

## Loci & Constructions

Definitions:

- Locus** The location (place) or locations of an object or person.
- Construct** To draw a plan of something, usually to scale.
- Scale** To shrink or enlarge something, for instance building a model to 1:50 scale would make it 50 times smaller.
- Equidistant** The same distance away.

*Work through the following questions, drawing diagrams to 1:100 scale (so 1 metre would be 1 centimetre on the plan).*

- 1** A goat is tied to a post by a 2m rope. Construct the locus of the goat, and give a value for the area of grass he can reach.
- Extension:** If the grass in this circle is only enough to feed the goat for one day, how long would the rope have to be to feed him for 4 days?
- 2** A flower-bed is planted beside a straight fence, and has its outer edge no more than 1m away from the fence. Construct the locus of the flower-bed.
- Extension:** The flower-bed is to be planted within a rectangular fence of size 4m by 6m. Construct the new locus of the flower-bed.
- 3** A gravel path is to be laid at a width of 0.5m around a 3m by 2m shed. Construct the locus of the gravel path.
- Extension:** If it costs £2 to lay 1 square metre of gravel, how much will it cost to surround the shed?
- 4** Construct the following loci:  
A garden is 20m long (north to south) and 12m wide (east to west).  
A clothes line is strung from halfway along the south side to a pole situated equidistant from the other three sides.  
A straight path of width 0.5m runs the length of the garden, from south to north in the west half, as close to the middle as possible without being closer than 0.5m to the clothes line.  
A 3m by 3m rectangular shed is to be placed in the north-east corner of the garden. It must be at least 2m from each fence, and as far as possible from the washing line.
- Extension** A sprinkler is to be installed on the east side of the garden, with a range of 2m. Shade in an area to show the possible locations of the sprinkler, with the following constraints: It must not spray the shed or the clothes line, and must water as much of the lawn as possible.