1-3 Measuring Segments

Vocabulary

Review

Draw an example of each.

1. *point*

2. $\overleftrightarrow{AB}$

3. $\overrightarrow{DF}$

Vocabulary Builder

segment (noun) **SEG munt**

Definition: A **segment** is part of a line that consists of two endpoints and all points between them.

Main Idea: You name a **segment** by its endpoints.

segment HJ

Use Your Vocabulary

Complete each sentence with *endpoint, endpoints, line,* or *points*.

4. A *ray* has one ? .

5. A *line* contains infinitely many ? .

6. A *segment* has two ? .

7. A *segment* is part of a ? .

Place a check ✓ if the phrase describes a *segment*. Place an ✗ if it does not.

___ **8.** Earth's equator

___ **9.** the right edge of a book's cover

___ **10.** one side of a triangle

take note

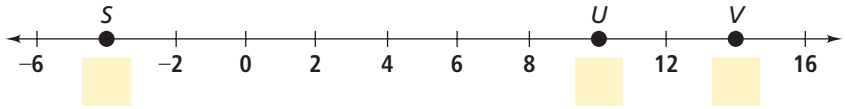
Postulate 1–5 Ruler Postulate

Every point on a line can be paired with a real number, called the *coordinate* of the point.

Problem 1 Measuring Segment Lengths

Got It? What are UV and SV on the number line?

11. Label each point on the number line with its coordinate.



12. Find UV and SV. Write a justification for each statement.

$UV = |\ \square - \square\ |$ _____ $SV = |\ \square - \square\ |$

$UV = |\ \square\ |$ _____ $SV = |\ \square\ |$

$UV = \square$ _____ $SV = \square$

take note

Postulate 1–6 Segment Addition Postulate

If three points A, B, and C are collinear and B is between A and C, then $AB + BC = AC$.

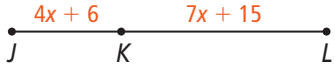
Given points A, B, and C are collinear and B is between A and C, complete each equation.

13. $AB = 5$ and $BC = 4$, so $AB + BC = \square + \square$ and $AC = \square$.

14. $AC = 12$ and $BC = 7$, so $AC - BC = \square - \square$ and $AB = \square$.

Problem 2 Using the Segment Addition Postulate

Got It? In the diagram, $JL = 120$. What are JK and KL?



15. Write a justification for each statement.

$JK + KL = JL$ _____

$(4x + 6) + (7x + 15) = 120$ _____

$11x + 21 = 120$ _____

$11x = 99$ _____

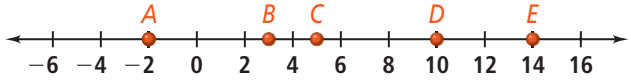
$x = 9$ _____

16. You know that $JK = 4x + 6$ and $KL = 7x + 15$. Use the value of x from Exercise 15 to to find JK and KL. find JK and KL.

17. $JK = \square$ and $KL = \square$

Problem 3 Comparing Segment Lengths

Got It? Use the diagram below. Is $\overline{AB}$ congruent to $\overline{DE}$?



In Exercises 18 and 19, circle the expression that completes the equation.

18. $AB =$ ■

$-2 - 2$	$\lvert -2 - 2 \rvert$	$\lvert -2 - 3 \rvert$	$\lvert -2 - 4 \rvert$

19. $DE =$ ■

$3 - 14$	$10 + 14$	$\lvert 5 - 14 \rvert$	$\lvert 10 - 14 \rvert$

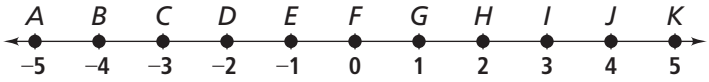
20. After simplifying, $AB =$ _____ and $DE =$ _____.

21. Is $\overline{AB}$ congruent to $\overline{DE}$? Explain.

_____

The *midpoint* of a segment is the point that divides the segment into two congruent segments.

Use the number line below for Exercises 22–25.



22. Point _____ is halfway between points B and J.

23. The midpoint of $\overline{AE}$ is point _____.

24. Point _____ divides $\overline{EK}$ into two congruent segments.

25. Find the midpoint of each segment. Then write the coordinate of the midpoint.

	$\overline{AG}$	$\overline{DH}$	$\overline{AK}$
Midpoint			
Coordinate			

26. Find the coordinate of the midpoint of each segment.

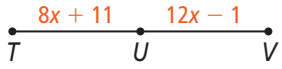
	segment with endpoints at -4 and 2	segment with endpoints at -2 and 4
Coordinate of midpoint		

27. Circle the expression that relates the coordinate of the midpoint to the coordinates of the endpoints.

$x_1 + x_2$	$\frac{(x_1 + x_2)}{2}$	$\frac{(x_1 - x_2)}{2}$

Problem 4 Using the Midpoint

Got It? *U* is the midpoint of $\overline{TV}$. What are *TU*, *UV*, and *TV*?



28. Use the justifications at the right to complete the steps below.

Step 1 Find *x*.

$TU = UV$	Definition of midpoint
$8x + 11 =$ ____	Substitute.
$8x + 11 +$ ____ $=$ ____ $+$ ____	Add 1 to each side.
____ $=$ ____	Subtract $8x$ from each side.
____ $= x$	Divide each side by 4.

Step 2 Find *TU* and *UV*.

$TU = 8 \cdot$ ____ $+ 11 =$ ____ Substitute ____ for *x*.

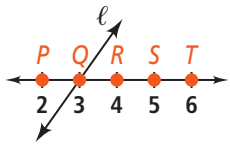
$UV = 12 \cdot$ ____ $- 1 =$ ____ Substitute.

Step 3 Find *TV*.

$TV = TU + UV$	Definition of midpoint
$=$ ____ $+$ ____	Substitute.
$=$ ____	Simplify.

Lesson Check • Do you UNDERSTAND?

Vocabulary Name two segment bisectors of $\overline{PR}$.



Underline the correct word or symbol to complete each sentence.

29. A bisector / midpoint may be a point, line, ray, or segment.

30. The midpoint of $\overline{PR}$ is point *P* / *Q* / *R*.

31. Line ℓ passes through point *P* / *Q* / *R*.

32. Two bisectors of $\overline{PR}$ are ____ and ____.

Math Success

Check off the vocabulary words that you understand.

☐ congruent segments ☐ coordinate ☐ midpoint ☐ segment bisector

Rate how well you can *find lengths of segments*.

Need to review 0 2 4 6 8 10 Now I get it!