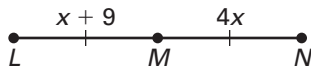


LESSON 1.3 Practice B
For use with pages 15–22

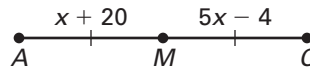
- Line RS bisects \overline{PQ} at point R . Find RQ if $PQ = 14$ centimeters.
- Line JK bisects \overline{MN} at point J . Find MN if $JM = 6\frac{3}{4}$ feet.
- Point T bisects \overline{UV} . Find UV if $UT = 4\frac{1}{2}$ yards.
- Point C bisects \overline{AB} . Find CB if $AB = 14.8$ meters.

In the diagram, M is the midpoint of the segment. Find the indicated length.

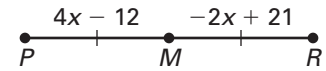
5. Find LN .



6. Find AM .



7. Find MR .



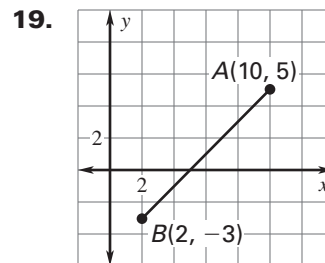
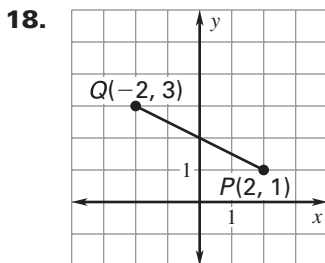
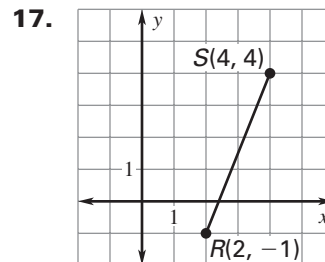
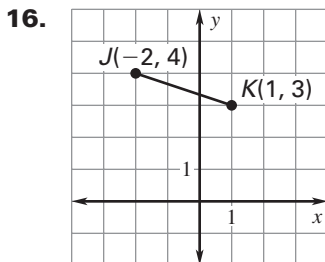
Find the coordinates of the midpoint of the segment with the given endpoints.

- $S(4, -1)$ and $T(6, 0)$
- $L(4, 2)$ and $P(0, 2)$
- $H(-5, 5)$ and $I(7, 3)$
- $G(-2, -8)$ and $H(-3, -12)$

Use the given endpoint R and midpoint M of \overline{RS} to find the coordinates of the other endpoint S .

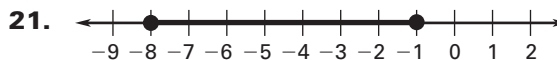
- $R(6, 0)$, $M(0, 2)$
- $R(3, 4)$, $M(3, -2)$
- $R(-3, -2)$, $M(-1, -8)$
- $R(11, -5)$, $M(-4, -4)$

Find the length of the segment. Round to the nearest tenth of a unit. Use the diagram to check that your answer is reasonable.



LESSON 1.3 **Practice B** *continued*
For use with pages 15–22

Find the length of the segment. Then find the coordinates of the midpoint of the segment.



The endpoints of two segments are given. Find each segment length. Tell whether the segments are congruent.

22. \overline{AB} : $A(2, 6)$, $B(0, 3)$

23. \overline{RS} : $R(5, 4)$, $S(0, 4)$

\overline{CD} : $C(-1, 0)$, $D(1, 3)$

\overline{TU} : $T(-4, -3)$, $U(-1, 1)$

24. \overline{KL} : $K(-4, 13)$, $L(-10, 6)$

25. \overline{OP} : $O(6, -2)$, $P(3, -2)$

\overline{MN} : $M(-1, -2)$, $N(-1, -11)$

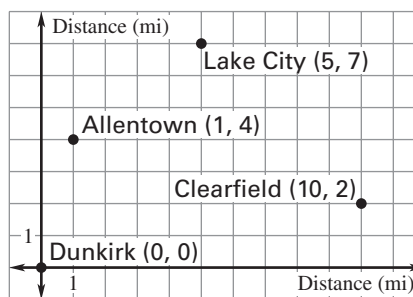
\overline{QR} : $Q(5, 2)$, $R(1, 5)$

26. **Distances** Your house and the mall are 9.6 miles apart on the same straight road. The movie theater is halfway between your house and the mall, on the same road.

- Make and label a sketch to represent this situation. How far is your house from the movie theater?
- You walk at an average speed of 3.2 miles per hour. About how long would it take you to walk to the movie theater from your house?

In Exercises 27–29, use the map. The locations of the towns on the map are: Dunkirk (0, 0), Clearfield (10, 2), Lake City (5, 7), and Allentown (1, 4). The coordinates are given in miles.

- Find the distance between each pair of towns. Round to the nearest tenth of a mile.
- Which two towns are closest together? Which two towns are farthest apart?
- The map is being used to plan a 26-mile marathon. Which of the following plans is the best route for the marathon? *Explain.*



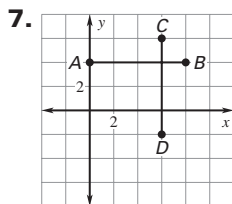
- Dunkirk to Clearfield to Allentown to Dunkirk
- Dunkirk to Clearfield to Lake City to Allentown to Dunkirk
- Dunkirk to Lake City to Clearfield to Dunkirk
- Dunkirk to Lake City to Allentown to Dunkirk

Lesson 1.2, continued

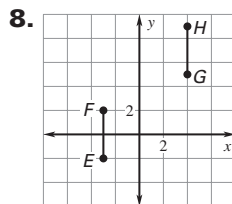
17. 8 18. 2 19. 11 20. 43 21. 33 22. 32
 23. 11 24. 44 25. 24 26. 28 27. 32
 28. $2x + 3x = 25$; $HJ = 10$; $JK = 15$
 29. $\frac{x}{4} + 3x - 4 = 22$; $HJ = 2$; $JK = 20$
 30. $5x - 4 + 8x - 10 = 38$; $HJ = 16$; $JK = 22$
 31. $5x - 3 + x - 9 = 5x$; $HJ = 57$; $JK = 3$
 32. 3.1 mi

Practice Level C

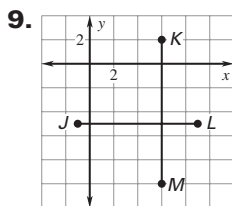
1. 3.3 cm; Check drawings. 2. 1.9 cm; Check drawings.
 3. 2.7 cm; Check drawings. 4. 15.3
 5. 11.5 6. 42.6



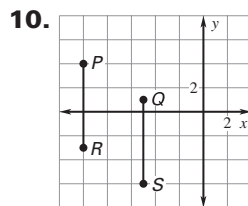
congruent



congruent



not congruent



congruent

11. 6 12. 8 13. 17 14. 13 15. 21 16. 24
 17. 15 18. 30 19. 8.7 20. 21.9 21. 39.3
 22. 11.5 23. 28.9 24. 41.5 25. 16.5
 26. 26.6 27. 23
 28. $7x + 2 + 2x - 1 = 64$; $AB = 51$; $BC = 13$
 29. $10x + 4 + 4x - 3 = 12x + 16$; $AB = 79$;
 $BC = 27$ 30. $4x + 3 + 8x - 11 = 10.5x + 4$;
 $AB = 35$; $BC = 53$
 31. a. 18 mi b. 10.8 mi c. 3.6 mi d. 4.8 mi

Review for Mastery

1. 10 2. 12 3. 6 4. 12 5. congruent 6. not congruent
 7. not congruent 8. congruent

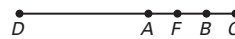
Challenge Practice

1. By the Segment Addition Postulate, you know $AB + BC = AC$ and $BC + CD = BD$. Because $AB = CD$, substitute CD for AB in $AB + BC = AC$ to obtain $CD + BC = AC$. You can then conclude $AC = BD$.
 2. $\overline{QS} \cong \overline{SU} \cong \overline{TV} \cong \overline{RT}$; $\overline{QT} \cong \overline{SV}$;
 $\overline{QU} \cong \overline{RV}$

3. Not sufficient. Counterexample:



4. Not sufficient. Counterexample:



5. Sufficient.
 $AD + DF + FC + CB = AB$

6. a. $AF = GE = CH = HI = ID = 4$;
 $HD = IC = FB = DG = 8$; $AC = CE = 6$;
 $AB = CB = CD = DE = 12$ b. $\frac{4}{13}$; There are a total of 13 segments in the diagram and 4 of those segments have lengths greater than 8.

7. $x^2 + x = 12$; $x = 3$; $LM = 9$, $MN = 3$

8. $x^2 - 5x = 50$; $x = 10$; $LM = 40$, $MN = 10$

9. $2x^2 + 9x = 56$; $x = \frac{7}{2}$; $LM = \frac{49}{4}$, $MN = \frac{175}{4}$

Lesson 1.3

Practice Level A

1. 12 cm 2. 34 cm 3. $16\frac{1}{2}$ in. 4. $12\frac{3}{8}$ in.
 5. 15.9 cm 6. $54\frac{1}{2}$ in. 7. 28 ft 8. $22\frac{1}{4}$ in.
 9. 9 10. 15 11. 19 12. 118 13. 222 14. 86
 15. (3, 4) 16. (4, 5) 17. (6, 1) 18. (11, 21)
 19. 6.4 20. 8.6 21. 4; 0 22. 10; -1
 23. $JK \approx 4.1$, $LM \approx 4.1$; congruent
 24. $PQ \approx 5.8$, $RS = 5$; not congruent

25. a.
 ; 4.2 mi

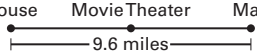
- b. about 1 h 24 min

26. about 9.8 yd; about 9.4 yd; about 18.4 yd

Practice Level B

1. 7 cm 2. 13.5 ft 3. 9 yd 4. 7.4 m 5. 24
 6. 26 7. 10 8. $(5, -\frac{1}{2})$ 9. (2, 2) 10. (1, 4)
 11. $(-2\frac{1}{2}, -10)$ 12. (-6, 4) 13. (3, -8)
 14. (1, -14) 15. (-19, -3) 16. 3.2 17. 5.4
 18. 4.5 19. 11.3 20. 9; 1.5 21. 7; -4.5
 22. $AB = \sqrt{13}$; $CD = \sqrt{13}$; congruent
 23. $RS = 5$; $TU = 5$; congruent
 24. $KL = \sqrt{85}$; $MN = 9$; not congruent
 25. $OP = 3$; $QR = 5$; not congruent

Lesson 1.3, continued

26. a.  4.8 mi b. 1.5 h

27. Dunkirk to Clearfield = 10.2 mi; Dunkirk to Lake City = 8.6 mi; Dunkirk to Allentown = 4.1 mi; Clearfield to Lake City = 7.1 mi; Clearfield to Allentown = 9.2 mi; Lake City to Allentown = 5 mi 28. Dunkirk and Allentown; Dunkirk and Clearfield 29. Choice C; the total distance of the path is closest to 26 mi.

Practice Level C


1. 23 cm 2. $19\frac{1}{4}$ in. 3. $29\frac{1}{6}$ ft 4. 8.45 m
 5. 7 6. 142 7. $24\frac{2}{3}$ 8. (8, 1) 9. (2.5, 4)
 10. (-5.5, -1) 11. (-11.5, -2.5)
 12. (0, -10) 13. (-11, 23) 14. (22, -2)
 15. (-18, -3) 16. 6.3 17. 7.8 18. 8.1
 19. 6.7 20. 16; -6 21. 45; -7.5
 22. $AB \approx 8.6$, $CD \approx 8.5$; not congruent
 23. $RS = 10$, $TU = 10$; congruent
 24. $KL \approx 12.0$, $MN \approx 12.0$; congruent
 25. $OP \approx 7.8$, $QR \approx 8.1$; not congruent
 26. 3737 units 27. 5458 units
 28. 5296 units 29. 3996 units
 30. Dunkirk to Clearfield: 10.8 mi; Dunkirk to Lake City: 14.4 mi; Dunkirk to Allentown: 12.6 mi; Clearfield to Lake City: 4.5 mi; Clearfield to Allentown: 10 mi; Lake City to Allentown: 8.9 mi 31. Clearfield and Lake City; Dunkirk and Lake City 32. D; The total distance of this route (35.9 mi) is closest to 36 miles.

Review for Mastery

1. 20 cm 2. 50 mm 3. 74 in. 4. 15 cm
 5. (2, 4) 6. $(4, \frac{3}{2})$ 7. (8, 3) 8. (3, 2) 9. (1, 1)
 10. $(\frac{5}{2}, -\frac{5}{2})$ 11. 7.2 12. 6.4

Problem Solving Workshop:

Mixed Problem Solving

1. a. 14 mi b. about 11.4 mi c. about 2.6 mi
 2. a.  b. 1125 ft 3. $Y(2, -1)$; Use the points S and T to find point W . Then use the midpoint formula with point W and point X to find the coordinates of point Y . 4. 2 5. EDC , DCF , CFE , FED ; The intersection of planes ABC and BGF is \overline{BC} .

6. a. 82 mi b. about 1.5 h c. Yes; The total time of the trip is $1.5 + 3(1.75) = 6.75$ hours which is less than 8 hours.

Challenge Practice

1. $(\frac{3x_1 + x_2}{4}, \frac{3y_1 + y_2}{4})$, $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$,
 $(\frac{x_1 + 3x_2}{4}, \frac{y_1 + 3y_2}{4})$ 2. a. $(\frac{7}{4}, -\frac{7}{4})$, $(\frac{5}{2}, -\frac{3}{2})$,
 $(\frac{13}{4}, -\frac{5}{4})$ b. $(-\frac{3}{2}, -\frac{9}{4})$, $(-1, -\frac{3}{2})$, $(-\frac{1}{2}, -\frac{3}{4})$

3. *Sample answer:* To determine whether three points A , B , and C in a coordinate plane are collinear, find AB , BC , and AC . By the Segment Addition Postulate, if $AB + BC = AC$, then B is between A and C , and when one point is between two other points, then the three points are collinear.

4. Collinear 5. Not collinear 6. Not collinear
 7. Collinear 8. $AB = \sqrt{29}$, $M = (5, 3, \frac{13}{2})$
 9. $AB = \sqrt{13}$, $M = (3, 1, \frac{15}{2})$
 10. $AB = \sqrt{19}$, $M = (-\frac{9}{2}, \frac{9}{2}, \frac{13}{2})$
 11. $AB = 17$, $M = (\frac{5}{2}, 2, 6)$
 12. a. (15, 22.5), (45, 22.5) b. 30 units

Lesson 1.4

Practice Level A

1. $\angle DEF$, $\angle FED$, and $\angle E$; vertex: E ; sides: \overrightarrow{ED} and \overrightarrow{EF}
 2. $\angle JKL$, $\angle LKJ$, and $\angle K$; vertex: K ; sides: \overrightarrow{KJ} and \overrightarrow{KL}
 3. $\angle QVS$, $\angle SVQ$, and $\angle V$; vertex: V ; sides: \overrightarrow{VQ} and \overrightarrow{VS}
 4. obtuse 5. acute 6. right 7. obtuse
 8. 30° ; acute 9. 50° ; acute 10. 105° ; obtuse
 11. 180° ; straight 12. $\angle JKL$; obtuse
 13. $\angle KLJ$; acute 14. $\angle LJK$, $\angle KJM$, $\angle MJK$, or $\angle J$; acute 15. $\angle LKM$; right
 16. $\angle LMJ$; straight 17. $\angle JMK$; obtuse
 18. 123° 19. 56° 20. 64° 21. 86° 22. 23°
 23. $m\angle ZXY = 39^\circ$, $m\angle WXY = 78^\circ$
 24. $m\angle YXZ = 57^\circ$, $m\angle YXW = 114^\circ$
 25. $m\angle WXZ = 73^\circ$, $m\angle ZXY = 73^\circ$ 26. 44°
 27. 86° 28. 116° 29. 58° 30. 35°