1.2 EXERCISES

SKILL PRACTICE
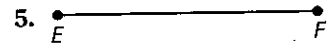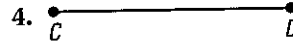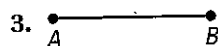
In Exercises 1 and 2, use the diagram at the right.

1. **VOCABULARY** *Explain* what $\overline{MN}$ means and what MN means.

2. ★ **WRITING** *Explain* how you can find PN if you know PQ and QN. How can you find PN if you know MP and MN?

EXAMPLE 1
on p. 9
for Exs. 3–5

MEASUREMENT Measure the length of the segment to the nearest tenth of a centimeter.

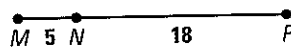3. A————B

4. C————————D

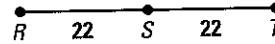5. E————————F

EXAMPLES 2 and 3
on pp. 10–11
for Exs. 6–12

SEGMENT ADDITION POSTULATE Find the indicated length.

6. Find MP.

M 5 N ——18—— P

7. Find RT.

R 22 S 22 T

8. Find UW.

U 39 V 26 W

9. Find XY.

|——— 30 ———|
X ———— Y 7 Z

10. Find BC.

|——— 42 ———|
A 27 B C

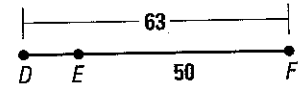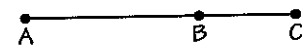11. Find DE.

|——— 63 ———|
D E 50 F
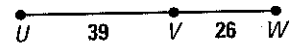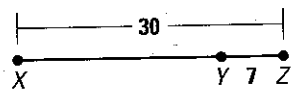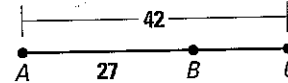
12. **ERROR ANALYSIS** In the figure at the right, $AC = 14$ and $AB = 9$. *Describe* and correct the error made in finding BC.

A————B—C

$BC = 14 + 9 = 23$

EXAMPLE 4
on p. 11
for Exs. 13–19

CONGRUENCE In Exercises 13–15, plot the given points in a coordinate plane. Then determine whether the line segments named are congruent.

⑬ $A(0, 1)$, $B(4, 1)$, $C(1, 2)$, $D(1, 6)$; $\overline{AB}$ and $\overline{CD}$

14. $J(-6, -8)$, $K(-6, 2)$, $L(-2, -4)$, $M(-6, -4)$; $\overline{JK}$ and $\overline{LM}$

15. $R(-200, 300)$, $S(200, 300)$, $T(300, -200)$, $U(300, 100)$; $\overline{RS}$ and $\overline{TU}$

⊗ ALGEBRA Use the number line to find the indicated distance.

16. JK ⑰ JL 18. JM 19. KM

J   K   L   M
◆———◆———◆———◆
-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7
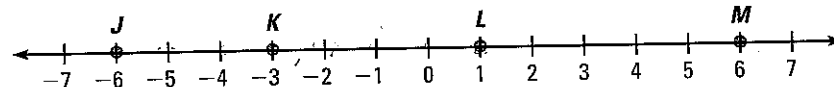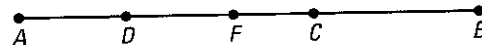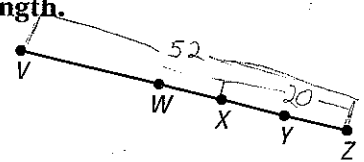
20. ★ **SHORT RESPONSE** Use the diagram. Is it possible to use the Segment Addition Postulate to show that $FB > CB$ or that $AC > DB$? *Explain.*
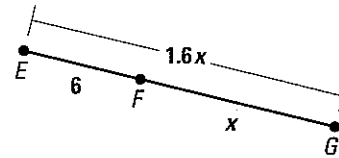
A   D   F   C   B

FINDING LENGTHS In the diagram, points V, W, X, Y, and Z are collinear, $VZ = 52$, $XZ = 20$, and $WX = XY = YZ$. Find the indicated length.

21. WX 22. VW 23. WY

24. VX 25. WZ 26. VY

27. ★ **MULTIPLE CHOICE** Use the diagram.
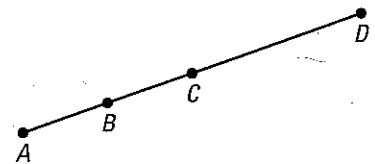What is the length of $\overline{EG}$?

     (**A**) 1   (**B**) 4.4

     (**C**) 10   (**D**) 16

ALGEBRA Point S is between R and T on $\overline{RT}$. Use the given information to write an equation in terms of x. Solve the equation. Then find RS and ST.

28. $RS = 2x + 10$
$ST = x - 4$
$RT = 21$

29. $RS = 3x - 16$
$ST = 4x - 8$
$RT = 60$

30. $RS = 2x - 8$
$ST = 3x - 10$
$RT = 17$

31. **CHALLENGE** In the diagram, $\overline{AB} \cong \overline{BC}$, $\overline{AC} \cong \overline{CD}$, and $AD = 12$. Find the lengths of all the segments in the diagram. Suppose you choose one of the segments at random. What is the probability that the measure of the segment is greater than 3? *Explain.*

PROBLEM SOLVING

32. **SCIENCE** The photograph shows an insect called a walkingstick. Use the ruler to estimate the length of the abdomen and the length of the thorax to the nearest $\frac{1}{4}$ inch. About how much longer is the walkingstick's abdomen than its thorax?

@HomeTutor for problem solving help at classzone.com
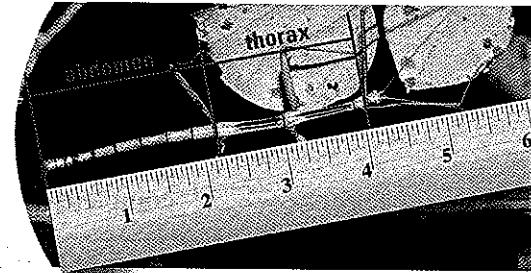
33. **MODEL AIRPLANE** In 2003, a remote-controlled model airplane became the first ever to fly nonstop across the Atlantic Ocean. The map shows the airplane's position at three different points during its flight.
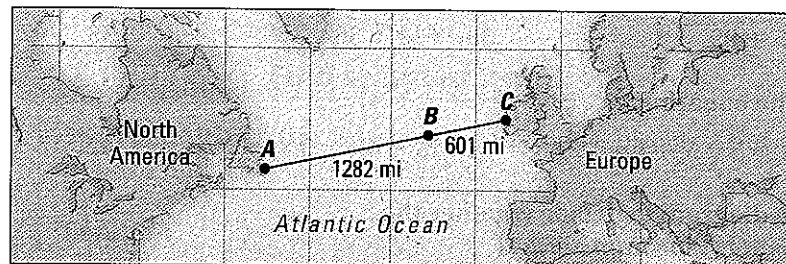
North America A 1282 mi B 601 mi C Europe Atlantic Ocean	**A** Leave Cape Spear, Newfoundland **B** Approximate position after about 1 day **C** Land at Mannin Bay, Ireland, after nearly 38 hours

a. Find the total distance the model airplane flew.

b. The model airplane's flight lasted nearly 38 hours. Estimate the airplane's average speed in miles per hour.

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34. ★ **SHORT RESPONSE** The bar graph shows the win-loss record for a lacrosse team over a period of three years.
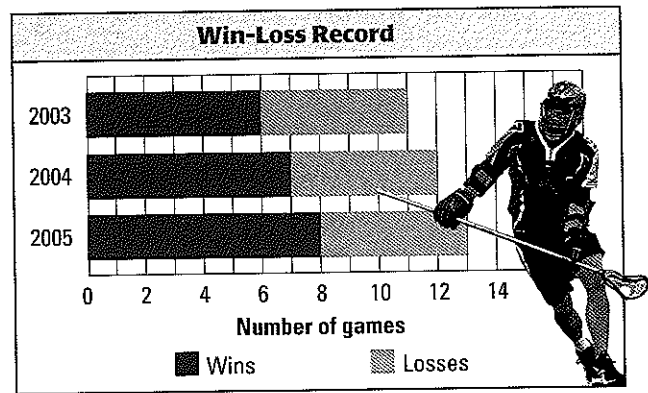
a. Use the scale to find the length of the yellow bar for each year. What does the length represent?

b. For each year, find the percent of games lost by the team.

c. *Explain* how you are applying the Segment Addition Postulate when you find information from a stacked bar graph like the one shown.

Win-Loss Record

■ Wins   ▨ Losses

35. **MULTI-STEP PROBLEM** A climber uses a rope to descend a vertical cliff. Let A represent the point where the rope is secured at the top of the cliff, let B represent the climber's position, and let C represent the point where the rope is secured at the bottom of the cliff.

a. **Model** Draw and label a line segment that represents the situation.

b. **Calculate** If AC is 52 feet and AB is 31 feet, how much farther must the climber descend to reach the bottom of the cliff?

(*Animated* Geometry) at classzone.com

36. **CHALLENGE** Four cities lie along a straight highway in this order: City A, City B, City C, and City D. The distance from City A to City B is 5 times the distance from City B to City C. The distance from City A to City D is 2 times the distance from City A to City B. Copy and complete the mileage chart.

	City A	City B	City C	City D
City A		?	?	?
City B	?		?	?
City C	?	?		10 mi
City D	?	?	?	

MIXED REVIEW

Simplify the expression. Write your answer in simplest radical form. *(p. 874)*

37. $\sqrt{45 + 99}$

38. $\sqrt{14 + 36}$

39. $\sqrt{42 + (-2)^2}$

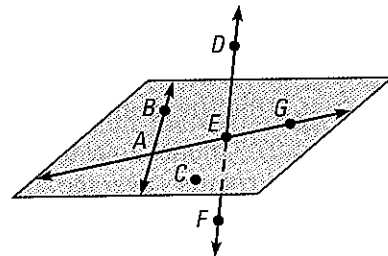**Solve the equation.** *(p. 875)*

40. $4m + 5 = 7 + 6m$

41. $13 - 4h = 3h - 8$

42. $17 + 3x = 18x - 28$

Use the diagram to decide whether the statement is *true* or *false*. *(p. 2)*

43. Points A, C, E, and G are coplanar.

44. $\overleftrightarrow{DF}$ and $\overleftrightarrow{AG}$ intersect at point E.

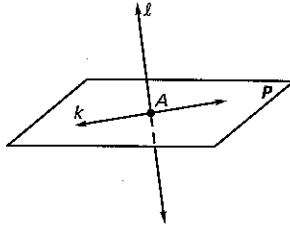45. $\overrightarrow{AE}$ and $\overrightarrow{EG}$ are opposite rays.

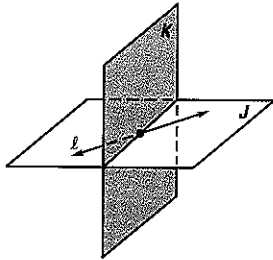**EXTRA PRACTICE** for Lesson 1.2, p. 896   🌀 **ONLINE QUIZ** at classzone.com

Selected Answers

Chapter 1

1.1 Skill Practice (pp. 5–7) **1. a.** point Q **b.** line segment MN **c.** ray ST **d.** line FG **3.** $\overleftrightarrow{QW}$, line g **5.** *Sample answer:* points R, Q, S; point T **7.** Yes; through any three points not on the same line, there is exactly one plane. **9.** $\overrightarrow{VY}$, $\overrightarrow{VX}$, $\overrightarrow{VZ}$, $\overrightarrow{VW}$ **11.** $\overrightarrow{WX}$
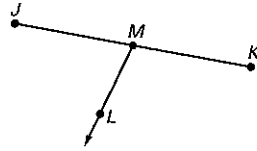**15.** *Sample:*

17. point R
19. $\overleftrightarrow{RS}$
21. yes; yes

23. *Sample:*

25. *Sample:*

27. on the line **29.** not on the line **31.** on the line
33.

 ray

35.

 segment

1.1 Problem Solving (pp. 7–8) **41.** intersection of a line and a plane **43.** Four points are not necessarily coplanar; no; three points determine a unique plane.
45. a–c.
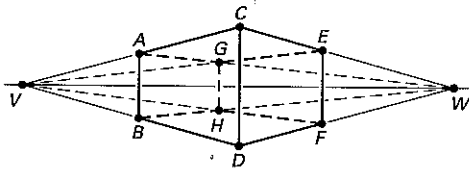
1.2 Skill Practice (pp. 12–13) **1.** $\overline{MN}$ means segment MN while MN is the length of $\overline{MN}$. **3.** 2.1 cm
5. 3.5 cm **7.** 44 **9.** 23 **11.** 13 **13.** congruent
15. not congruent **17.** 7 **19.** 9 **21.** 10 **23.** 20 **25.** 30
29. $(3x - 16) + (4x - 8) = 60$; 12; 20, 40

1.2 Problem Solving (pp. 13–14)
33. a. 1883 mi **b.** about 50 mi/h
35. a. *Sample:* **b.** 21 ft

1.3 Skill Practice (pp. 19–20) **1.** Distance Formula
3. $10\frac{1}{4}$ in. **5.** 26 cm **7.** $4\frac{3}{4}$ in. **9.** $2\frac{3}{8}$ in. **11.** 10 **13.** 1
15. 70 **17.** (5, 5) **19.** (1, 4) **21.** $\left(1\frac{1}{2}, -1\right)$ **23.** $\left(\frac{m}{2}, \frac{n}{2}\right)$;
when x_2 and y_2 are replaced by zero in the Midpoint
Formula and x_1 and y_1 are replaced by m and n the
result is $\left(\frac{m}{2}, \frac{n}{2}\right)$. **25.** $(-3, 10)$ **27.** (4, 8) **29.** $(-18, 22)$
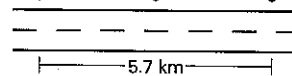**31.** 4.5 **33.** 5.7 **35.** 7; $-\frac{1}{2}$ **37.** 40; 5 **39.** 9; $-3\frac{1}{2}$
43. $AB = 3\sqrt{5}$, $CD = 2\sqrt{10}$; not congruent
45. $JK = 8\sqrt{2}$, $LM = \sqrt{130}$; not congruent
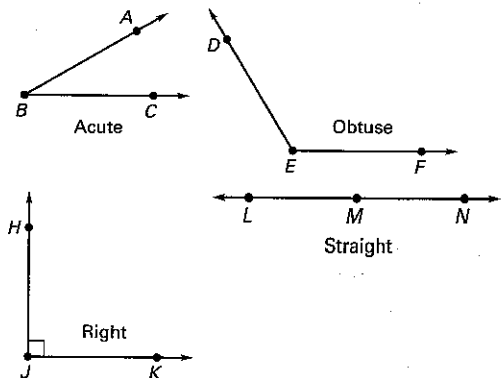
1.3 Problem Solving (pp. 21–22)
49.

 2.85 km

51. objects B and D; objects A and C **53. a.** 191 yd
b. 40 yd **c.** About 1.5 min; find the total distance, about 230 yards, and divide by 150 yards per minute.

1.4 Skill Practice (pp. 28–31)
1. *Sample:*

3. $\angle ABC$, $\angle B$, $\angle CBA$; B, $\overrightarrow{BA}$, $\overrightarrow{BC}$ **5.** $\angle MTP$, $\angle T$,
$\angle PTM$; T, $\overrightarrow{TM}$, $\overrightarrow{TP}$ **7.** straight **9.** right **11.** 90°; right
13. 135°; obtuse **15–19.** Sample answers are given.
15. $\angle BCA$; right **17.** $\angle DFB$; straight **19.** $\angle CDB$; acute
23. 65° **25.** 55° **29.** $m\angle XWY = 104°$, $m\angle ZWY = 52°$