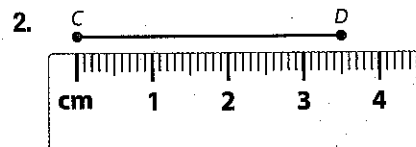
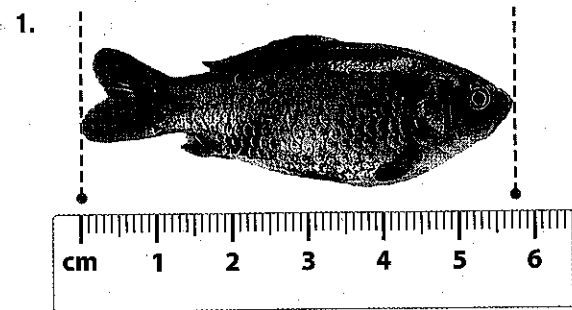


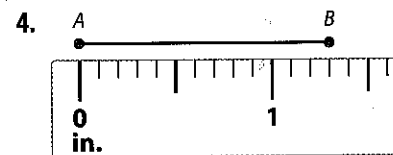
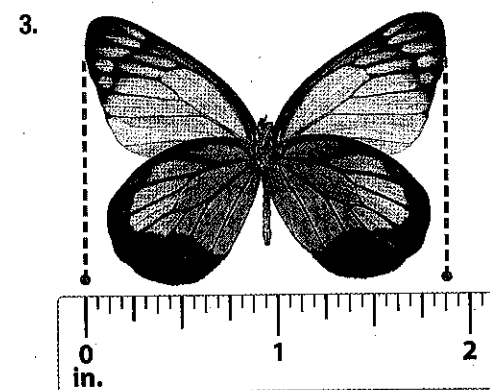
**Check Your Understanding**

= Step-by-Step Solutions begin on page R14.

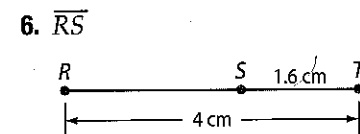
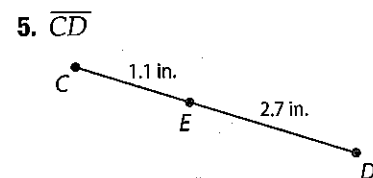
**Example 1** Find the length of each line segment or object.



**Example 2**



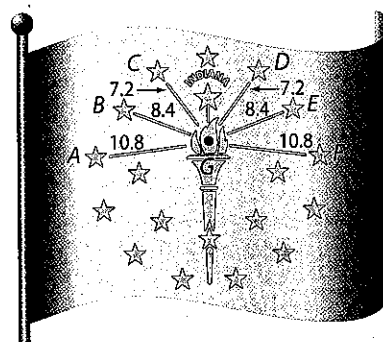
**Examples 3–4** Find the measurement of each segment. Assume that each figure is not drawn to scale.



**Example 5** ALGEBRA Find the value of  $x$  and  $BC$  if  $B$  is between  $C$  and  $D$ .

- $CB = 2x$ ,  $BD = 4x$ , and  $CD = 12$ .
- 8.  $CB = 4x - 9$ ,  $BD = 3x + 5$ , and  $CD = 17$

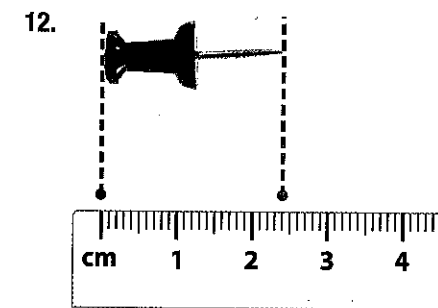
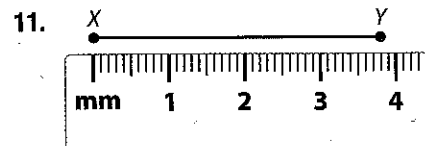
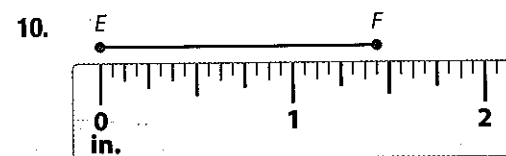
**Example 6** 9. **CCSS STRUCTURE** The Indiana State Flag was adopted in 1917. The measures of the segments between the stars and the flame are shown on the diagram in inches. List all of the congruent segments in the figure.



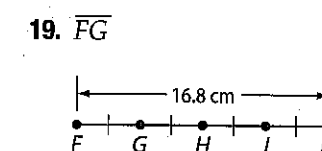
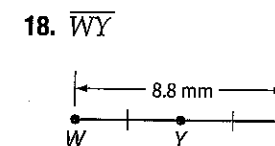
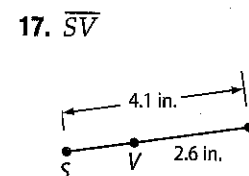
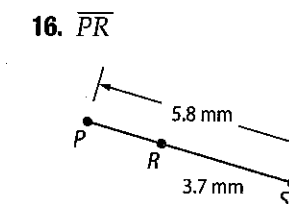
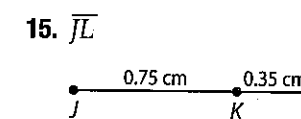
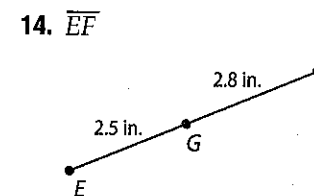
**Practice and Problem Solving**

Extra Practice is on page R1.

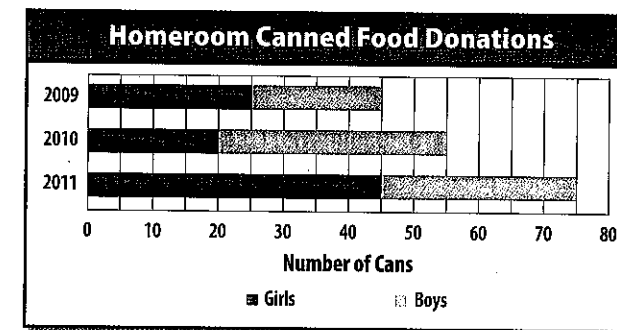
**Examples 1–2** Find the length of each line segment.



**Examples 3–4** Find the measurement of each segment. Assume that each figure is not drawn to scale.



20. **CCSS SENSE-MAKING** The stacked bar graph shows the number of canned food items donated by the girls and the boys in a homeroom class over three years. Use the concept of betweenness of points to find the number of cans donated by the boys for each year. Explain your method.

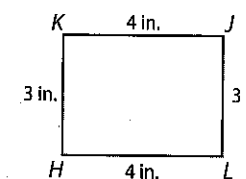


**Example 5** ALGEBRA Find the value of the variable and  $YZ$  if  $Y$  is between  $X$  and  $Z$ .

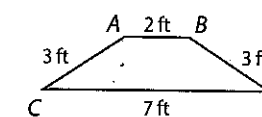
- 21.  $XY = 11$ ,  $YZ = 4c$ ,  $XZ = 83$
- 22.  $XY = 6b$ ,  $YZ = 8b$ ,  $XZ = 175$
- 23.  $XY = 7a$ ,  $YZ = 5a$ ,  $XZ = 6a + 24$
- 24.  $XY = 11d$ ,  $YZ = 9d - 2$ ,  $XZ = 5d + 28$
- 25.  $XY = 4n + 3$ ,  $YZ = 2n - 7$ ,  $XZ = 22$
- 26.  $XY = 3a - 4$ ,  $YZ = 6a + 2$ ,  $XZ = 5a + 22$

**Example 6** Determine whether each pair of segments is congruent.

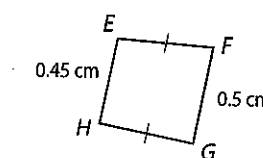
●  $\overline{KJ}$ ,  $\overline{HL}$



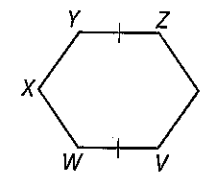
28.  $\overline{AC}$ ,  $\overline{BD}$



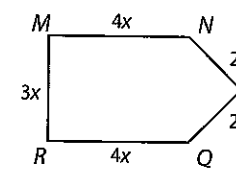
29.  $\overline{EH}$ ,  $\overline{FG}$



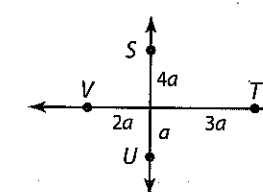
30.  $\overline{VW}$ ,  $\overline{UZ}$



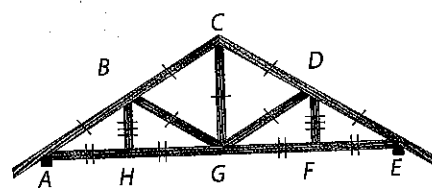
31.  $\overline{MN}$ ,  $\overline{RQ}$



32.  $\overline{SU}$ ,  $\overline{VT}$

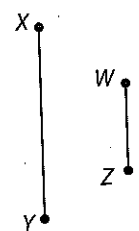


- TRUSSES** A truss is a structure used to support a load over a span, such as a bridge or the roof of a house. List all of the congruent segments in the figure.

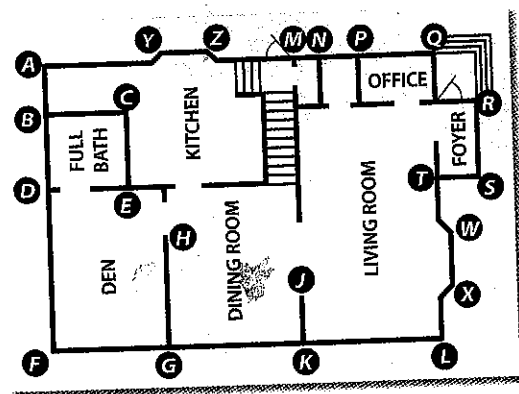


34. **CONSTRUCTION** For each expression:

- construct a segment with the given measure,
  - explain the process you used to construct the segment, and
  - verify that the segment you constructed has the given measure.
- a.  $2(XY)$       b.  $6(WZ) - XY$



35. **BLUEPRINTS** Use a ruler to determine at least five pairs of congruent segments with labeled endpoints in the blueprint at the right.



36. **MULTIPLE REPRESENTATIONS** Betweenness of points ensures that a line segment may be divided into an infinite number of line segments.
- a. **Geometric** Use a ruler to draw a line segment 3 centimeters long. Label the endpoints  $A$  and  $D$ . Draw two more points along the segment and label them  $B$  and  $C$ . Draw a second line segment 6 centimeters long. Label the endpoints  $K$  and  $P$ . Add four more points along the line and label them  $L$ ,  $M$ ,  $N$ , and  $O$ .
- b. **Tabular** Use a ruler to measure the length of the line segment between each of the points you have drawn. Organize the lengths of the segments in  $\overline{AD}$  and  $\overline{KP}$  into a table. Include a column in your table to record the sum of these measures.
- c. **Algebraic** Give an equation that could be used to find the lengths of  $\overline{AD}$  and  $\overline{KP}$ . Compare the lengths determined by your equation to the actual lengths.

**H.O.T. Problems** Use Higher-Order Thinking Skills

37. **WRITING IN MATH** If point  $B$  is between points  $A$  and  $C$ , explain how you can find  $AC$  if you know  $AB$  and  $BC$ . Explain how you can find  $BC$  if you know  $AB$  and  $AC$ .
38. **OPEN ENDED** Draw a segment  $\overline{AB}$  that measures between 2 and 3 inches long. Then sketch a segment  $\overline{CD}$  congruent to  $\overline{AB}$ , draw a segment  $\overline{EF}$  congruent to  $\overline{AB}$ , and construct a segment  $\overline{GH}$  congruent to  $\overline{AB}$ . Compare your methods.
39. **CHALLENGE** Point  $K$  is between points  $J$  and  $L$ . If  $JK = x^2 - 4x$ ,  $KL = 3x - 2$ , and  $JL = 28$ , write and solve an equation to find the lengths of  $JK$  and  $KL$ .
40. **REASONING** Determine whether the statement *If point  $M$  is between points  $C$  and  $D$ , then  $CD$  is greater than either  $CM$  or  $MD$  is sometimes, never, or always true.* Explain.
41. **WRITING IN MATH** Why is it important to have a standard of measure?

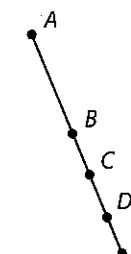
**Standardized Test Practice**

42. **SHORT RESPONSE** A 36-foot-long ribbon is cut into three pieces. The first piece of ribbon is half as long as the second piece of ribbon. The third piece is 1 foot longer than twice the length of the second piece of ribbon. How long is the longest piece of ribbon?

44. **SAT/ACT** If  $f(x) = 7x^2 - 4x$ , what is the value of  $f(2)$ ?

- F -8      J 17  
G 2      K 20  
H 6

43. In the figure, points  $A$ ,  $B$ ,  $C$ ,  $D$ , and  $E$  are collinear. If  $AE = 38$ ,  $BD = 15$ , and  $\overline{BC} \cong \overline{CD} \cong \overline{DE}$ , what is the length of  $\overline{AD}$ ?



- A 7.5      C 22.5  
B 15      D 30.5

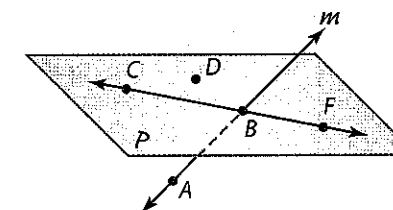
45. **ALGEBRA** Simplify  $(3x^2 - 2)(2x + 4) - 2x^2 + 6x + 7$ .

- A  $4x^2 + 14x - 1$   
B  $4x^2 - 14x + 15$   
C  $6x^3 + 12x^2 + 2x - 1$   
D  $6x^3 + 10x^2 + 2x - 1$

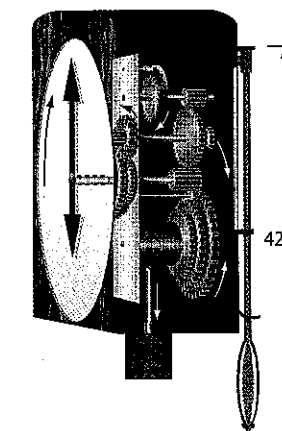
**Spiral Review**

Refer to the figure. (Lesson 1-1)

46. What are two other names for  $\overleftrightarrow{AB}$ ?
47. Give another name for plane  $P$ .
48. Name the intersection of plane  $P$  and  $\overleftrightarrow{AB}$ .
49. Name three collinear points.
50. Name two points that are not coplanar.



51. **CLOCKS** The period of a pendulum is the time required for it to make one complete swing back and forth. The formula of the period  $P$  in seconds of a pendulum is  $P = 2\pi\sqrt{\frac{\ell}{32}}$ , where  $\ell$  is the length of the pendulum in feet. (Lesson 0-9)
- a. What is the period of the pendulum in the clock shown to the nearest tenth of a second?
- b. About how many inches long should the pendulum be in order for it to have a period of 1 second?



Solve each inequality. (Lesson 0-6)

52.  $-14n \geq 42$       53.  $p + 6 > 15$   
54.  $-2a - 5 < 20$       55.  $5x \leq 3x - 26$

**Skills Review**

Evaluate each expression if  $a = -7$ ,  $b = 4$ ,  $c = -3$ , and  $d = 5$ .

56.  $b - c$       57.  $|a - d|$       58.  $|d - c|$   
59.  $\frac{b - a}{2}$       60.  $(a - c)^2$       61.  $\sqrt{(a - b)^2 + (c - d)^2}$