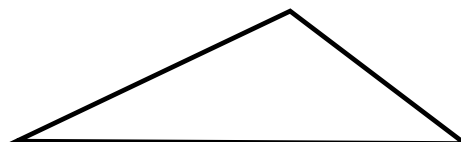




6-4: Midsegments

Essential Question

How are the midsegments of a triangle related to the sides of the triangle?



Exploration 1

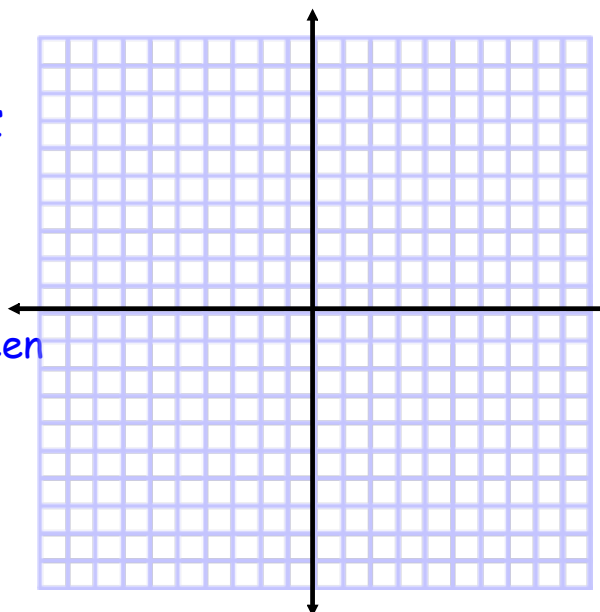
1. Graph the triangle

$A(2,1)$ $B(8,3)$ $C(3,7)$

2. Plot the midpoints of AB and BC

3. Connect these midpoints

4. Describe the relationship between
This segment and side AC .

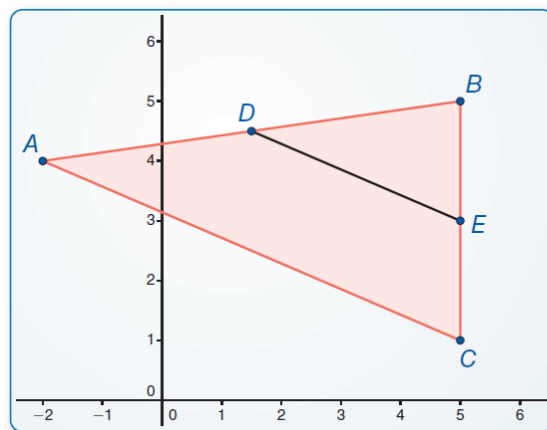


Exploration 2

Work with a partner. Use dynamic geometry software.

Draw any $\triangle ABC$.

a. Plot midpoint D of \overline{AB} and midpoint E of \overline{BC} . Draw \overline{DE} , which is a midsegment of $\triangle ABC$.

**Sample**

Points

$A(-2, 4)$

$B(5, 5)$

$C(5, 1)$

$D(1.5, 4.5)$

$E(5, 3)$

Segments

$BC = 4$

$AC = 7.62$

$AB = 7.07$

$DE = ?$

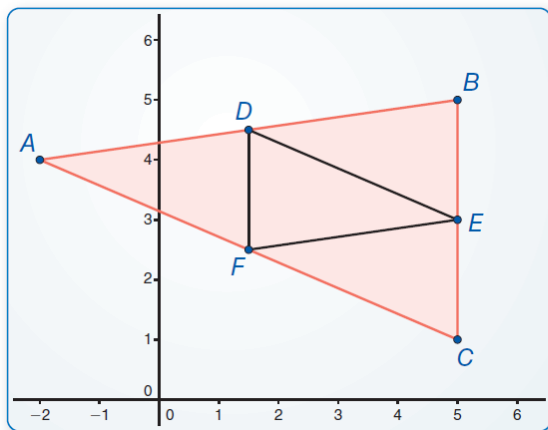
b. Compare the slope and length of \overline{DE} with the slope and length of \overline{AC} .

c. Write a conjecture about the relationships between the midsegments and sides of a triangle. Test your conjecture by drawing the other midsegments of $\triangle ABC$, dragging vertices to change $\triangle ABC$, and noting whether the relationships hold.

Work with a partner. Use dynamic geometry software. Draw any $\triangle ABC$.

a. Draw all three midsegments of $\triangle ABC$.

b. Use the drawing to write a conjecture about the triangle formed by the midsegments of the original triangle.

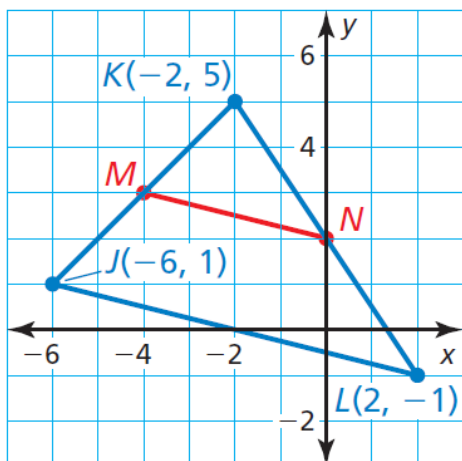


Sample

Points	Segments
$A(-2, 4)$	$BC = 4$
$B(5, 5)$	$AC = 7.62$
$C(5, 1)$	$AB = 7.07$
$D(1.5, 4.5)$	$DE = ?$
$E(5, 3)$	$DF = ?$
	$EF = ?$

In $\triangle JKL$, show that midsegment \overline{MN} is parallel to \overline{JL}

and that $MN = \frac{1}{2} JL$



1. Find the slope of \overline{JL} and \overline{MN}

2. Find the lengths MN and JL

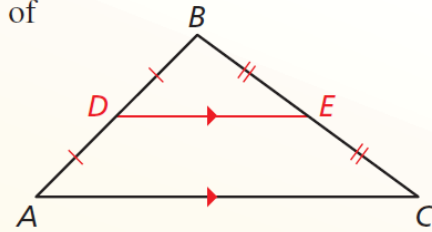
Theorem

Theorem 6.8 Triangle Midsegment Theorem

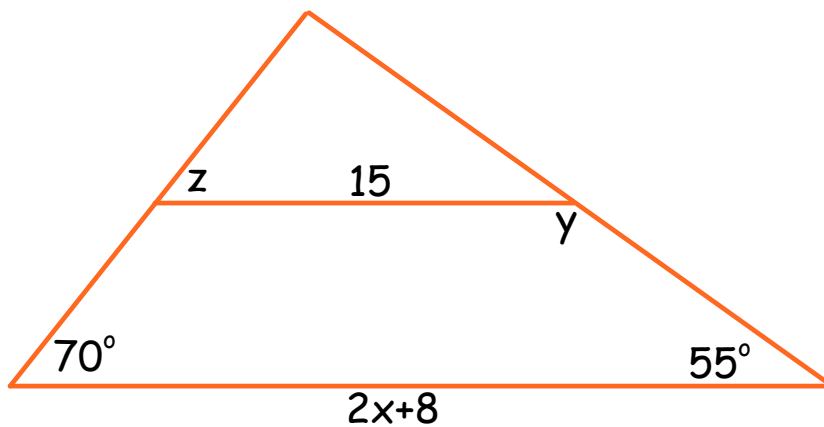
The segment connecting the midpoints of two sides of a triangle is parallel to the third side and is half as long as that side.

\overline{DE} is a midsegment of $\triangle ABC$, $\overline{DE} \parallel \overline{AC}$,
and $DE = \frac{1}{2}AC$.

Proof Example 2, p. 331; Monitoring Progress Question 3, p. 331; Ex. 22, p. 334

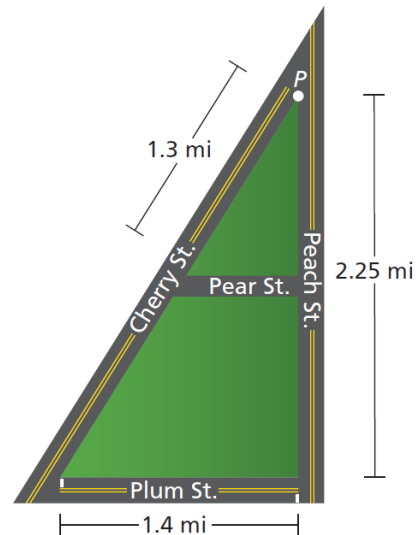


Example Find the value of the variables



6-4-Notes.notebook

Pear Street intersects Cherry Street and Peach Street at their midpoints. Your home is at point P. You leave your home and jog down Cherry Street to Plum Street, over Plum Street to Peach Street, up Peach Street to Pear Street, over Pear Street to Cherry Street, and then back home up Cherry Street. About how many miles do you jog?



4. Copy the diagram in Example 3. Draw and name the third midsegment. Then find the length of \overline{VS} when the length of the third midsegment is 81 inches.

5. In Example 4, if F is the midpoint of \overline{CB} , what do you know about \overline{DF} ?