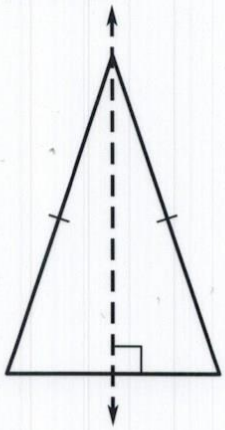
Answers for 9.6

For use with pages 621–624

9.6 Skill Practice

1. If a figure has rotational symmetry it is the point about which the figure is rotated.

2. *Sample:*



no

3. 1 **4.** 0 **5.** 1

6. yes; 90° or 180° about the center

7. yes; 72° or 144° about the center

8. yes; 45°, 90°, 135°, or 180° about the center

9. no

10. Line symmetry, rotational symmetry; the 5 lines of symmetry run through the center of each seed; 72° or 144° about the center.

11. Line symmetry, rotational symmetry; there are four lines of symmetry, two passing through the outer opposite pairs of leaves and two passing through the inner opposite pairs of leaves; 90° or 180° about the center.

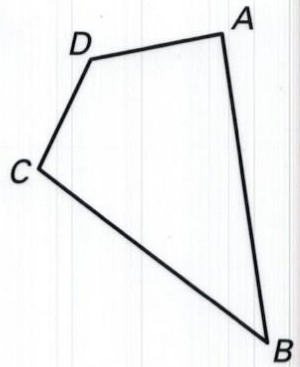
12. Line symmetry, no rotational symmetry; the line of symmetry runs through the violin between the 2 center strings.

13. C **14.** D

15. There is no rotational symmetry; the figure has 1 line of symmetry but no rotational symmetry.

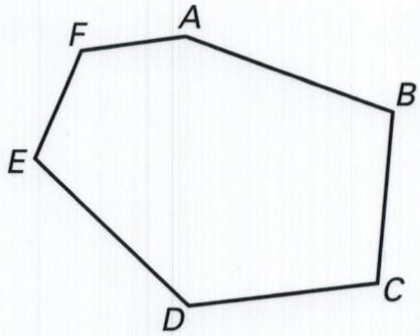
16. There are 2 lines of symmetry; the figure has 2 lines of symmetry and 180° rotational symmetry.

17. *Sample:*



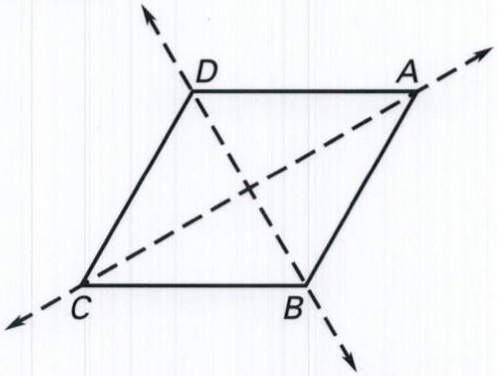
18. not possible

19. *Sample:*



20. not possible

21. *Sample:*



22. a rotation of 180° about C; rotational symmetry of 180°

23. No; what's on the left and right of the first line would have to be the same as what's on the left and right of the second line which is not possible.

24. Infinitely many; infinitely many; any line passing through the center of the circle is a line of symmetry and any rotation about the center is rotational symmetry. There are an infinite number in both cases.

25. 5 planes

26. The regular polygon would have rotational symmetry about the center of the n-gon and the smallest angle of rotation would be $\frac{360°}{n}$.

9.6 Problem Solving

27. No line symmetry, rotational symmetry of 180° about the center of the letter O.

28. No line symmetry, no rotational symmetry

29. It has a line of symmetry passing horizontally through the center of each O, no rotational symmetry.

30. No line symmetry, it has rotational symmetry of 180° about the center of o.

31. 22.5° **32.** 30° **33.** 15°

34. The molecules are reflections of each other; one is a mirror image of the other.

35. **a.** line symmetry and rotational symmetry

b. planes, z-axis

36. Translation, rotation; the left spiral is counterclockwise rotation and the right spiral is clockwise rotation.

9.6 Mixed Review

37. 9 **38.** $\frac{17}{8}$ **39.** $-\frac{8}{13}$

40. enlargement; $\frac{3}{2}$

41. reduction; $\frac{1}{2}$

42–45. Sample answers are given.

42. $\begin{bmatrix} 3 & \frac{11}{3} & 5 \\ 1 & 3 & 1 \end{bmatrix}$

43. $\begin{bmatrix} 6 & 7 & 9 \\ 2 & 5 & 2 \end{bmatrix}$

44. $\begin{bmatrix} 4 & 4 & -2 & -6 & 0 \\ 0 & 3 & 3 & 0 & -3 \end{bmatrix}$

45. $\begin{bmatrix} 2 & 2 & -1 & -3 & 0 \\ 0 & 1.5 & 1.5 & 0 & -1.5 \end{bmatrix}$