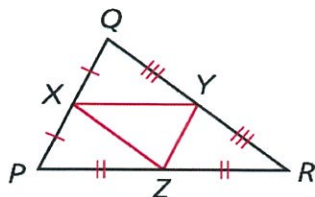


I. What is a midsegment?

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



Midsegments: $\overline{XY}, \overline{YZ}, \overline{ZX}$
Midsegment triangle: $\triangle XYZ$

Example #1: The vertices of $\triangle XYZ$ are $X(-1, 8)$, $Y(9, 2)$, and $Z(3, -4)$. M and N are the midpoints of \overline{XZ} and \overline{YZ} . Show that $\overline{MN} \parallel \overline{XY}$ and $MN = \frac{1}{2}XY$.

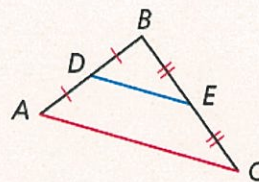
(see graph paper) same slope use distance formula

II. What is the Triangle Midsegment Theorem?

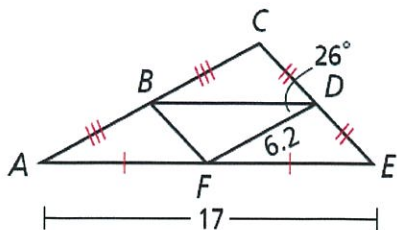
Theorem 5-4-1 Triangle Midsegment Theorem

A midsegment of a triangle is parallel to a side of the triangle, and its length is half the length of that side.

$\ast \overline{DE} \parallel \overline{AC}, DE = \frac{1}{2}AC$



Example #2: Find each measure.

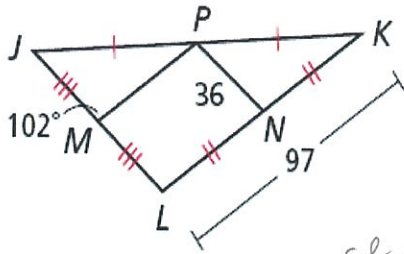


a. $BD = 8.5$

b. $m\angle CBD = 26^\circ$

\ast c. $CA = 12.4$

Example#3: Find each measure.



a. $JL = 72$

b. $m\angle MLK = 102^\circ$ (corr. \angle 's $\overline{MP} \parallel \overline{LK}$)

* Add these questions in

c. $MP = 48.5$

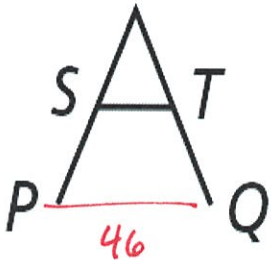
d. $m\angle PML = 78^\circ$ (lin. pair)

e. $m\angle MPN = 102^\circ$ (alt. int.)

f. $m\angle KNP = 102^\circ$ (corr.)

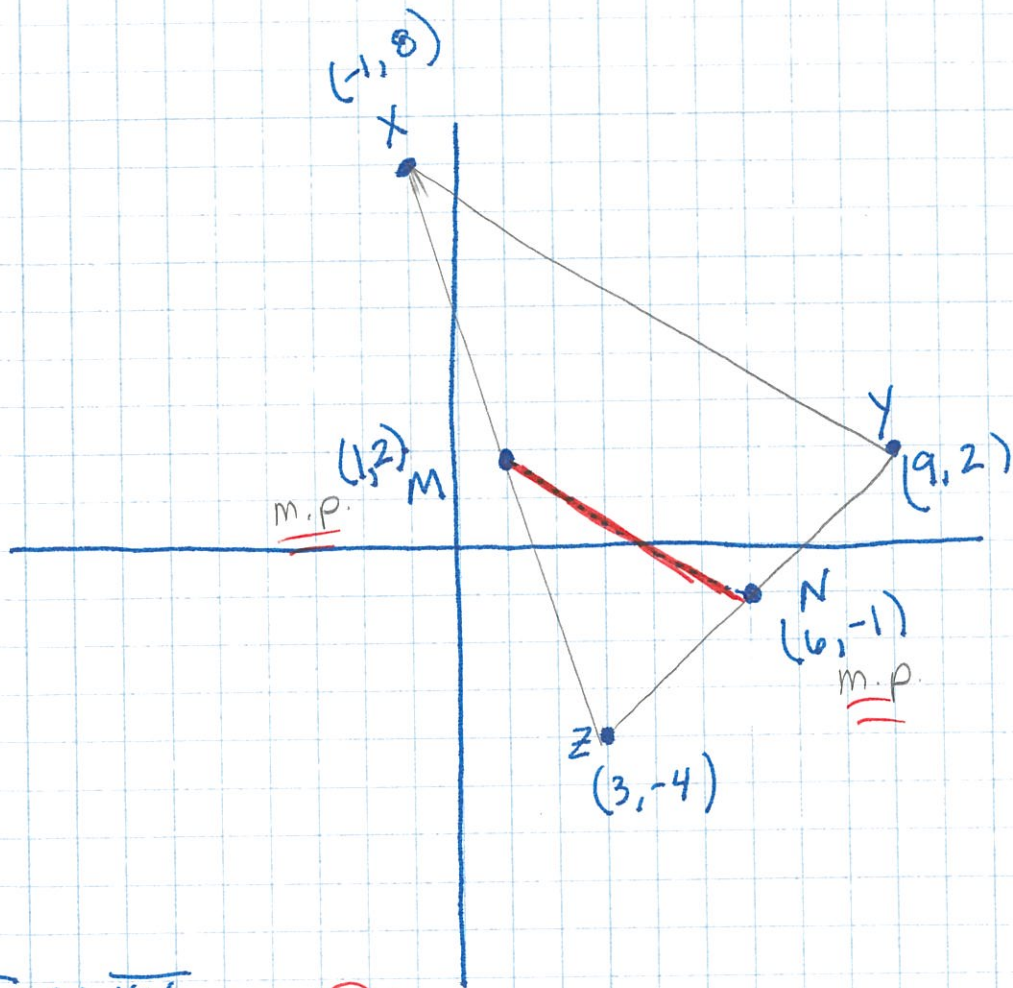
Example #4: In an A-frame support, the distance \overline{PQ} is 46 inches.

What is the length of the support \overline{ST} if S and T are at the midpoints of the sides?



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Ex1.



$$\overline{MN} \parallel \overline{XY}$$

Slope $\overline{MN} \rightarrow \frac{-1-2}{6-1} = \frac{-3}{5}$

Slope $\overline{XY} \rightarrow \frac{2-8}{9-1} = \frac{-6}{10} = \frac{-3}{5}$

same slope

$$MN = \frac{1}{2}XY \quad (\text{distance})$$

$$MN = \sqrt{\frac{(1-6)^2 + (2-(-1))^2}{25 + 9}} = \sqrt{34}$$

$$XY = \sqrt{(9-(-1))^2 + (2-8)^2} = \sqrt{10^2 + (-6)^2} = \sqrt{100 + 36} = \sqrt{136} = 2\sqrt{34}$$