Geometry: *Hutschenreuter*
Chapter 5 Note Packet

Name KEY

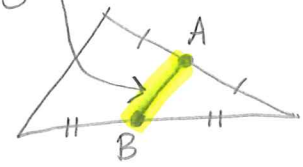
Section 5.1: Midsegment Theorem and Coordinate Proof

Essential Question: What is the relationship between a midsegment and the non-adjacent (opposite) side?

Vocabulary:

midsegment of a triangle

A segment whose endpoints are the midpoints of a △'s sides



coordinate proof

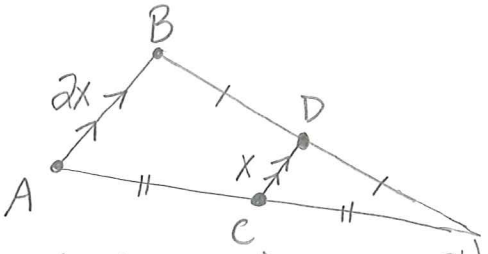
A proof involving algebra coordinates

Theorem 5.1: Midsegment Theorem

The segment connecting the midpoints of two sides of any triangle is parallel to and half as long as the third side (opposite side).

midsegment = $\frac{1}{2}$(opp. side)

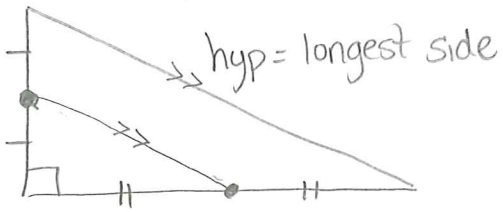
$CD = \frac{1}{2}(AB)$



= OR = 2(midsegment) = opp. side

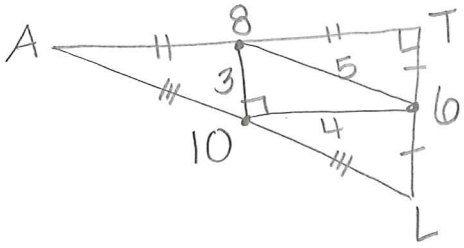
2(CD) = AB

A1. Sketch a right triangle and its longest midsegment.



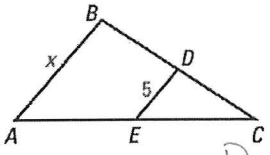
A2. Sketch ΔATL with 3, 4, and 5 for midsegments lengths.

*A △ with sides 3,4,5 is a rt △



A3. Find the value of x if $\overline{DE}$ is a midsegment.

a.

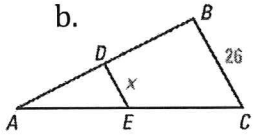


2(midsegment) = opposite side

2(5) = x

X = 10

b.

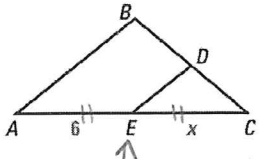


midsegment = $\frac{1}{2}$(opp. side)

$X = \frac{1}{2}(26)$

X = 13

c.



midpoint

X = 6

A4. Use ΔGHJ, where A, B, and C are midpoints. If $AB = 3x + 8$ and $GJ = 2x + 24$, what is AB?

2(midsegment) = opp. side

2(AB) = GJ

2(3x+8) = 2x+24

6x+16 = 2x+24

−2x −16

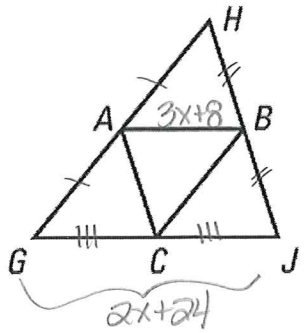
4x = 8

X = 2

AB = 3x+8

3(2)+8

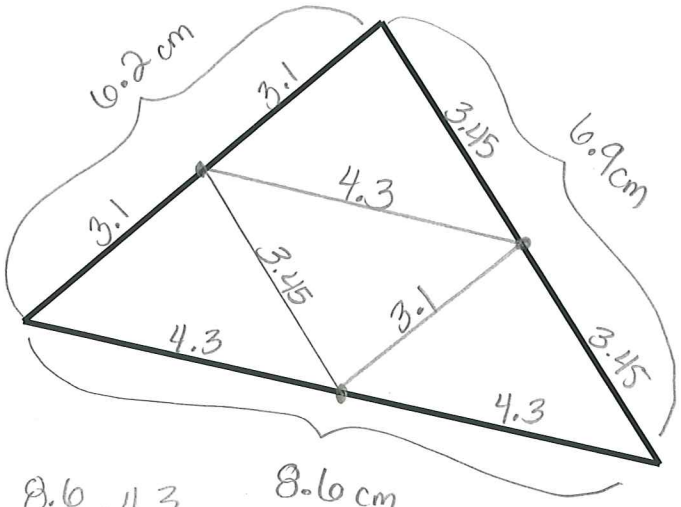
AB = 14



→ use ruler

A5. Draw the three midsegments of the triangle.

$\frac{6.2}{2} = 3.1$



$\frac{6.9}{2} = 3.45$

$\frac{8.6}{2} = 4.3$

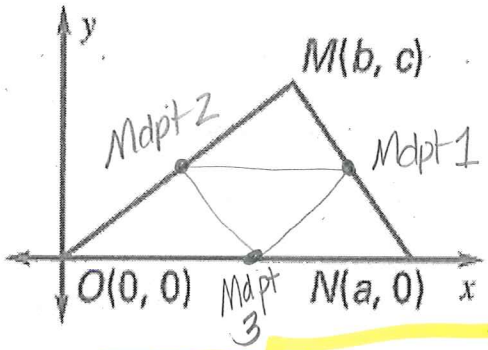
*midsegment is half the length of the opposite side

A6. Find the coordinate of the endpoints for each midsegment of ΔMNO.

Midpoint 1 (of $\overline{MN}$) $= \left(\frac{a+b}{2}, \frac{c+0}{2}\right) = \left(\frac{a+b}{2}, \frac{c}{2}\right)$

Midpoint 2 (of $\overline{MO}$) $= \left(\frac{0+b}{2}, \frac{0+c}{2}\right) = \left(\frac{b}{2}, \frac{c}{2}\right)$

Midpoint 3 (of $\overline{ON}$) $= \left(\frac{0+a}{2}, \frac{0+0}{2}\right) = \left(\frac{a}{2}, 0\right)$



Remember → midpoint $= \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

Section 5.1 Summary:

A midsegment is half the length of the non-adjacent (opposite) side and parallel to it.

2(midsegment) = opposite side

2(BE) = AJ