5-4

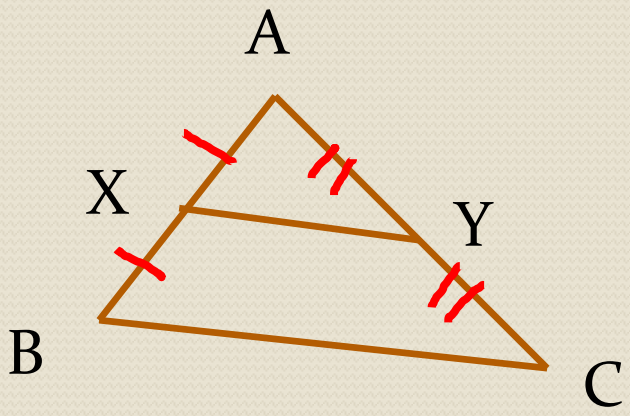
Midsegments of Triangles

OBJECTIVE

To use the properties of midsegments to solve problems

KEY CONCEPT

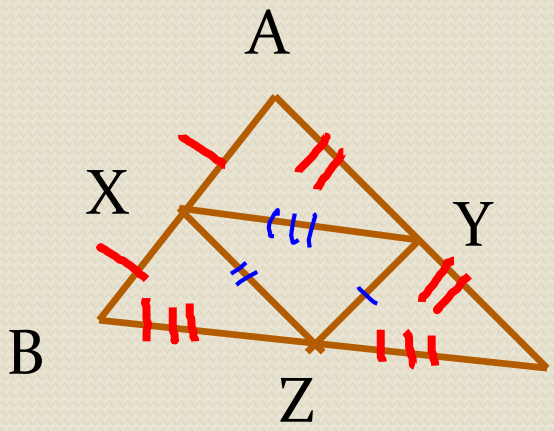
Midsegment of a triangle – segment that connects the midpoints of two sides of a triangle



If AX = XB and AY = YC, then $\overline{XY}$ is a midsegment of ΔABC

KEY CONCEPT

Triangle Midsegment Theorem – If a segment joins the midpoints of two sides of a triangle, then it is parallel to the third side, and it is half as long.



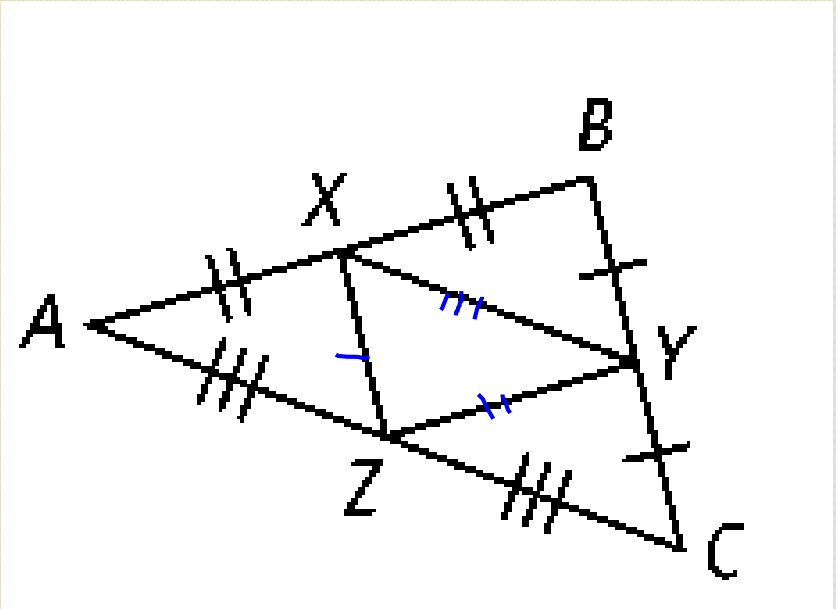
If X, Y & Z are midpoints:

1) $\overline{XY} \parallel \overline{BC}$; $XY = \frac{1}{2}BC$
2) $\overline{YZ} \parallel \overline{AB}$; $YZ = \frac{1}{2}AB$
3) $\overline{XZ} \parallel \overline{AC}$; $XZ = \frac{1}{2}AC$

CLASS WORK

Name the segment that is parallel to the given segment.

1. $\overline{AB} \parallel \overline{ZY}$
2. $\overline{CB} \parallel \overline{XZ}$
3. $\overline{XY} \parallel \overline{AC}$

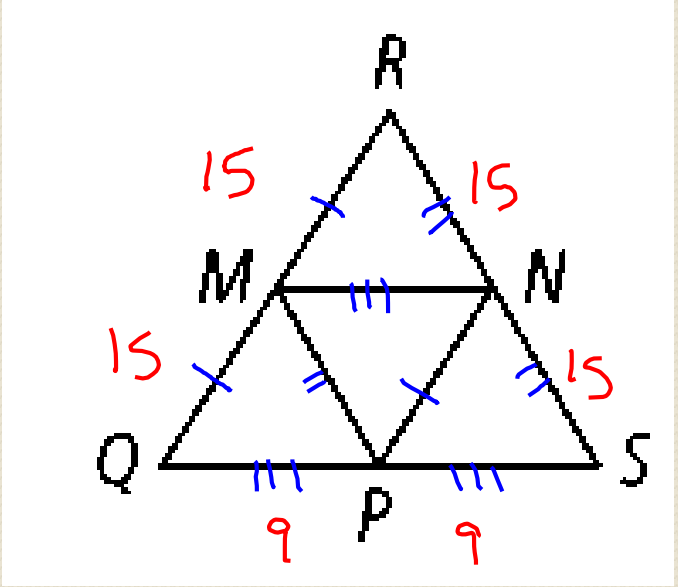


CLASS WORK

Points *M*, *N*, and *P* are the midpoints of the sides of ΔQRS. $QR = 30$, $RS = 30$, and $SQ = 18$.

4. Find *MN*. = 9

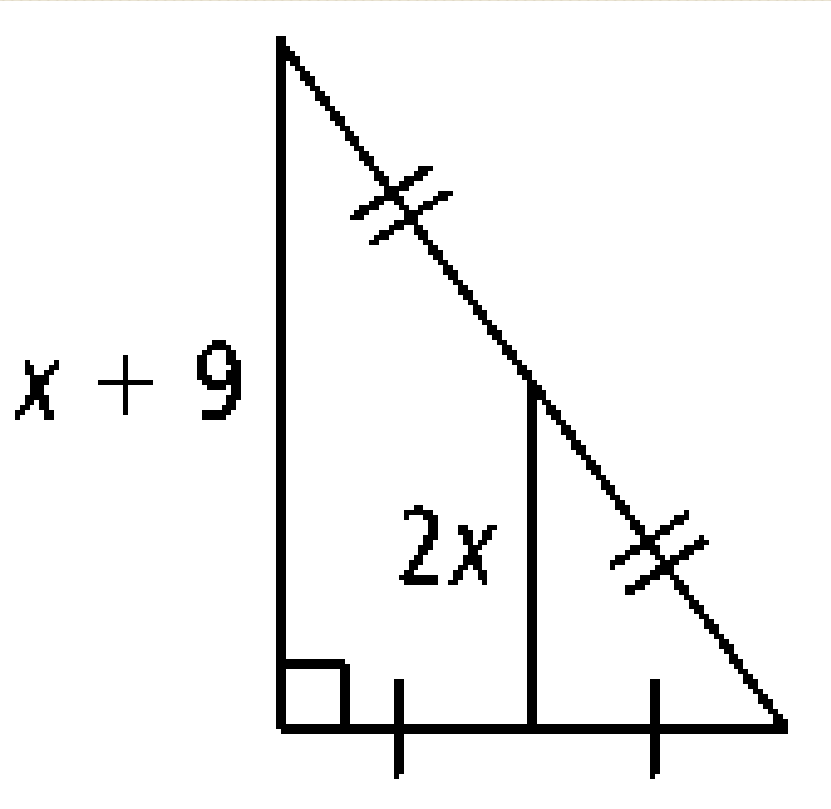
5. Find *MQ*. = 15



CLASS WORK

Find the value of x.

6.



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

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

$4x = x+9$

$3x = 9$

$x = 3$

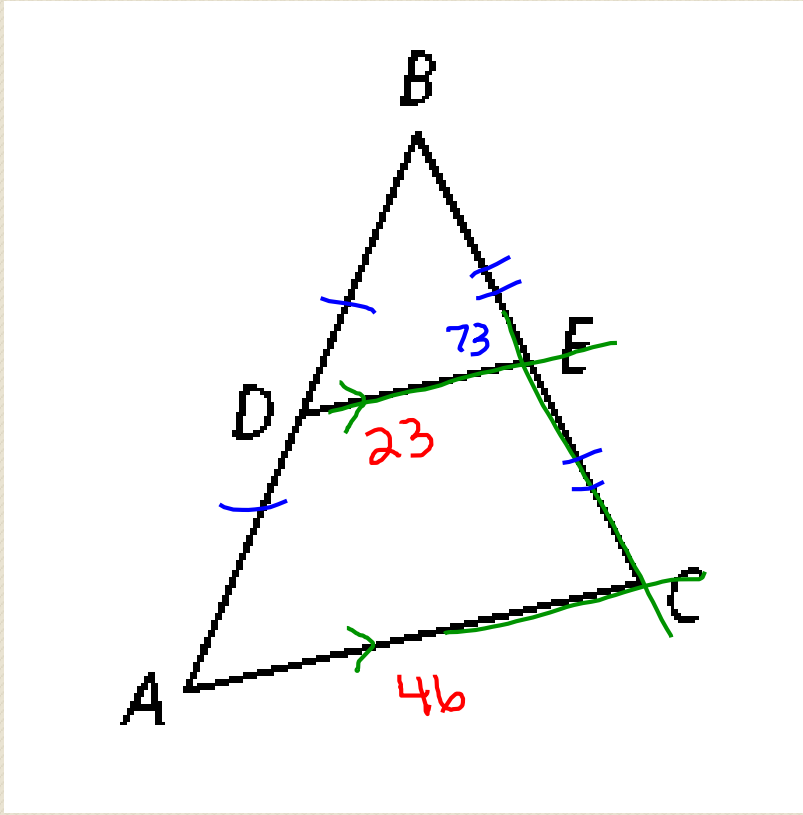
CLASS WORK

D is the midpoint of $\overline{AB}$.
E is the midpoint of $\overline{CB}$.

7. If $m\angle BED = 73$, find $m\angle C$. $= 73$ (corrLs)

8. If $DE = 23$, find AC.

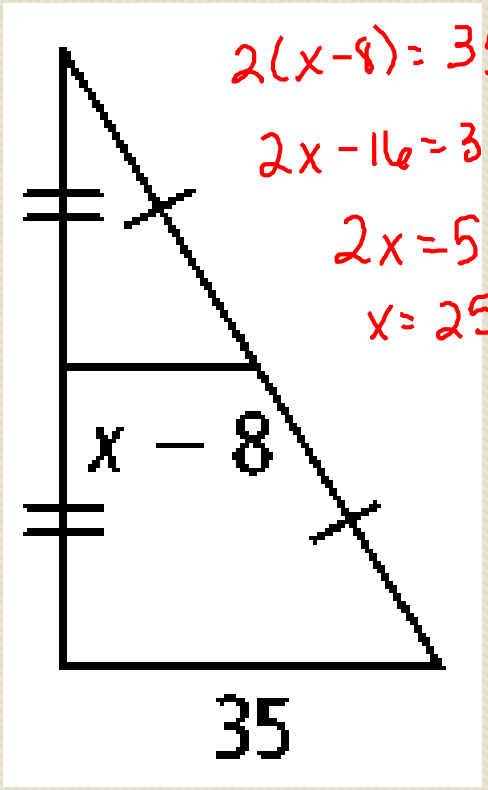
$AC = 2(23) = 46$



CLASS WORK

Find the value of x.

9.



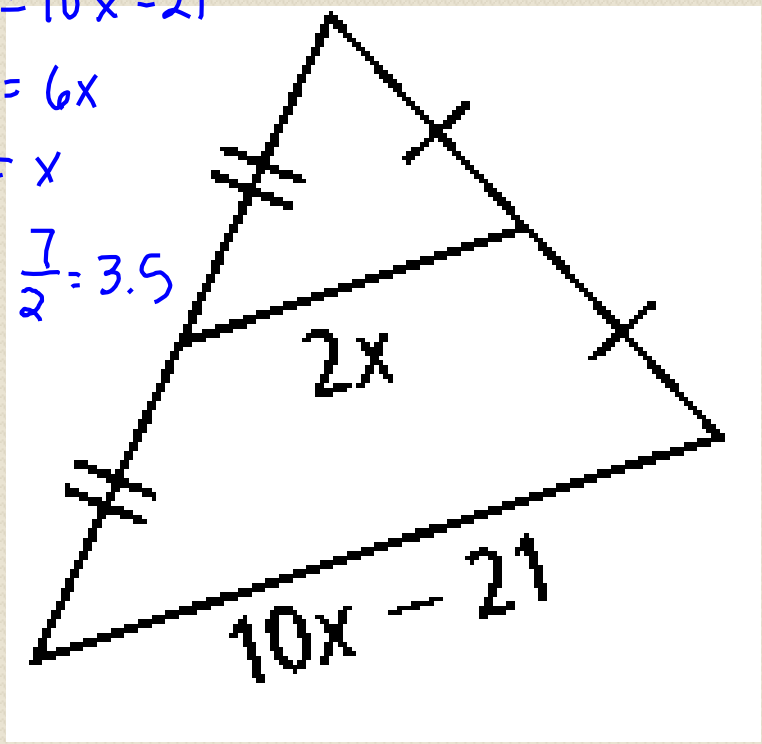
$2(x-8)=35$

$2x-16=35$

$2x=51$

$x=25.5$

10.



$2(2x)=10x-21$

$4x=10x-21$

$21=6x$

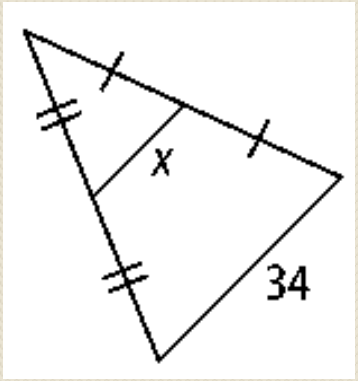
$\frac{21}{6}=x$

$x=\frac{7}{2}=3.5$

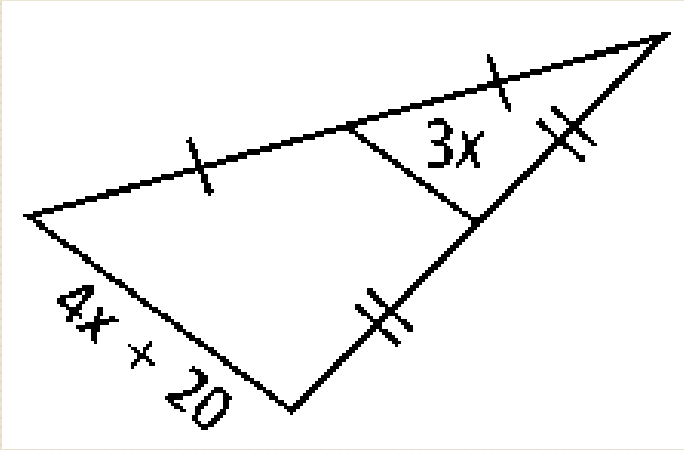
CLASS WORK

Find the value of x.

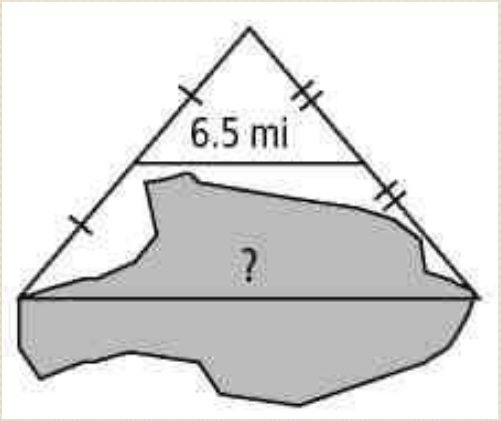
11.



12.



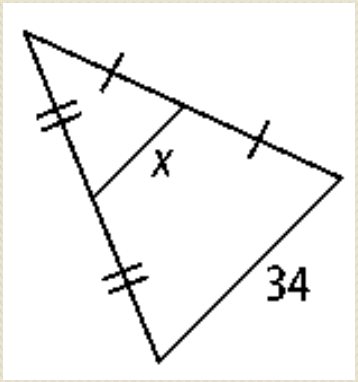
13. Find the distance across the lake.



CLASS WORK

Find the value of x.

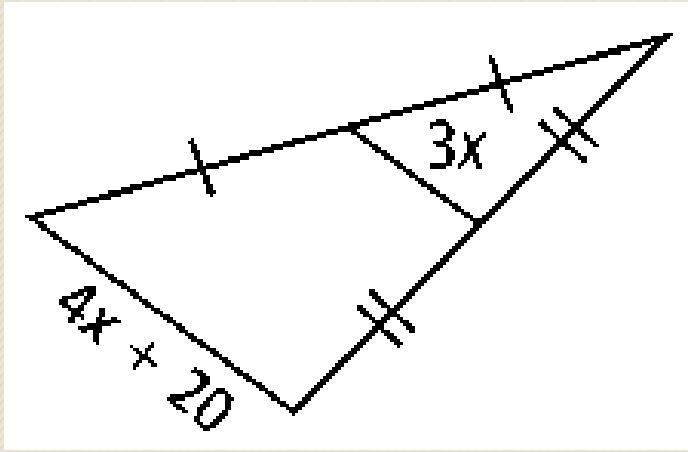
11.



$2(x) = 34$

$x = 17$

12.



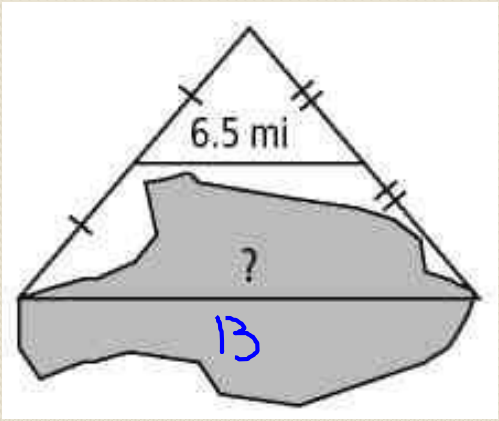
$2(3x) = 4x + 20$

$6x = 4x + 20$

$2x = 20$

$x = 10$

13. Find the distance across the lake.



CHALLENGE

14. Coordinate Geometry. The coordinates of the vertices of a triangle are $K(2, 3)$, $L(-2, -1)$, and $M(5, 1)$.

a. Find the coordinates of N, the midpoint of KM, and P, the midpoint of LM.

b. Show that $\overline{NP} \parallel \overline{KL}$

c. Show that $NP = \frac{1}{2} KL$

SUMMARY

- ✓A midsegment connects the midpoints of two sides of a triangle.
- ✓A midsegment is parallel to the third side.
- ✓A midsegment is half as long as the third side.

ANSWER SLIDE

1. $\overline{YZ}$
2. $\overline{XZ}$
3. $\overline{AC}$
4. 9
5. 15
6. 3
7. 73
8. 46
9. 25.5
10. 3.5
11. 17
12. 10
13. 13

HOMEWORK

Pages 336 – 338

12 – 26 even;

30, 32, 34, 36, 40