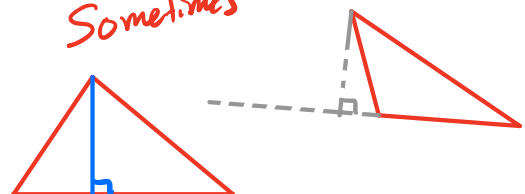
#7) In an equilateral triangle, a median is also an angle bisector and is also an altitude.

Always



#8) An altitude is on the exterior of a triangle.

Sometimes

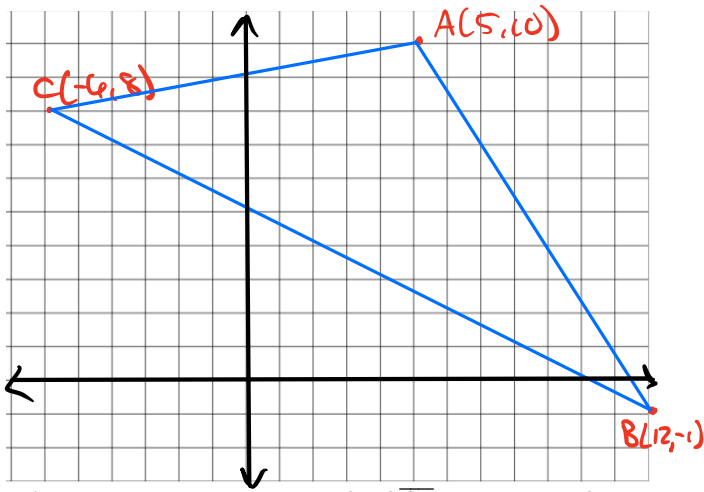


Applying Congruent Triangles – Medians, Altitudes and Bisectors

Homework Section 5.1b

Name _____

Answer each question if A(5, 10), B(12, -1), and C(-6, 8) are the vertices of $\triangle ABC$



#9) What are the coordinates of K if \overline{CK} is a median of $\triangle ABC$?

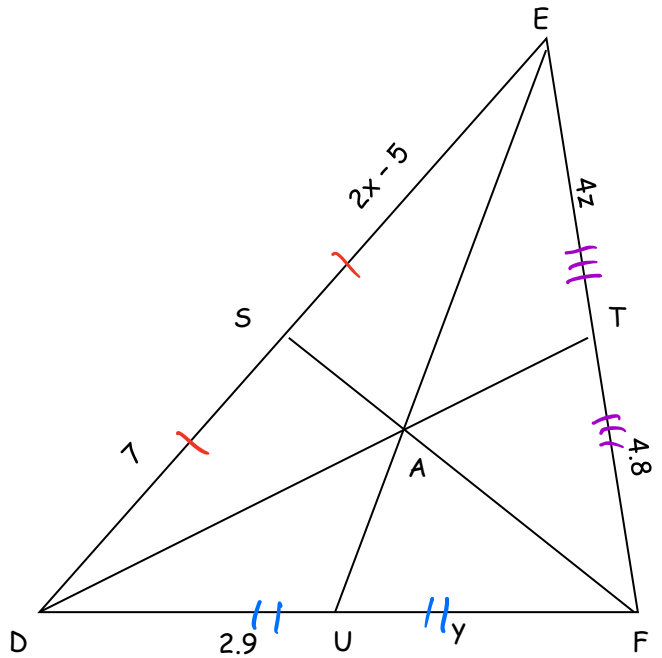
$$\begin{aligned}
 K &= M_{\overline{AB}} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\
 &= \left(\frac{(5) + (12)}{2}, \frac{(10) + (-1)}{2} \right) \\
 K &= \left(\frac{17}{2}, \frac{9}{2} \right)
 \end{aligned}$$

#10) What is the slope of the perpendicular bisector of \overline{AB} ?
What is the slope of \overline{CL} if \overline{CL} is the altitude from point C?

$$\begin{aligned}
 m_{\overline{AB}} &= \frac{\Delta y}{\Delta x} & \overline{CL} &\perp \overline{AB} \\
 &= \frac{(10) - (-1)}{(5) - (-6)} & \text{so } m_{\overline{CL}} &= \frac{7}{11} \\
 m_{\overline{AB}} &= \frac{11}{-7}
 \end{aligned}$$

\perp bisector of \overline{AB} has a slope of $\frac{7}{11}$

#11) Points S, T, and U are the midpoints of \overline{DE} , \overline{EF} , and \overline{DF} , respectively. Find x, y, and z.



$$\begin{aligned}
 2x - 5 &= 7 & y &= 2.9 & 4z &= 4.8 \\
 2x &= 12 & & & z &= 1.2 \\
 x &= 6 & & & &
 \end{aligned}$$

- #1) 13
- #2) 96
- #3) 30°
- #4) 236
- #5) Sometimes
- #6) Sometimes
- #7) Always
- #8) Sometimes
- #9) $\left(\frac{17}{2}, \frac{9}{2} \right)$
- #10) ~~$\frac{11}{-7}, \frac{7}{11}$~~ $\frac{7}{11}, \frac{7}{11}$
- #11) $x = 6, y = 2.9, z = 1.2$