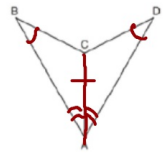
Warm-up

Take out your homework

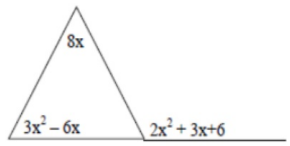
1. As shown in the diagram below, $\overline{AC}$ bisects $\angle BAD$ and $\angle B \cong \angle D$.



Which method could be used to prove $\Delta ABC \cong \Delta ADC$?

1) SSS
2) AAA
3) SAS
4) AAS

2. **Solve for x.**



$3x^2 - 6x + 8x = 2x^2 + 3x + 6$

$3x^2 + 2x = 2x^2 + 3x + 6$

$-2x^2 \quad -2x^2$

$x^2 + 2x = 3x + 6$

$-3x \quad -3x$

$x^2 - x = 6$

$-6 \quad -6$

$x^2 - x - 6 = 0$

-6

$-3 \quad 2$

-1

$x - 3 = 0 \quad x + 2 = 0$

$+3 \quad +3 \quad -2 \quad -2$

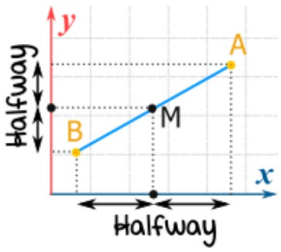
$x = 3 \quad x = -2$

Midpoint and Midsegments

The midpoint is the point on a line segment that divides the segment into two equal parts

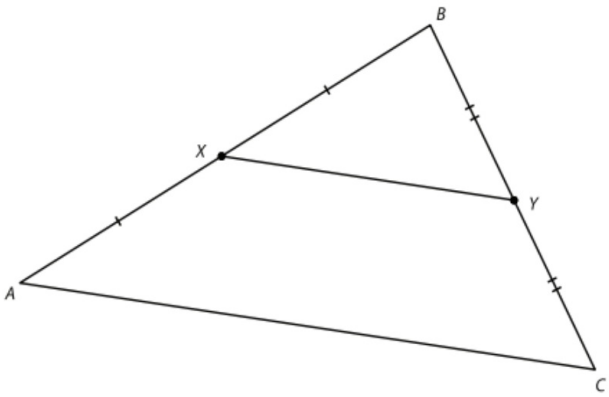
•A **midsegment** of a triangle is a line segment that joins the **midpoints** of two sides of a triangle.

Midpoint



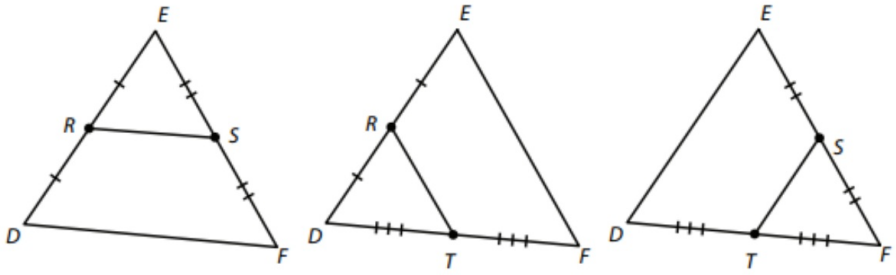
$$M = \left(\frac{x_A + x_B}{2}, \frac{y_A + y_B}{2} \right)$$

Midsegment



Midsegment

Every triangle has 3 midsegments



Key Concepts, *continued*

Theorem

Triangle Midsegment Theorem

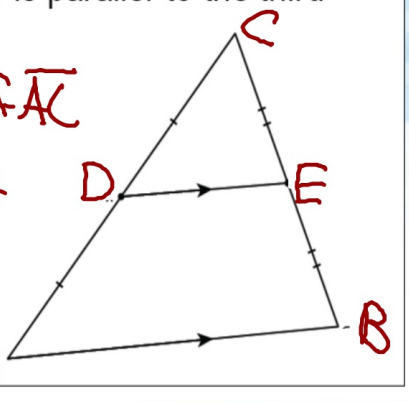
A midsegment of a triangle is parallel to the third side and is half as long.

D is the midpoint of $\overline{AC}$

E is the midpoint of $\overline{BC}$

then... $\overline{DE} \parallel \overline{AB}$

$\overline{DE} = \frac{1}{2}\overline{AB}$

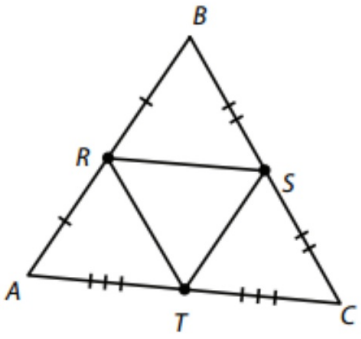


Midsegment triangle

When all 3 midsegments are connected a midsegment triangle is formed

The triangle is similar ($\sim$) to the original triangle.

*Similar: triangles who have the same angles and their sides have the same ratio (we will be learning about this in depth in a few days)



Guided Practice

Example 1

Find the lengths of BC and YZ and the measure of $\angle AXZ$.

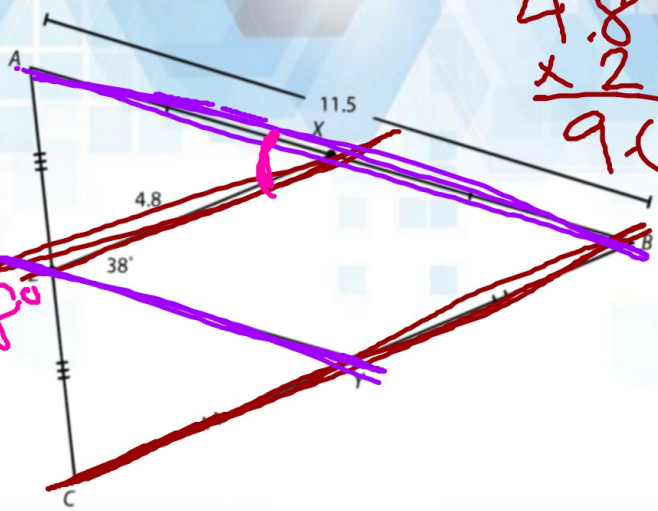
$2\sqrt{11.5}$

$YZ = 5.75$

$\angle AXZ = 38°$

4.8×2

$9.6 = BC$



Ex 2.

If AB = 2x + 7 and YZ = 3x – 6.5, what is the length of AB?

$2(5)+7$

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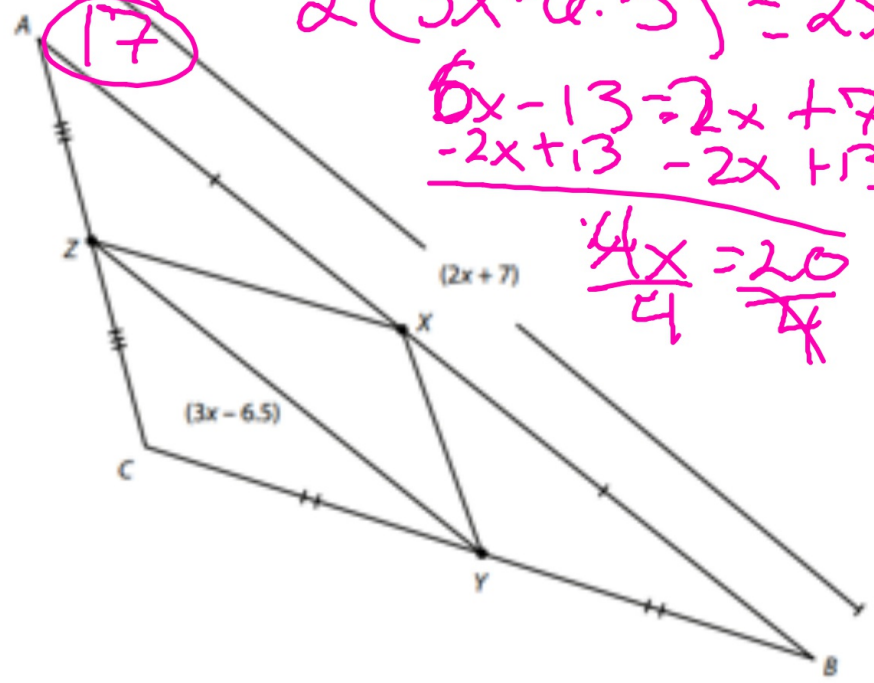


$2(3x-6.5)=2x+7$

$6x-13=2x+7$

$-2x+13 \quad -2x+13$

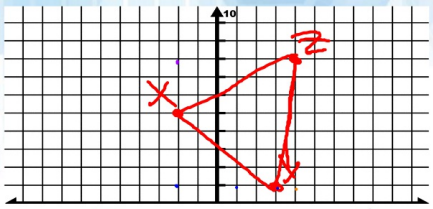
$\frac{4x}{4}=\frac{20}{4}$

$x=5$

Example 3

The midpoints of a triangle are $X(-2, 5)$, $Y(3, 1)$, and $Z(4, 8)$. Find the coordinates of the vertices of the triangle.

$y=mx+b$



$m=\frac{y_2-y_1}{x_2-x_1}$

$m_{xz}=\frac{3}{6}=\frac{1}{2}$

$1=\frac{1}{2}(3)+b$

$1=\frac{3}{2}+b$

$-\frac{3}{2} \quad -\frac{3}{2}$

$-\frac{1}{2}=b$

$y=\frac{1}{2}x-\frac{1}{2}$

$m_{zy}=\frac{7}{1}=7$

$5=7(-2)+b$

$5=-14+b$

$+14 \quad +14$

$19=b$

$y=7x+19$

$m_{xy}=\frac{-4}{5}$

$8=\frac{-4}{5}(4)+b$

$8=\frac{-16}{5}+b$

$+\frac{16}{5} \quad +\frac{16}{5}$

$\frac{24}{5}=b$

$y=\frac{-4}{5}x+\frac{24}{5}$

$(-1.82, 6.26)$

$(4.08, 1.54)$

$(-3, -2)$

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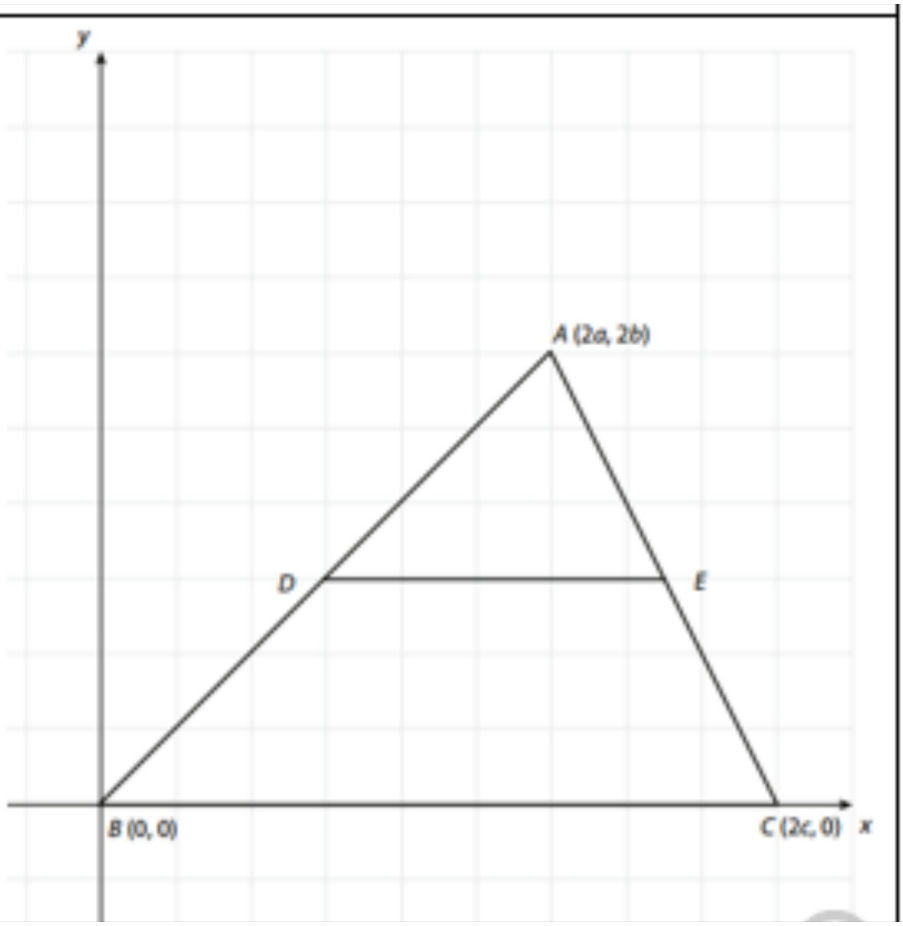
Ex 4. (NEED GRAPH PAPER)

Write a coordinate proof of the Triangle Mid-segment Theorem using the graph below.



LOTTERY WEDNESDAY!

Independent Practice!

- **You may work with a partner. Turn in your individual paper.**
- **Turn it in if you finish before the class ends, whatever you don't finish will be HW.**
- **Once you're finished, start working on your Quiz REVIEW for tomorrow's quiz on Google Classroom.**