LESSON 5.1

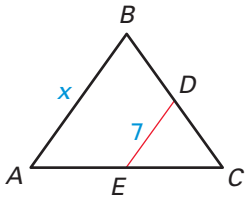
Exercise Set A

MM1G1c Determine the midpoint of a segment.

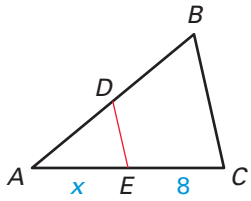
MM1G1e Use the coordinate plane to investigate properties of and verify conjectures related to triangles and quadrilaterals.

$\overline{DE}$ is a midsegment of $\triangle ABC$. Find the value of x.

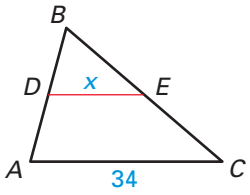
1.



2.



3.



In $\triangle JKL$, $\overline{JR} \cong \overline{RK}$, $\overline{KS} \cong \overline{SL}$, and $\overline{JT} \cong \overline{TL}$. Copy and complete the statement.

4. $\overline{RS} \parallel$?

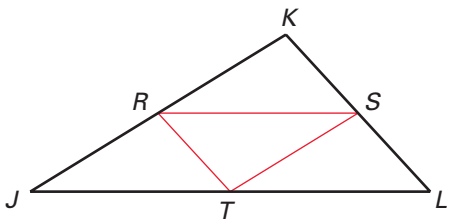
5. $\overline{ST} \parallel$?

6. $\overline{KL} \parallel$?

7. $\overline{SL} \cong$? $\cong$?

8. $\overline{JR} \cong$? $\cong$?

9. $\overline{JT} \cong$? $\cong$?



Place the figure in a coordinate plane in a convenient way. Assign coordinates to each vertex.

10. Right triangle: leg lengths are 5 units and 3 units

11. Rectangle: length is 7 units and width is 4 units

12. Square: side length is 6 units

13. Isosceles right triangle: leg length is 12 units

Use $\triangle GHJ$, where D, E, and F are midpoints of the sides.

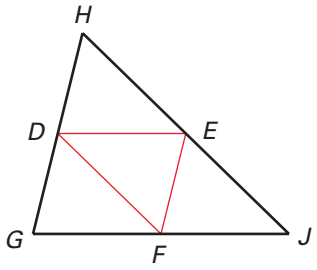
14. If $DE = 4x + 5$ and $GJ = 3x + 25$, what is DE?

15. If $EF = 3x - 1$ and $GH = 5x + 3$, what is EF?

16. If $HJ = 8x - 2$ and $DF = 2x + 11$, what is HJ?

17. Find the perimeter of $\triangle DEF$.

18. Find the perimeter of $\triangle GHJ$.



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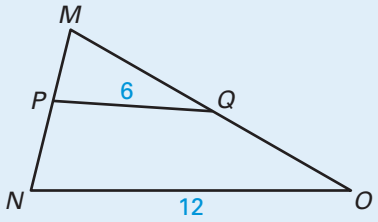
Exercise Set A *(continued)*

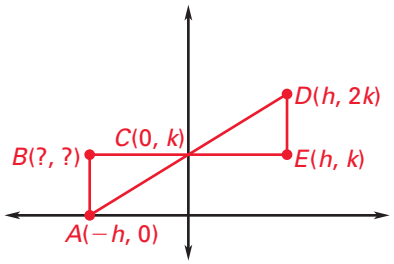
19. **Error Analysis** *Explain* why the conclusion is incorrect.



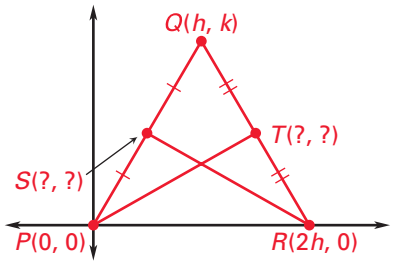
$PQ = \frac{1}{2}NO$, so by the Midsegment Theorem $\overline{MP} \cong \overline{PN}$ and $\overline{MQ} \cong \overline{QO}$.

Find the unknown coordinates of the point(s) in the figure. Then show that the given statement is true.

20. $\triangle ABC \cong \triangle DEC$

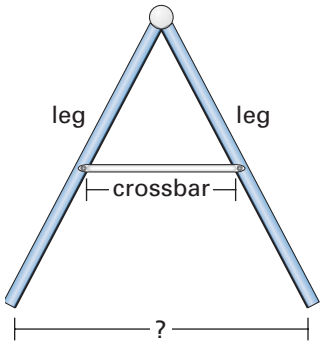


21. $\overline{PT} \cong \overline{SR}$

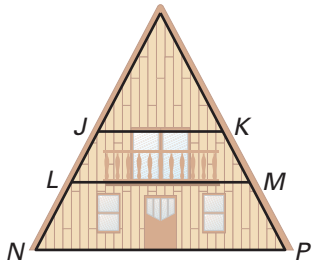


22. The coordinates of $\triangle ABC$ are $A(0, 5)$, $B(8, 20)$, and $C(0, 26)$. Find the length of each side and the perimeter of $\triangle ABC$. Then find the perimeter of the triangle formed by connecting the three midsegments of $\triangle ABC$.

23. **Swing Set** You are assembling the frame for a swing set. The horizontal crossbars in the kit you purchased are each 36 inches long. You attach the crossbars at the midpoints of the legs. At each end of the frame, how far apart will the bottoms of the legs be when the frame is assembled? *Explain*.



24. **A-Frame House** In an A-frame house, the floor of the second level, labeled $\overline{LM}$, is closer to the first floor, $\overline{NP}$, than midsegment $\overline{JK}$. If $\overline{JK}$ is 14 feet long, can $\overline{LM}$ be 12 feet long? 14 feet long? 20 feet long? 24 feet long? 30 feet long? *Explain*.



UNIT 5

LESSON 5.1

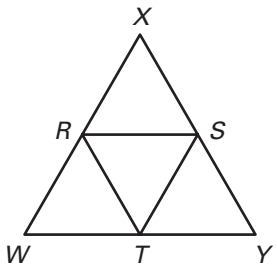
Exercise Set B

MM1G1c Determine the midpoint of a segment.

MM1G1e Use the coordinate plane to investigate properties of and verify conjectures related to triangles and quadrilaterals.

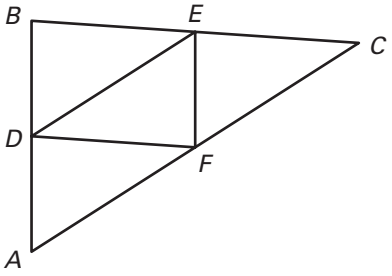
Use △*WXY*, where *R*, *S*, and *T* are midpoints of the sides.

1. $\overline{RS} \parallel$ ___?___
2. $\overline{ST} \parallel$ ___?___
3. If $TY = 4$, then $RS =$ ___?___.
4. If $RT = 7$, then $XY =$ ___?___.



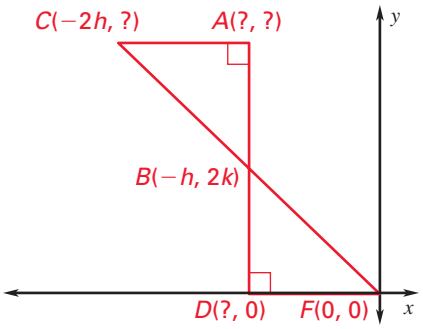
Use the diagram of △*ABC* where *D*, *E*, and *F* are the midpoints of the sides.

5. If $FE = 6.5x - 10$ and $AB = 3x + 20$, then $AB =$ ___?___.
6. If $DF = 3.5x + 6$ and $BC = 3x + 36$, then $DF =$ ___?___.

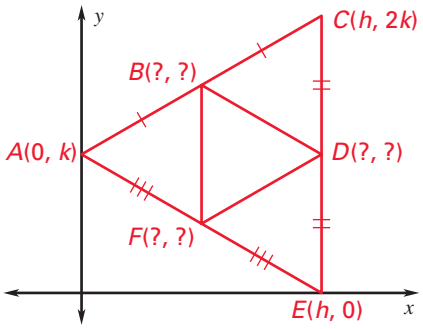


Find the unknown coordinates of the points in the figure.

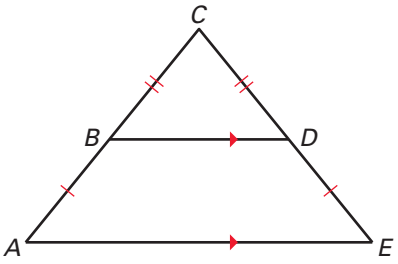
7.



8.



9. **Error Analysis** *Explain* why $\overline{BD}$ is not a midsegment of △*ACE*.



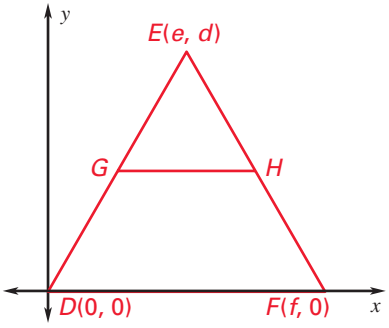
UNIT 5

Exercise Set B *(continued)*

In Exercises 10 and 11, write a coordinate proof.

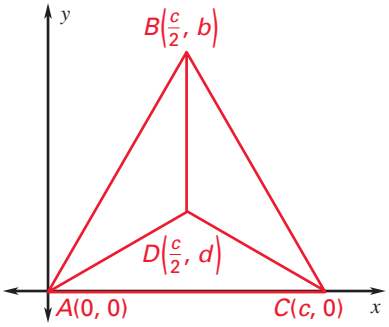
10. **GIVEN:** Coordinates of $\triangle DEF$
G is the midpoint of $\overline{DE}$.
H is the midpoint of $\overline{EF}$.

PROVE: $GH = \frac{1}{2}DF$

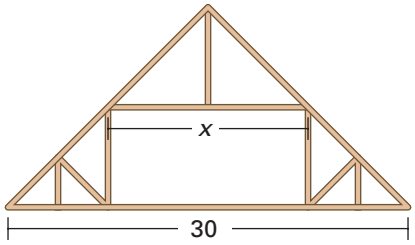


11. **GIVEN:** $\overline{DB}$ bisects $\angle ABC$.

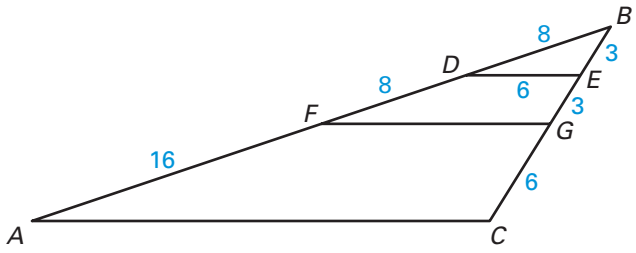
PROVE: $\triangle ABD \cong \triangle CBD$



12. **Roof Trusses** An attic truss provides storage space within the roof of a house. The midsegment of the truss is the ceiling of the storage space. If the base of the truss is 30 feet, find the width x of the storage space. *Explain*.



13. Use the information in the diagram at the right. What is the length of $\overline{AC}$ of $\triangle ABC$? *Explain* your reasoning.



UNIT 5