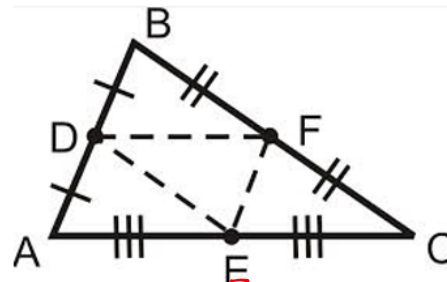
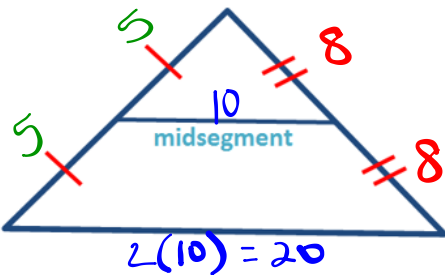


### Segment Relationships in Triangles

A midsegment of a triangle is a segment that joins the midpoints of two sides of the triangle. Every triangle has three midsegments, which forms the midsegment triangle.

**Triangle Midsegment Theorem:** A midsegment of a triangle is parallel to a side of the triangle, and its length is half the length of that side.



The Midsegment is:

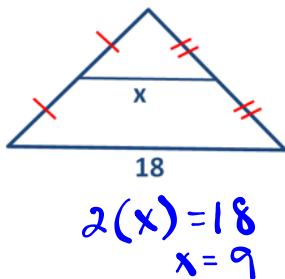
- Parallel to one side of the triangle
- Is half the length of the parallel side
- Connects to the midpoints

Midsegments:  $\overline{DF}, \overline{FE}, \overline{DE}$

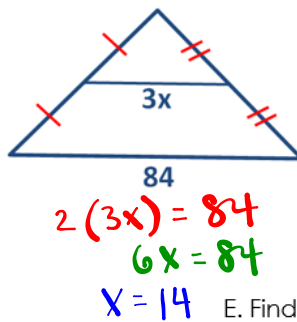
Midsegment Triangle:

**Practice:**

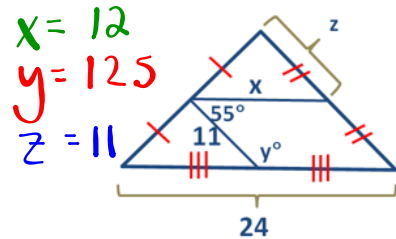
A. Solve for x:



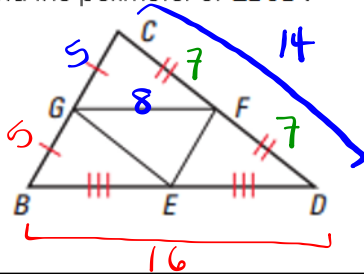
B. Solve for x:



C. Solve for x, y, and z:

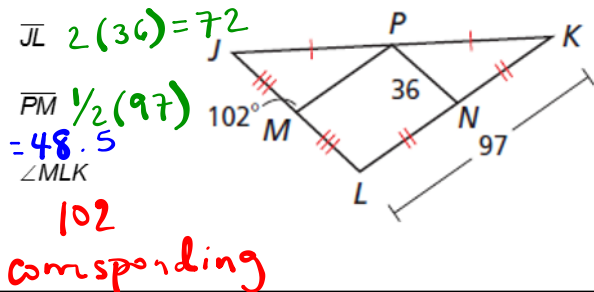


D. Given  $CD = 14$ ,  $GF = 8$ , and  $GC = 5$ , Find the perimeter of  $\triangle BCD$ .



Perimeter = 40

E. Find the measure of the following:



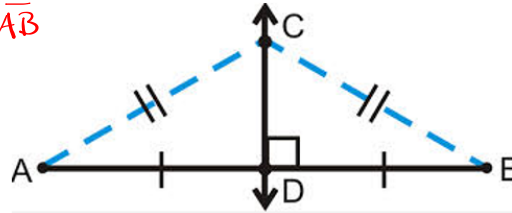
Perpendicular Bisectors of Triangles

If you remember from Day 1, perpendicular bisectors are lines, line segments, or rays that intersect at the midpoint of a line segment at a 90 degree angle.

**Perpendicular Bisector Theorem:** If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

If:  $\overline{AD} \cong \overline{DB}$  and  $\overline{CD} \perp \overline{AB}$

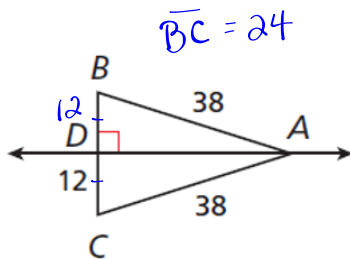
Then:  
 $\overline{CD}$  is a perpendicular bisector  
 and  
 $\overline{AC} \cong \overline{BC}$



**Converse of the Perpendicular Bisector Theorem:** If a point is equidistant from the endpoints of the segment, then it is on the perpendicular bisector of the segment.

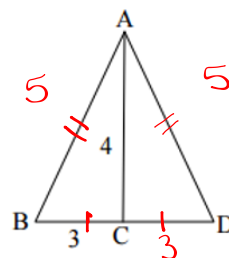
Practice:

A. Find BC.

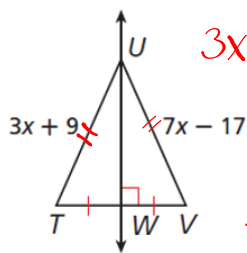


$BC = 24$

B. Find AD if AC is the perpendicular bisector to BD.



C. Find TU



$3x + 9 = 7x - 17$   
 $26 = 4x$   
 $x = 6.5$   
 $TU = 28.5$

Triangle Inequality Theorem

\* The 2 shorter sides must add up to MORE than the longest side

ex. 5, 6, 10

$5 + 6 = 11$   $11 > 10$

yes it is a triangle!

1) 2, 3, 6  
 $2 + 3 = 5$  No!

2) 7, 8, 15  
 $7 + 8 = 15$  No!