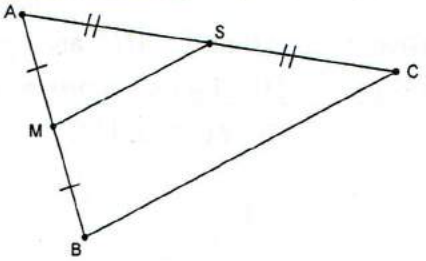
Midsegments of a Triangle Date _____

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



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?

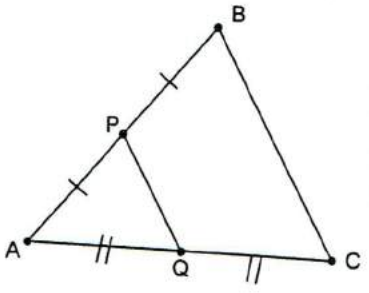
Use the diagram above. Notice that ΔAMS can be formed by dilating ΔABC with center of dilation A and magnitude of $\frac{1}{2}$. Think back to Unit 1. Since $\overline{BC}$ does not pass through the center of dilation, what can you conclude about $\overline{BC}$ and $\overline{MS}$?

Midsegment Theorem:

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

(1) has a length that is half the length of the third side.

(2) is parallel 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 = _____.

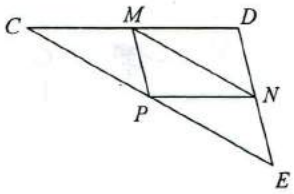
Kuta Software - Infinite Geometry Name_____

Midsegment of a Triangle

Date_____ Period____

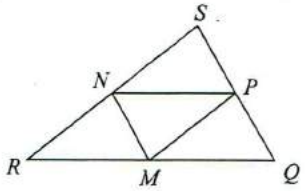
In each triangle, M, N, and P are the midpoints of the sides. Name a segment parallel to the one given.

1)



$\overline{CD} \parallel \overline{PN}$

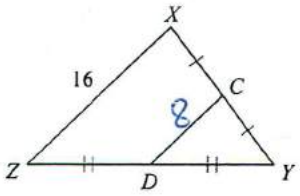
2)



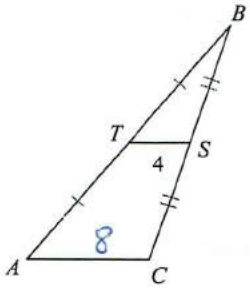
$\overline{MN} \parallel \overline{QS}$

Find the missing length indicated.

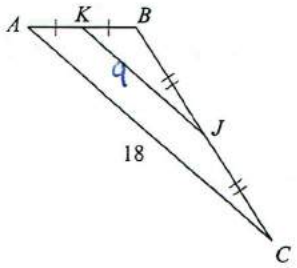
3) Find *CD*



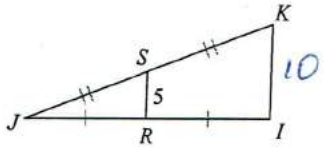
4) Find *AC*



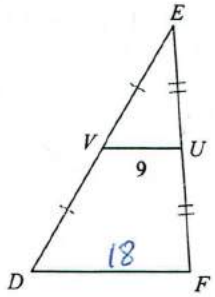
5) Find *KJ*



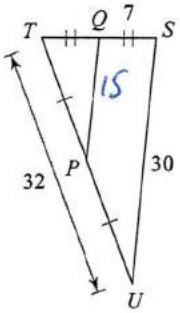
6) Find *IK*



7) Find *DF*



8) Find *PQ*



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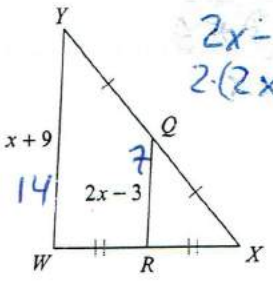
Solve for x.

9)



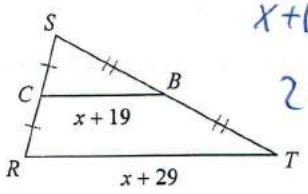
$2x-3=\frac{1}{2}(x+9)$

$2(2x-3)=x+9$

$3x=15$

$x=5$

10)

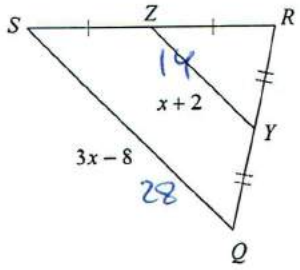


$x+19=\frac{1}{2}(x+29)$

$2x+38=x+29$

$x=-9$

11)

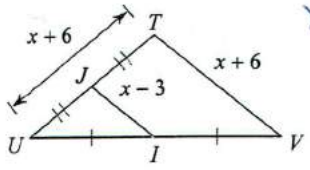


$x+2=\frac{1}{2}(3x-8)$

$2x+4=3x-8$

$x=12$

12)



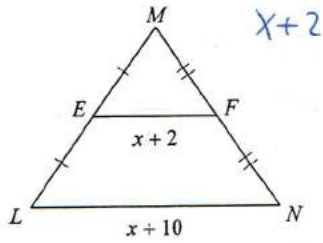
$x-3=\frac{1}{2}(x+6)$

$2x-6=x+6$

$x=12$

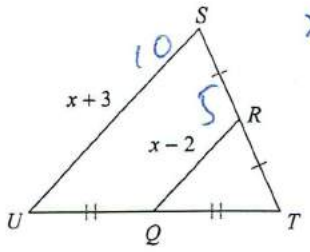
Find the missing length indicated.

13) Find LN



$x+2=\frac{1}{2}(x+10)$

14) Find RQ

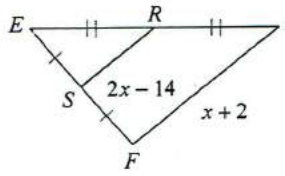


$x-2=\frac{1}{2}(x+3)$

$2x-4=x+3$

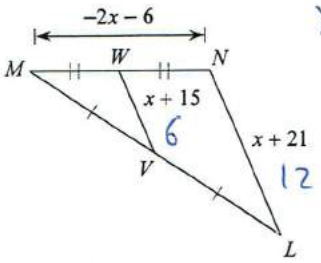
$x=7$

15) Find SR



$2x-14=\frac{1}{2}(x+2)$

16) Find VW



$x+15=\frac{1}{2}(x+21)$

$2x+30=x+21$

$x=-9$

30