

Name: Key

Date:

Period:

Midsegments of Triangles

Lesson Objective INBAT use midsegments of Δ s in the coord. plane; use the Δ midsegment theorem to find distances

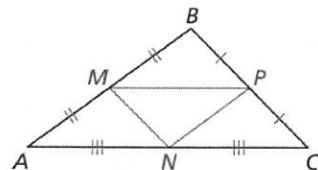
Midsegment of a Triangle: The midsegment of a triangle is a segment that connects the midpoints of two sides of the triangle.

→ EVERY triangle has 3 midsegments, which form a midsegment Δ

**In the diagram...

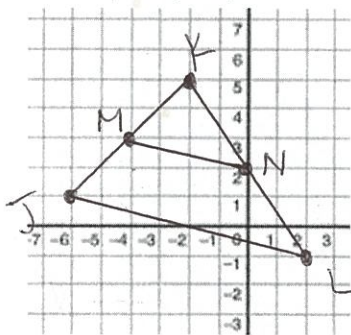
① $\overline{MP}$, $\overline{MN}$, and $\overline{NP}$ are midsegs

② the midseg Δ is ΔMNP



Example:

1. In ΔJKL , show that midsegment $\overline{MN}$ is parallel to $\overline{JL}$ and that $MN = \frac{1}{2}JL$



need to show same slopes!

$$m_{\overline{MN}} = -\frac{1}{4}$$

$$m_{\overline{JL}} = \frac{-2}{8} = -\frac{1}{4}$$

so, $\overline{MN} \parallel \overline{JL}$

$$MN^2 = 1^2 + 4^2$$

$$MN^2 = 1 + 16$$

$$\sqrt{MN^2} = \sqrt{17}$$

$$MN = \sqrt{17}$$

$$\text{so, } MN = \frac{1}{2}JL$$

$$\sqrt{17} = \frac{1}{2}(2\sqrt{17})$$

find dist...

$$JL^2 = 2^2 + 8^2$$

$$JL^2 = 4 + 64$$

$$\sqrt{JL^2} = \sqrt{68}$$

$$JL = \sqrt{68}$$

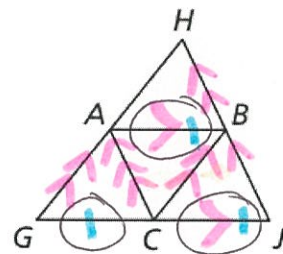
$$JL = \sqrt{4 \cdot 17}$$

$$JL = 2\sqrt{17}$$

Triangle Midsegment Theorem

The segment connecting the midpoints of two sides of a triangle is...

1. parallel to the third side
2. half as long as the third side



Examples:

2. In the diagram, $\overline{XJ} \cong \overline{JY}$, $\overline{YL} \cong \overline{LZ}$, and $\overline{XK} \cong \overline{KZ}$. Complete each statement.

a. $\overline{JK} \parallel \underline{\overline{YZ}}$

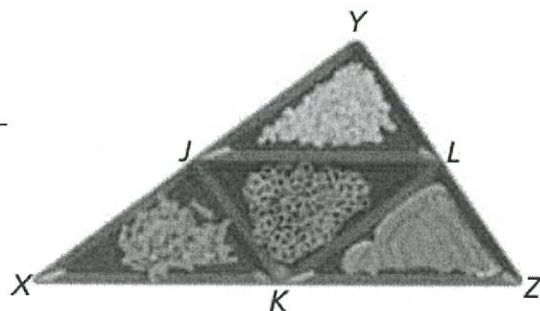
b. $\overline{JL} \parallel \underline{\overline{XZ}}$

c. $\overline{XY} \parallel \underline{\overline{LK}}$

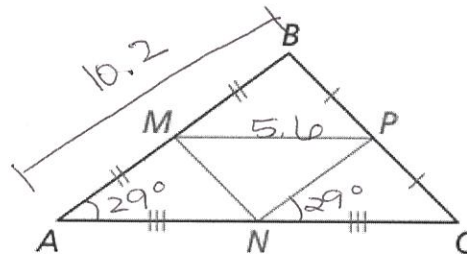
d. $\overline{JY} \cong \underline{\overline{JX}} \cong \underline{\overline{LK}}$

e. $\overline{JL} \cong \underline{\overline{XK}} \cong \underline{\overline{ZK}}$

f. $\overline{JK} \cong \underline{\overline{YL}} \cong \underline{\overline{ZL}}$



3. In the diagram, $AB = 10.2$, $MP = 5.6$, and $m\angle CNP = 29^\circ$. Find...



a. $NP = 5.1$

b. $AC = 2(5.6) = 11.2$

c. $NC = 5.6$

d. $m\angle MPN = 29^\circ$ ($\overline{MP} \parallel \overline{AC}$, makes alt. int. $\angle$'s w/ transv. $\overline{NP}$)

e. $m\angle BAC = 29^\circ$ ($\overline{NP} \parallel \overline{AB}$, makes corresp. $\angle$'s w/ transv. $\overline{AC}$)

f. $m\angle AMP = 180 - 29 = 151^\circ$

($\overline{MP} \parallel \overline{AC}$, makes consec. int. $\angle$'s w/ transv. $\overline{AB}$)

4. Triangles are used for strength in roof trusses.

In the diagram, $\overline{UV}$ and $\overline{VW}$ are midsegments of $\triangle RST$. Find UV and RS .

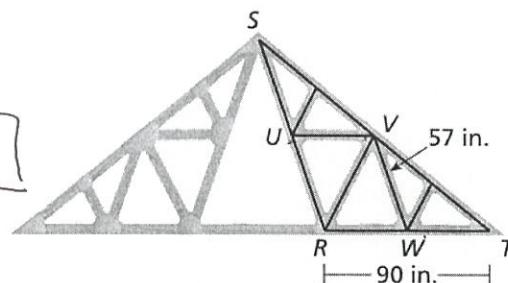
$UV = \frac{1}{2}(RT)$

$UV = \frac{1}{2}(90)$

$UV = 45 \text{ in}$

$RS = 2(57)$

$RS = 114 \text{ in}$



5. Pear Street intersects Cherry Street and Peach Street at their midpoints. Your home is at point P. You leave your home and jog...

a. down Cherry Street to Plum Street, 2.6 mi

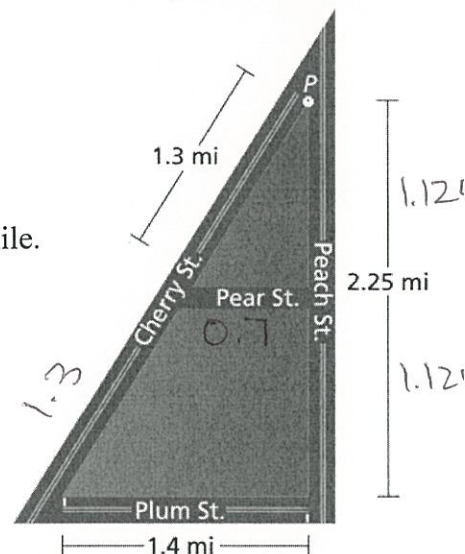
b. over Plum Street to Peach Street, 1.4 mi

c. up Peach Street to Pear Street, 1.125 mi

d. over Pear Street to Cherry Street, 0.7 mi

e. then back home up Cherry Street, 1.3 mi

Approximately how many miles did you jog? Round to the nearest whole mile.



add them!

$= 7.125 \text{ miles}$

You ran ≈ 7 miles!