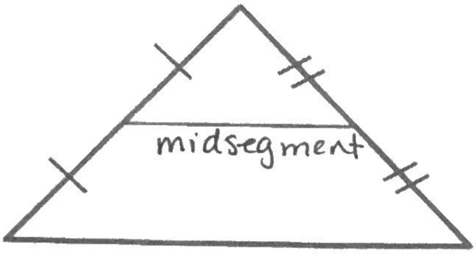
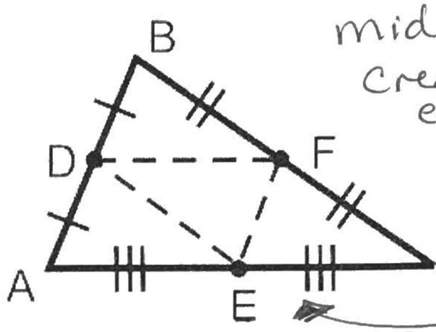
Segment Relationships in Triangles

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.





midpoints create equal seg. pieces.

typo!

The Midsegment is:

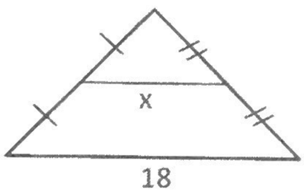
- Parallel to one side of the triangle
- Is half the length of the parallel side
- Connects to the midpoints

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

Midsegment Triangle: $\triangle DEF$

Practice:

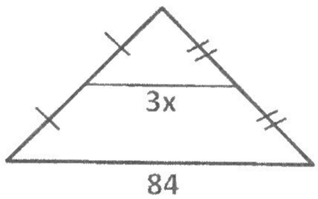
A. Solve for x:



$x = \frac{1}{2}(18)$

$\boxed{x = 9}$

B. Solve for x:

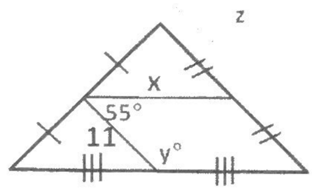


$3x = \frac{1}{2}(84)$

$3x = 42$

$\boxed{x = 14}$

C. Solve for x, y, and z:

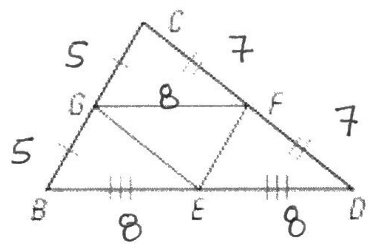


$x = \frac{1}{2}(24) = 12$

$y = 180 - 55 = 125°$

$z = 11$

D. Given CD = 14, GF = 8, and GC = 5, Find the perimeter of ΔBCD.



$8 \times 2 = 16$

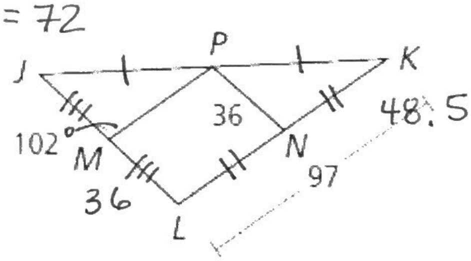
$P = 10 + 14 + 16 = 40$

E. Find the measure of the following:

$\overline{JL}$ $36 + 36 = 72$

$\overline{PM}$ 48.5

$\angle MLK$ $102°$



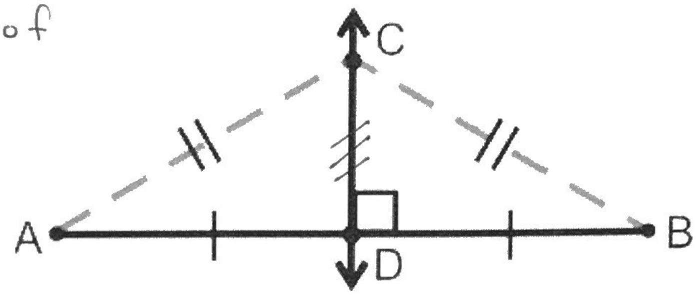
Perpendicular Bisectors of Triangles

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: If $\overleftrightarrow{CD}$ is a $\perp$ bisector of $\overline{AB}$,

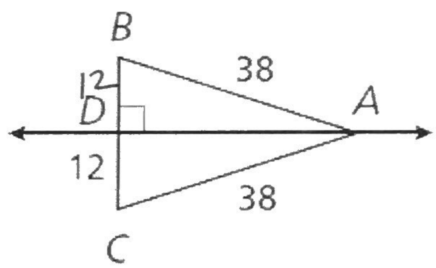
Then: Then $\overline{AD} \cong \overline{DB}$ (and $\overline{AC} \cong \overline{BC}$)



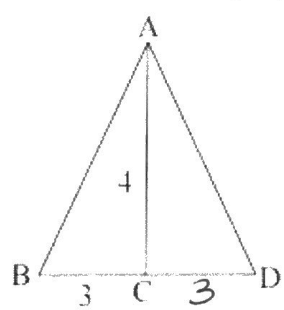
Converse of the Perpendicular Bisector Theorem: If a point is equidistant from the endpoints of the segment, then it is on the perpendicular bisector of the segment.

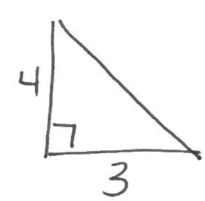
Practice:

A. Find BC. $12+12=\boxed{24}$



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



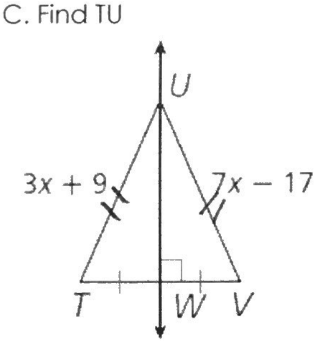


$3^2+4^2=c^2$

$25=c^2$

$\boxed{\overline{AD}=5=c}$

C. Find TU



$3x+9=7x-17$

$-3x \quad -3x$

$9=4x-17$

$+17 \quad +17$

$26=4x$

$x=6.5$

$TU=3(6.5)+9\boxed{=28.5}$