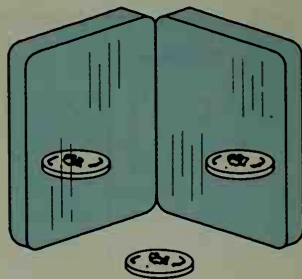
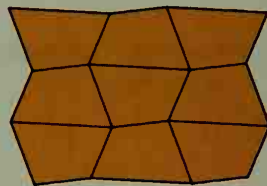


24. If you use tape to hinge together two pocket mirrors as shown and place the mirrors at a  $120^\circ$  angle, then a coin placed between the mirrors will be reflected, giving a pattern with  $120^\circ$  and  $240^\circ$  rotational symmetry.



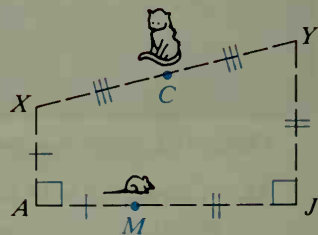
- What kinds of symmetries occur when the mirrors are at a right angle?
  - Experiment by forming various angles with two mirrors. Be sure to try  $60^\circ$ ,  $45^\circ$ , and  $30^\circ$  angles. Record the number of coins you see, including the actual coin.
25. You can make a tessellation by tracing around *any* quadrilateral, placing copies of the quadrilateral systematically as shown.
- The tessellation shown has many symmetry points but none of these are at vertices of the quadrilateral. Where are they?
  - What other kind of symmetry does this mosaic have?



26. A figure has  $60^\circ$  rotational symmetry. What other rotational symmetries *must* it have? Explain your answer.
- C** 27. Show that if a hexagon has point symmetry, then its opposite sides must be parallel.
28. A figure has  $50^\circ$  rotational symmetry. What other rotational symmetries *must* it have? Explain your answer.
- ★ 29. Tell how many planes of symmetry and axes of rotation each solid has.
- a right circular cone
  - a cube
  - a regular tetrahedron (a pyramid formed by four equilateral triangles)

## Challenges

1. A mouse moves along  $\overline{AJ}$ . For any position  $M$  of the mouse,  $X$  and  $Y$  are such that  $\overline{AX} \perp \overline{AJ}$  with  $AX = AM$ , and  $\overline{JY} \perp \overline{AJ}$  with  $JY = JM$ . The cat is at  $C$ , the midpoint of  $\overline{XY}$ . Describe the locus of the cat as the mouse moves from  $A$  to  $J$ .



2. Points  $O$ ,  $A$ ,  $B$ , and  $C$  lie on a number line with coordinates 0, 8, 12, and 26. Take any point  $P$  not on the line. Draw  $\overline{PA}$  and label its midpoint  $Q$ . Draw  $\overline{QB}$  and label its midpoint  $R$ . Draw  $\overline{PC}$  and label its midpoint  $S$ . Draw  $\overline{SR}$ . What is the coordinate of the point where  $\overline{SR}$  intersects the number line?