CURVES FROM STRAIGHT LINES

The SKA will have thousands of radio telescopes all working together. All radio telescopes have the same shape dish. This shape is called a *paraboloid.* You can make a *paraboloid* by getting a *parabola* and rotating it around its centre.

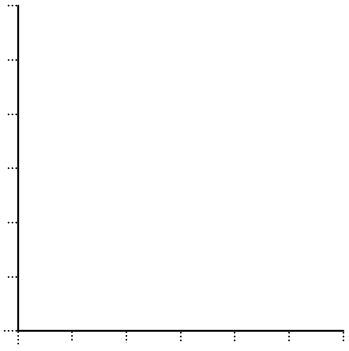
Whilst it is fairly easy to plot and draw a parabola on graph paper, it is not the only way to do it. You can draw an approximation of a parabola using perfectly straight lines (it just takes a lot of them).

Drawing Parabolas

You will need

Graph paper Ruler Pencil

What to do



The most famous way of doing this involves drawing a pair of axes like this. The scale of the axes will affect how the parabola forms. You might want to start with a scale of 1 unit per centimetre.

First, draw a line on the graph paper from the 6 on the vertical axis to the 1 on the horizontal axis.

Second, draw a line from the 5 on the vertical axis to the 2 on the horizontal axis.

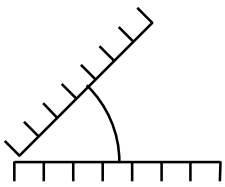
Continue joining up the numbers (6 to 1, 5 to 2, 4 to 3, 3 to 4, 2 to 5 and 1 to 6).

You end up with an *approximation* of a famous curve called a parabola.

With only 6 points, the curve is noticeable, but still looks like it is made of lots of straight lines. The more points - and more lines you use - the more pronounced it becomes.

Explore

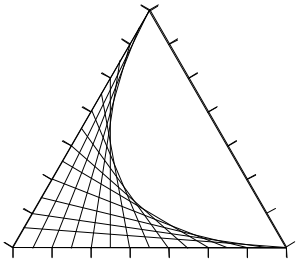
You can change what the curve looks like by altering the angle and length of the axes.



This parabola was drawn using axes set at 45°…

This parabola was drawn using axes set at different scales…

You can combine more than one set of axes. As long as the lines cross each other, you'll make a parabola.



In these examples, the length of the line that you draw changes - the line joining (0,1) and (6,0) is much longer than the line joining (3,4) and (4,3).

What do you think would happen if you created a set of parabolas, but using a set of axes like this?

13 cm

What do you think would happen if you created a curve in the same sort of way, but kept the lines joining the points the same length? The lines won't always end on a unit, but that's alright.