

Crochet Sphere

Introduction

How many stitches should there be in each round of crochet to produce a sphere?

There are many web sites on the Internet which give details for a specific size sphere made with a specific size of wool, hook and tension, but there seems to be nothing of a general nature.



A 100mm diameter sphere with DK yarn.

It is clear that the number of stitches will depend on the number of stitches per mm, the height of each round and the diameter of the sphere.

With this information, a formula can be produced for the number of stitches per round and its derivation is given under the Theory heading.

If R = radius of the sphere, mm

w = width of a stitch, mm

h = height of a stitch, mm

and n = the round number

then the number of stitches in each round, $x = \frac{2 \pi R}{w} \sin(n h/R)$

The width of a stitch, w and the height of a stitch, h are found by making a test square of fabric. This should be at least 15 stitches by 15 rows to be reasonably accurate.

Making the calculations directly is tedious and so a web page calculator has been created to do this.

http://www.ikes.16mb.com/physproj/Sphere_crochet.htm

The calculator also suggests a suitable pattern for creating the disc, which aims to produce the best 'sphere' possible by evenly distributing the increases throughout each round.

Abbreviations.

The crochet patterns use the English notation.

inc	=	increase is made by making two stitches into the same stitch.
rnd	=	round
×	=	repeat so many times e.g. (1st, inc)×6 means (crochet 1 stitch, then make 2 stitches in the next stitch) and repeat this 6 times in total.
ss	=	slip stitch
st	=	stitch. The type of stitch is not specified and will depend on what was used to form the tension sample.
loop method	=	This is used for the first round. Make a loop of yarn, with the tail hanging downwards and the working yarn overlapping in front of the tail. Holding the loop in place, insert the hook through the centre of the loop and pull the working yarn through the loop. Make chain(s). Work the requires number of stitches into the loop and then pull the loop tight to complete the first round.
FO	=	Finish off, by cutting the yarn leaving a tail for sewing in and then pulling through the last stitch.

It will be found helpful to mark the beginning of each round with a piece of different coloured yarn. This makes it easier to correct any miscounting of stitches that may occur.

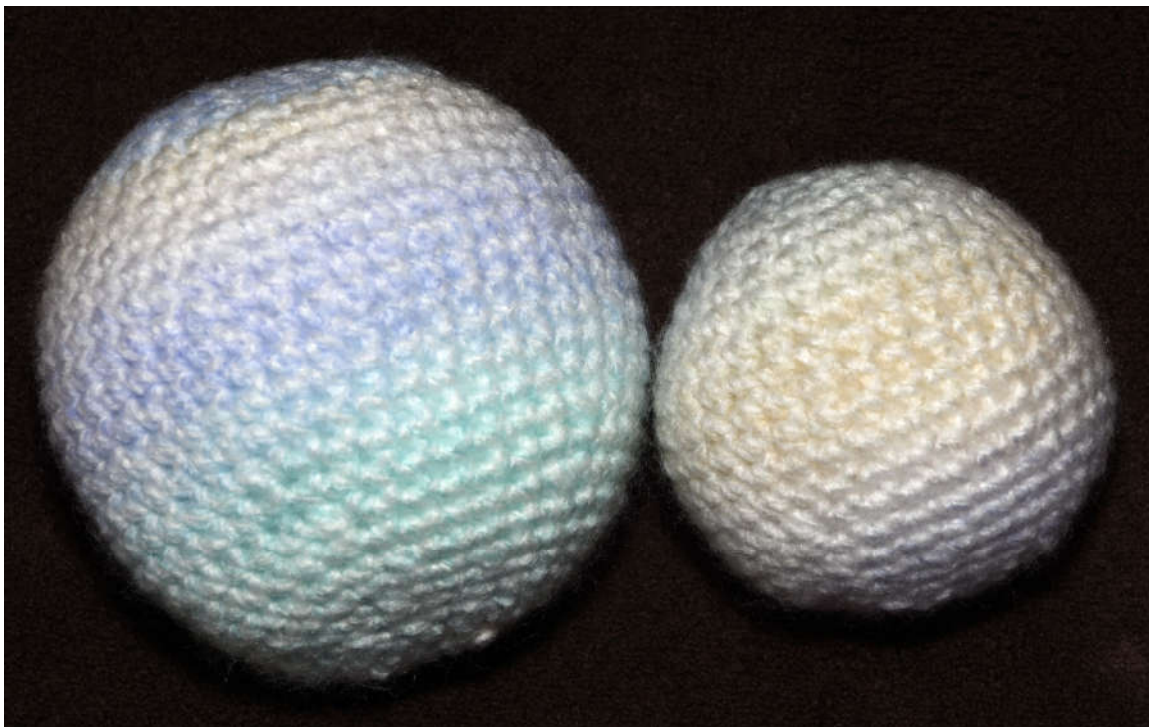
The sphere will need to be stuffed before completing the crochet.

It is recommended that this is done when there are just three or four more rounds left to complete.

When the last round has been completed, the stuffing can be topped up if necessary and the crochet fastened off by cutting the yarn, leaving a long tail, and pulling it through the last stitch.

The tail can then be threaded through the stitches of the last round with an embroidery needle.

The tail can then be pulled tight to close up the sphere and the tail sewn into the sphere to secure.

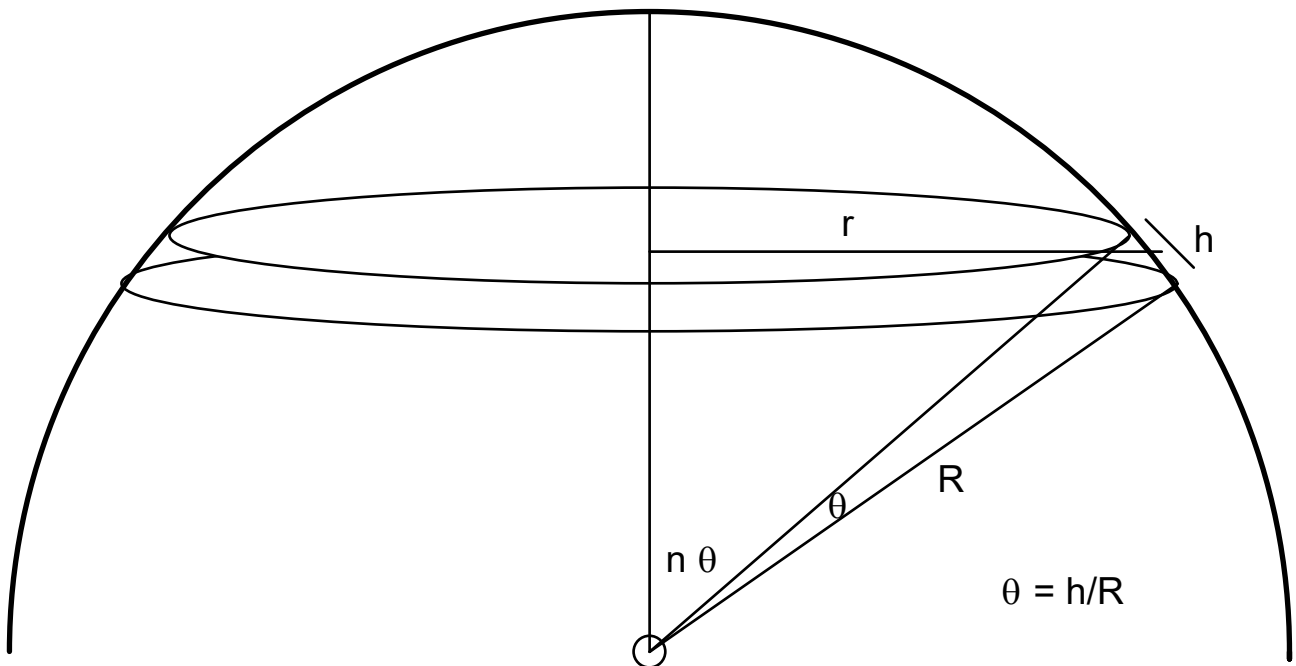


An 80mm and 60mm diameter sphere made with DK yarn.

Theory.

Consider a sphere of radius R .

Within the sphere, consider row n of radius r , where n is the number of rows out from the top.



R = radius of the sphere

w = width of a stitch

h = height of a stitch

$\theta = h/R$

Let row n have x stitches

$$\Rightarrow 2\pi r = x w$$

From the diagram

$$r = R \sin(n\theta) = R \sin(n h/R)$$

But $r = (x w)/(2\pi)$

$$\Rightarrow (x w)/(2\pi) = R \sin(n h/R)$$

$$\Rightarrow x = \frac{2\pi R \sin(n h/R)}{w}$$