**Exercises 18–20 deal with figures in space.**

18. Given a sphere, what is the locus of the midpoints of the radii of the sphere?

19. Given a square, what is the locus of points equidistant from the sides?

20. Given a scalene triangle, what is the locus of points equidistant from the vertices?

C 21. A ladder leans against a house. As A moves up or down on the wall, B moves along the ground. What path is followed by midpoint M? (*Hint*: Experiment with a meter stick, a wall, and the floor.)
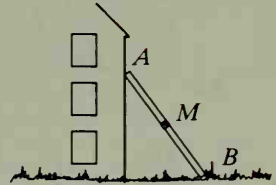
22. Given a segment $\overline{CD}$, what is the locus in space of points P such that $m \angle CPD = 90$?

23. A goat is tied to a square shed as shown. Using the scale 1 : 100, carefully draw a diagram that shows the region over which the goat can graze.
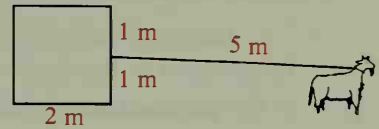
24. A tight wire $\overline{AC}$ is stretched between the tops of two vertical posts $\overline{AB}$ and $\overline{CD}$ that are 5 m apart and 2 m high. A ring, at one end of a 6 m leash, can slide along $\overline{AC}$. A dog is tied to the other end of the leash. Draw a diagram that shows the region over which the leashed dog can roam. Use the scale 1 : 100.
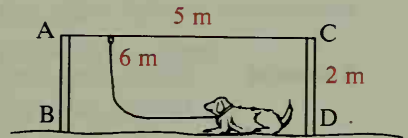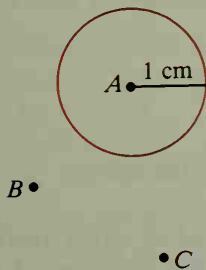
10-7 *Locus Problems*

The plural of *locus* is *loci*. The following problem involves intersections of loci.

Suppose you are given three noncollinear points, A, B, and C. In the plane of A, B, and C, what is the locus of points that are 1 cm from A and are, at the same time, equidistant from B and C?

You can analyze one part of the problem at a time.

The locus of points 1 cm from A is $\odot A$ with radius 1 cm.
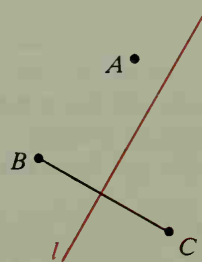
The locus of points equidistant from B and C is l, the perpendicular bisector of $\overline{BC}$.