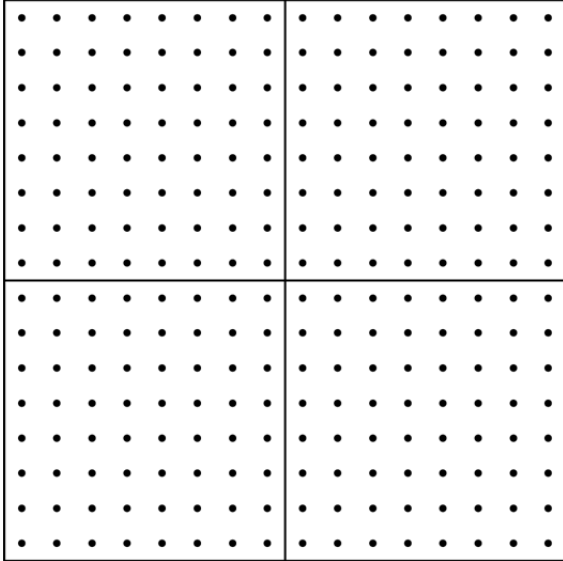


## How to use a dot grid

The dot grid we use in Forestry 1001 has 64 dots per 4 X 4 cm square (note this may not be exactly to scale due to printer and screen settings):



The  $\text{cm}^2/\text{dot}$  can be found using:

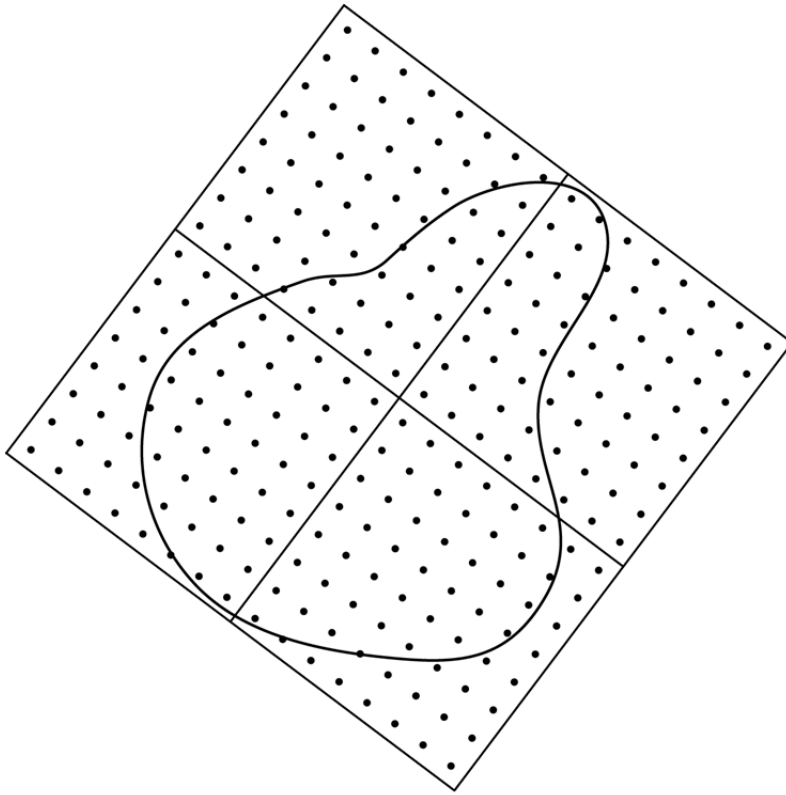
$$64 \text{ dots} = (4 \text{ cm} \cdot 4 \text{ cm})$$

$$64 \text{ dots} = 16 \text{ cm}^2$$

$$\frac{\text{cm}^2}{\text{dot}} = \frac{16 \text{ cm}^2}{64 \text{ dots}} = \frac{1 \text{ cm}^2}{4 \text{ dots}} = 0.25 \text{ cm}^2/\text{dot}$$

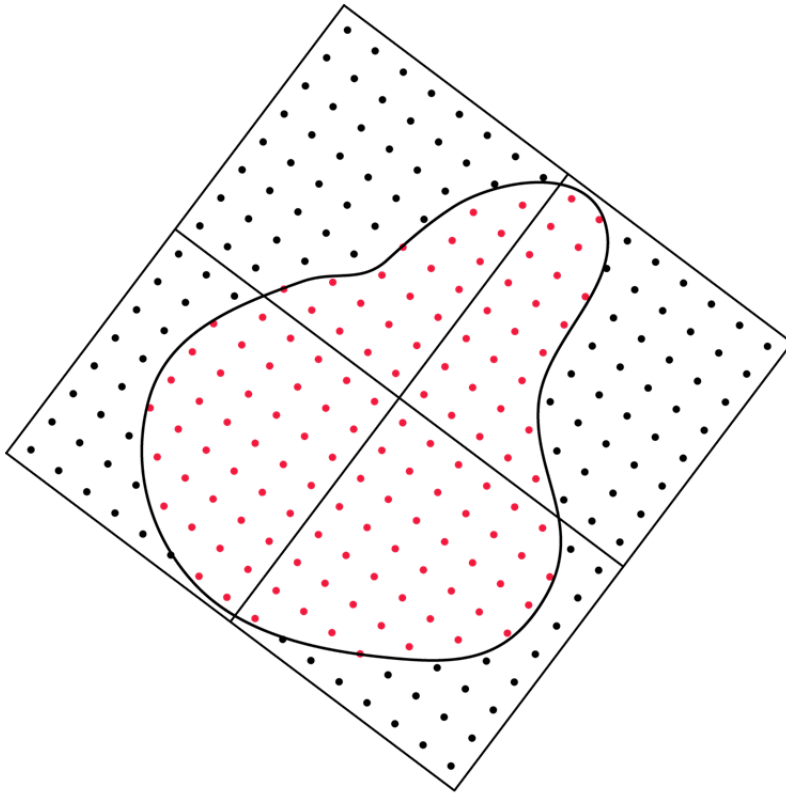
So each dot represents  $.25 \text{ cm}^2$ .

The dot grid is then placed randomly over the area of the map to be measured:



Scale: 1:22 000

We then need to count the dots inside the area of interest:



Scale: 1:22 000

I count 128 dots within the area of interest. The map area is then found by:

$$\text{Map Area (cm}^2\text{)} = 128 \text{ dots} \cdot \frac{.25 \text{ cm}^2}{\text{dot}} = 32.0 \text{ cm}^2$$

We now need to convert map area to ground area. The map scale is given in what is referred to as representative fraction: 1: 22 000. This simply means that 1 unit on the map represents 22 000 units on the ground. We can use any units we want. Normally, in Canada, area is measured in hectares. A hectare is a 100 m X 100 m area or 10 000 m<sup>2</sup>. We want to develop a conversion factor to go from cm<sup>2</sup> to ha, given our map scale:

$$1 : 22\ 000$$

Since we have map area in cm squared, we should use centimeters as our base unit:

$$1 \text{ cm} = 22\ 000 \text{ cm}$$

We can convert this to a dimensional equivalent: map (cm) = ground (m):

$$1 \text{ cm} = 22\ 000 \text{ cm} \cdot \frac{1 \text{ m}}{100 \text{ cm}} = 220 \text{ m}$$

$$1 \text{ cm} = 220 \text{ m}$$

We now need to develop a dimensional equivalent for area: map ( $\text{cm}^2$ ) = ground ( $\text{m}^2$ ):

$$(1 \text{ cm})^2 = (220 \text{ m})^2$$

$$1 \text{ cm}^2 = 48400 \text{ m}^2$$

Since we ultimately want ha on the ground, we can convert this dimensional equivalent to one for map ( $\text{cm}^2$ ) = ground (ha):

$$1 \text{ cm}^2 = 48400 \text{ m}^2 \cdot \frac{1 \text{ ha}}{10000 \text{ m}^2} = 4.84 \text{ ha}$$

So our final conversion factor is:

$$1 \text{ cm}^2 = 4.84 \text{ ha}$$

Finally to get hectares on the ground, we multiply the map area ( $\text{cm}^2$ ) by the dimensional equivalent for map ( $\text{cm}^2$ ) = ground (ha):

$$\text{Ground Area (ha)} = \text{Map Area (cm}^2\text{)} \cdot \frac{\text{ha}}{\text{cm}^2}$$

$$\text{Ground Area (ha)} = 32.0 \text{ (cm}^2\text{)} \cdot \frac{4.84 \text{ ha}}{1 \text{ cm}^2} = 154.88 \text{ ha}$$

So the area on the ground represented on the map is 154.88 ha.