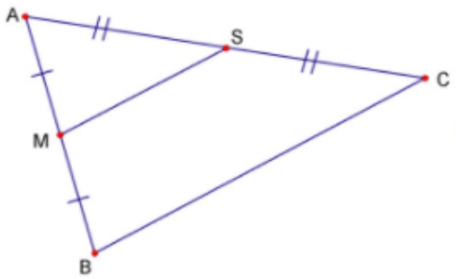
Midsegment Triangle Theorem

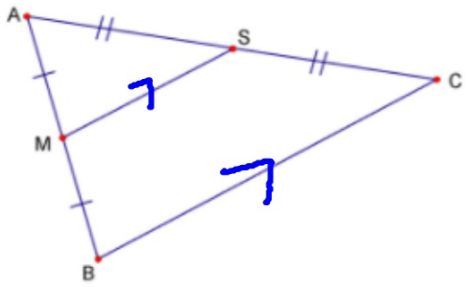


Midsegment of a Triangle: segment whose endpoints are midpoints of 2 sides of a triangle

**Open up the link on my website
kgrimmrhs@weebly.com
It will be found under Unit 4B tab

Use dynamic software to create and explore a midsegment of a triangle by doing the following steps.

1. Construct a triangle.
2. Construct the midpoints of 2 of its sides. Then construct the segment with those endpoints to form the midsegment.
3. Measure the length of the midsegment and the third side. (The third side is the side of the original triangle for which you did not find the midpoint.)
4. Compare the lengths of the midsegment and the third side. What appears to be true about the relationship of these two lengths?
5. Drag a vertex of the triangle. Does the relationship you discovered in #4 still hold true?



Use the diagram above. Notice that ΔAMS can be formed by dilating ΔABC with center of dilation A and magnitude of $\frac{1}{2}$. Think back to Unit 1. Since $\overline{BC}$ does not pass through the center of dilation, what can you conclude about $\overline{BC}$ and $\overline{MS}$? $\overline{MS} \parallel \overline{BC}$

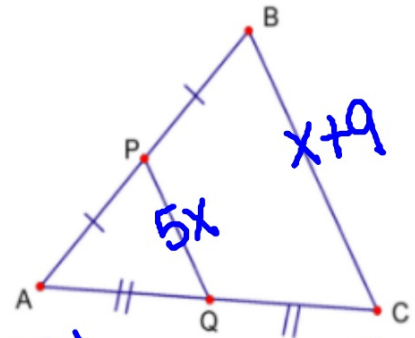
Midsegment Theorem:

In a triangle, the segment joining the midpoints of 2 sides of a triangle:

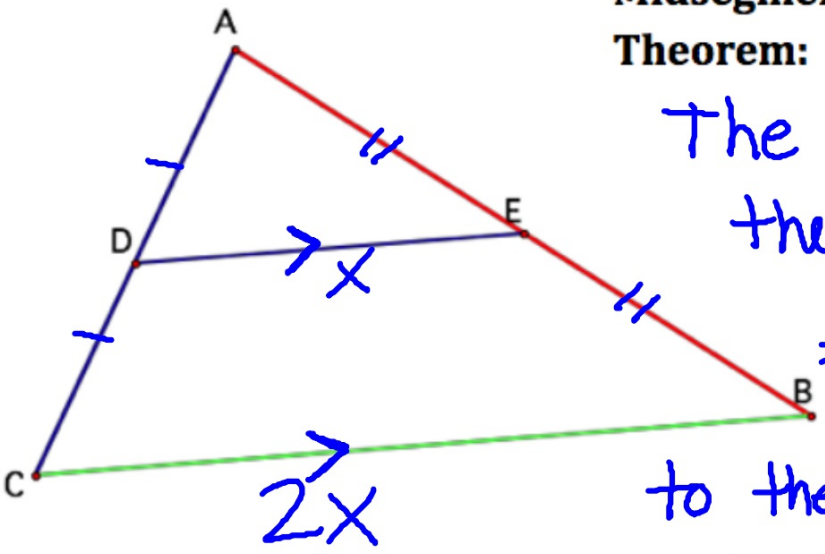
(1) has a length that is $\frac{1}{2}$ the length of the third side.

(2) is proportional to the third side.

Examples:



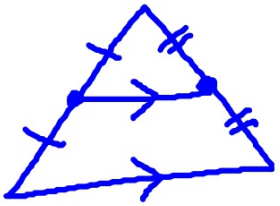
1. If PQ = 8, BC = 16.
2. If BC = 8, PQ = 4.
3. If AP = 12, PB = 12 and AB = 24.
4. If BC = x + 9 and PQ = 5x, then x = 1, PQ = 5, and BC = 10.
5. If PQ = x + 12 and BC = x^2, then x = _____, PQ = _____, and BC = _____.



Midsegment Theorem:

The segment joining the midpoints of any two sides will be parallel to the 3rd side and half its length

Similarity and Midsegments

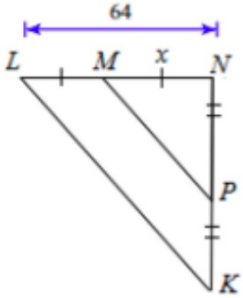
Word	Definition	Characteristics	Picture
Midsegment		• Always // to 3rd side • $\frac{1}{2}$ length 3rd side	

Examples:

1. z = 10

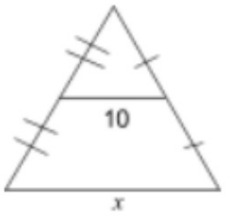
$\frac{20}{2} = 10$

2. x = 32

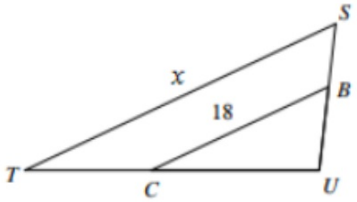


$\frac{64}{2} = 32$

3. x = _____

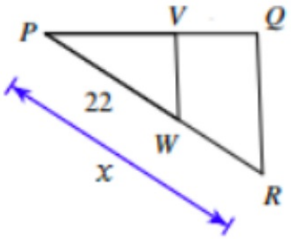


4. x = 36

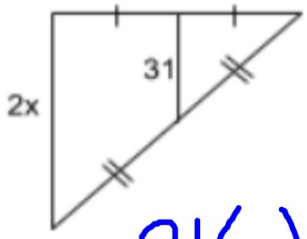


18(2)

5. x = _____



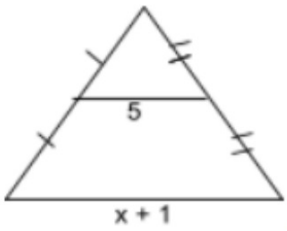
6. x = 31



$31(2) = 2x$

$\frac{62}{2} = \frac{2x}{2}$

7. x = 9



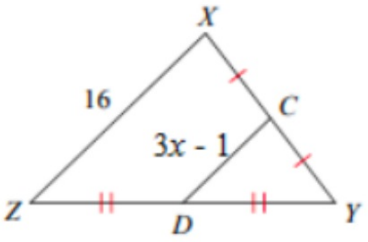
$2[5] = [\frac{1}{2}(x+1)]2$

$10 = x + 1$

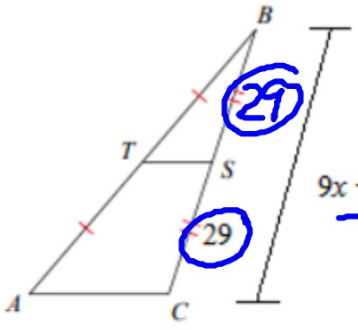
$-1 \quad -1$

$x = 9$

8. x = _____



9. x = 6



$29(2) = 9x+4$

$58 = 9x+4$

$-4 \quad -4$

$54 = 9x$

$\frac{54}{9} = \frac{9x}{9}$

$x = 6$

Homework is Page 3 in Packet