

5-1

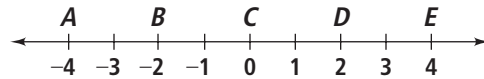
Midsegments of Triangles



Vocabulary

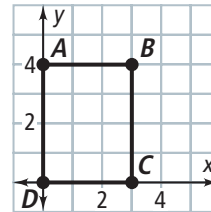
Review

Use the number line at the right for Exercises 1–3.



- Point is the *midpoint* of \overline{AE} .
- Point is the *midpoint* of \overline{CE} .
- Point is the *midpoint* of \overline{AC} .

Use the graph at the right for Exercises 4–6. Name each *segment*.



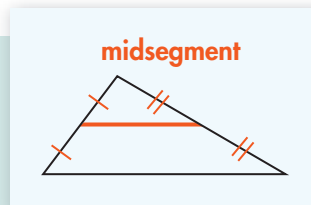
- a *segment* that lies on the x -axis
- a *segment* that contains the point $(0, 4)$
- a *segment* whose endpoints both have x -coordinate 3

Vocabulary Builder

midsegment (noun) MID seg munt

Related Words: midpoint, segment

Definition: A **midsegment** of a triangle is a segment connecting the midpoints of two sides of the triangle.



Use Your Vocabulary

Circle the correct statement in each pair.

- A *midsegment* connects the midpoints of two sides of a triangle.

A *midsegment* connects a vertex of a triangle to the midpoint of the opposite side.
- A triangle has exactly one *midsegment*.

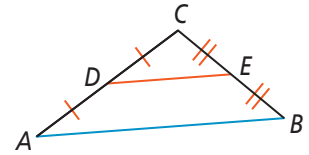
A triangle has three *midsegments*.

Theorem 5-1 Triangle Midsegment Theorem

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

9. Use the triangle at the right to complete the table below.

If	Then
<input type="text"/> is the midpoint of \overline{CA} and	<input type="text"/> $\parallel \overline{AB}$
<input type="text"/> is the midpoint of \overline{CB}	<input type="text"/> $= \frac{1}{2} AB$



Use the graph at the right for Exercises 10–11.

10. Draw \overline{RS} . Then underline the correct word or number to complete each sentence below.

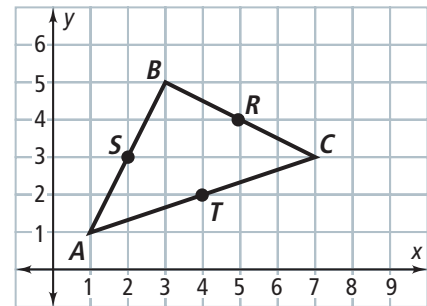
\overline{RS} is a midsegment of / parallel to $\triangle ABC$.

\overline{RS} is a midsegment of / parallel to \overline{AC} .

11. Use the Triangle Midsegment Theorem to complete.

$RS =$ AC

12. Draw \overline{ST} . What do you know about \overline{ST} ?



Problem 1 Identifying Parallel Segments

Got It? In $\triangle XYZ$, A is the midpoint of \overline{XY} , B is the midpoint of \overline{YZ} , and C is the midpoint of \overline{ZX} . What are the three pairs of parallel segments?

13. Draw a diagram to illustrate the problem.

14. Write the segment parallel to each given segment.

$\overline{AB} \parallel$

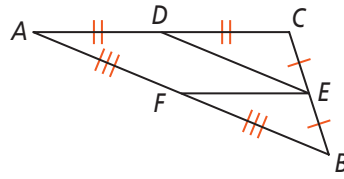
$\overline{CB} \parallel$

$\overline{CA} \parallel$



Problem 2 Finding Lengths

Got It? In the figure below, $AD = 6$ and $DE = 7.5$. What are the lengths of \overline{DC} , \overline{AC} , \overline{EF} , and \overline{AB} ?



15. Complete the problem-solving model below.

Know
 $AD = 6$ and $DE = 7.5$.
 $CE = EB, AD = DC$,
 $BF = \square$

Need

Plan
Use the Triangle Midsegment Theorem to find DC, AC, EF , and \square .

16. The diagram shows that \overline{EF} and \overline{DE} join the midpoints of two sides of $\triangle \square$.
By the Triangle Midsegment Theorem, $EF = \frac{1}{2} \cdot \square$ and $DE = \frac{1}{2} \cdot \square$.

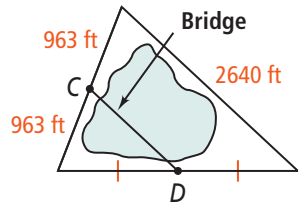
Complete each statement.

- 17. $DC = AD = \square$
- 18. $AC = AD + \square = \square + \square = \square$
- 19. $EF = \square \cdot AC = \square \cdot \square = 6$
- 20. $CB = \square \cdot DE = \square \cdot \square = 15$



Problem 3 Using the Midsegment of a Triangle

Got It? \overline{CD} is a bridge being built over a lake, as shown in the figure at the right. What is the length of the bridge?



21. Complete the flow chart to find the length of the bridge.

\overline{CD} joins the ? of two sides of a triangle.

\overline{CD} is parallel to a side that is ft.

Use the Triangle ? Theorem.

$CD = \frac{1}{2} \cdot \square$

$CD = \square$

22. The length of the bridge is ft.



Lesson Check • Do you know HOW?

If $JK = 5x + 20$ and $NO = 20$, what is the value of x ?

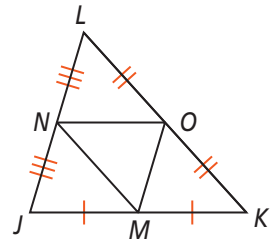
Complete each statement.

23. is the midpoint of \overline{LJ} .

24. is the midpoint of \overline{LK} .

25. \overline{NO} is a ? of $\triangle JKL$, so $NO = \frac{1}{2}JK$.

26. Substitute the given information into the equation in Exercise 25 and solve for x .



Lesson Check • Do you UNDERSTAND?

Reasoning If two noncollinear segments in the coordinate plane have slope 3, what can you conclude?

27. Place a \checkmark in the box if the response is correct. Place an \times if it is incorrect.

If two segments in a plane are parallel, then they have the same slope.

If two segments lie on the same line, they are parallel.

28. Now answer the question.



Math Success

Check off the vocabulary words that you understand.

midsegment

midpoint

segment

Rate how well you can use *properties of midsegments*.

