



Practice and Problem-Solving Exercises



MATHEMATICAL PRACTICES



Practice

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

See Problem 1.

6. 2 and 4

7. -9 and 6

8. 2 and -5

9. -8 and -12

Find the coordinates of the midpoint of \overline{HX} .

10. $H(0, 0)$, $X(8, 4)$

11. $H(-1, 3)$, $X(7, -1)$

12. $H(13, 8)$, $X(-6, -6)$

13. $H(7, 10)$, $X(5, -8)$

14. $H(-6.3, 5.2)$, $X(1.8, -1)$

15. $H(5\frac{1}{2}, -4\frac{3}{4})$, $X(2\frac{1}{4}, -1\frac{1}{4})$

The coordinates of point T are given. The midpoint of \overline{ST} is $(5, -8)$. Find the coordinates of point S .

See Problem 2.

16. $T(0, 4)$

17. $T(5, -15)$

18. $T(10, 18)$

19. $T(-2, 8)$

20. $T(1, 12)$

21. $T(4.5, -2.5)$

Find the distance between each pair of points. If necessary, round to the nearest tenth.

See Problem 3.

22. $J(2, -1)$, $K(2, 5)$

23. $L(10, 14)$, $M(-8, 14)$

24. $N(-1, -11)$, $P(-1, -3)$

25. $A(0, 3)$, $B(0, 12)$

26. $C(12, 6)$, $D(-8, 18)$

27. $E(6, -2)$, $F(-2, 4)$

28. $Q(12, -12)$, $T(5, 12)$

29. $R(0, 5)$, $S(12, 3)$

30. $X(-3, -4)$, $Y(5, 5)$

Maps For Exercises 31–35, use the map below. Find the distance between the cities to the nearest tenth.

See Problem 4.

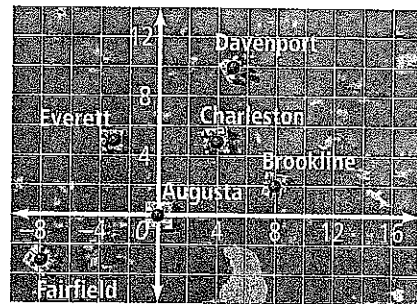
31. Augusta and Brookline

32. Brookline and Charleston

33. Brookline and Davenport

34. Everett and Fairfield

35. List the cities in the order of least to greatest distance from Augusta.



Apply

Find (a) PQ to the nearest tenth and (b) the coordinates of the midpoint of \overline{PQ} .

36. $P(3, 2)$, $Q(6, 6)$

37. $P(0, -2)$, $Q(3, 3)$

38. $P(-4, -2)$, $Q(1, 3)$

39. $P(-5, 2)$, $Q(0, 4)$

40. $P(-3, -1)$, $Q(5, -7)$

41. $P(-5, -3)$, $Q(-3, -5)$

42. $P(-4, -5)$, $Q(-1, 1)$

43. $P(2, 3)$, $Q(4, -2)$

44. $P(4, 2)$, $Q(3, 0)$

© 45. Think About a Plan An airplane at $T(80, 20)$ needs to fly to both $U(20, 60)$ and $V(110, 85)$. What is the shortest possible distance for the trip? Explain.

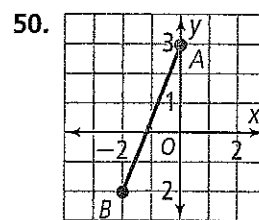
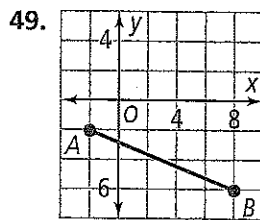
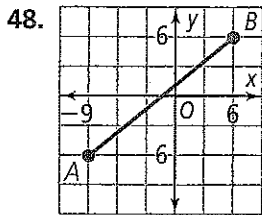
- What type of information do you need to find the shortest distance?
- How can you use a diagram to help you?

46. **Reasoning** The endpoints of \overline{AB} are $A(-2, -3)$ and $B(3, 2)$. Point C lies on \overline{AB} and is $\frac{2}{5}$ of the way from A to B . What are the coordinates of Point C ? Explain how you found your answer.

47. Do you use the Midpoint Formula or the Distance Formula to find the following?

- Given points K and P , find the distance from K to the midpoint of \overline{KP} .
- Given point K and the midpoint of \overline{KP} , find KP .

For each graph, find (a) AB to the nearest tenth and (b) the coordinates of the midpoint of \overline{AB} .



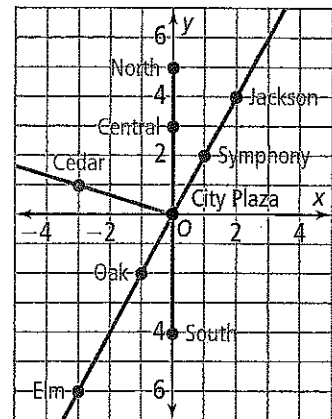
51. **Coordinate Geometry** Graph the points $A(2, 1)$, $B(6, -1)$, $C(8, 7)$, and $D(4, 9)$.

Draw parallelogram $ABCD$, and diagonals \overline{AC} and \overline{BD} .

- Find the midpoints of \overline{AC} and \overline{BD} .
- What appears to be true about the diagonals of a parallelogram?

Travel The units of the subway map at the right are in miles. Suppose the routes between stations are straight. Find the distance you would travel between each pair of stations to the nearest tenth of a mile.

- Oak Station and Jackson Station
- Central Station and South Station
- Elm Station and Symphony Station
- Cedar Station and City Plaza Station
- Maple Station is located 6 mi west and 2 mi north of City Plaza. What is the distance between Cedar Station and Maple Station?



57. **Open-Ended** Point $H(2, 2)$ is the midpoint of many segments.
- Find the coordinates of the endpoints of four noncollinear segments that have point H as their midpoint.
 - You know that a segment with midpoint H has length 8. How many possible noncollinear segments match this description? Explain.

- Challenge** 58. Points $P(-4, 6)$, $Q(2, 4)$, and R are collinear. One of the points is the midpoint of the segment formed by the other two points.
- What are the possible coordinates of R ?
59. **Reasoning** $RQ = \sqrt{160}$. Does this information affect your answer to part (a)? Explain.