

Spotting the patterns!

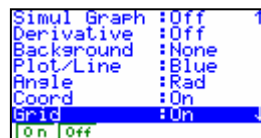
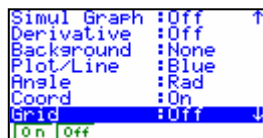
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Select GRAPH icon (press 5) from the main menu or by using the arrow keys to highlight and then press EXE.

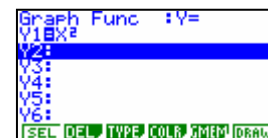


Turning a 2-D image into 3-D will have an awesome effect in enhancing the learning and understanding of graphing, along with the students having fun making them!

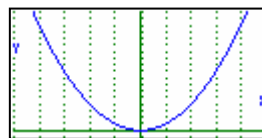
Once entered in the **Graph** icon, go into **SETUP** [SHIFT] [MENU]. Here you can alter a range of settings for the calculator, we want the 'Grid' ON. Scroll down to **Grid** being highlighted and then press [F1] then EXIT to return to the graph entry screen.



Enter the function $y = x^2$ into the Y1 space then press [EXE] to store this.



Set up the V-Window: [SHIFT] [F3] to the settings illustrated in the screensnap on the right. Then [EXIT] and [F6] to draw the graph.



OR

Enter in the **Table** icon from the **MAIN MENU**.



Go into [RANG]e, [F5] and set up the domain (x) values as shown in the screensnap as shown on the right.

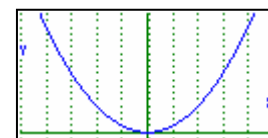


Then [EXIT] and [TABL]e [F6] to create the table of co-ordinates then [F5] to draw the graph of $y = x^2$.

X	Y1
-5	25
-4	16
-3	9
-2	4

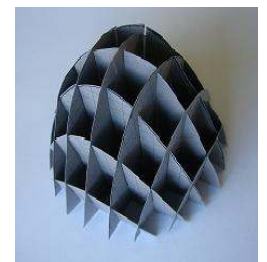
X	Y1
-1	1
0	0
1	1
4	16

X	Y1
2	4
3	9
4	16
5	25

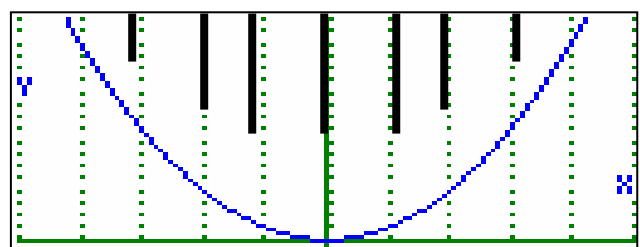


This is the template for making the parabolaoid.

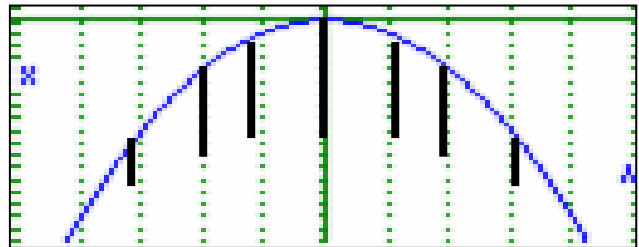
You need 14 of these made either by using the **CASIO FA122 or FA123** software to capture the graph and then copy 14 times into a word document and print or by making a template on some card and copying this. See the finished product on the right.



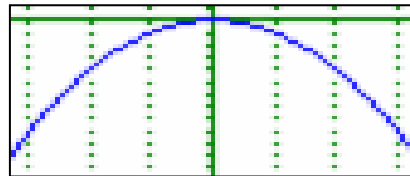
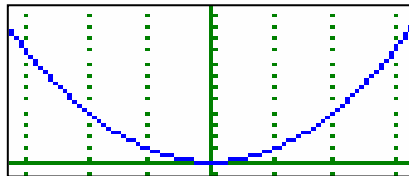
To create the 3-D effect using scissors and the grid lines as your guide cut slips about 1 mm wide to 1/2 way marks, as illustrated.



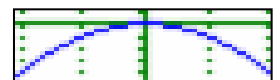
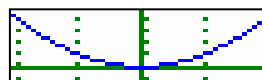
Repeat the same, as illustrated here.



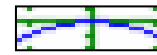
Now trim **four** of your templates to this size. Then using scissors and the grid lines as your guide cut slips about 1 mm wide to 1/2 way marks.



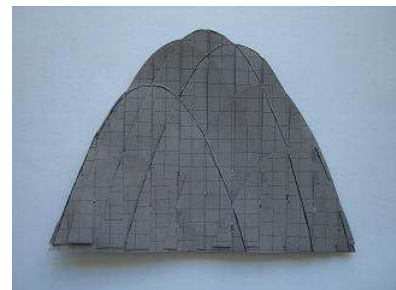
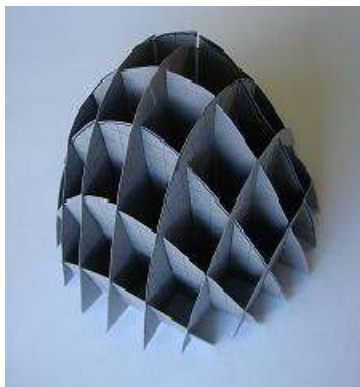
Trim another **four** of your templates to this size. Then using scissors and the grid lines as your guide cut slips about 1 mm wide to 1/2 way marks.



With the remaining **four** of your templates. Then using scissors and the grid lines as your guide cut slips about 1 mm wide to 1/2 way marks, as illustrated.



Now, fit them all together to make the 3-D parabolaloid. Once constructed it should flatten as shown below.



Questions:

What is the equation of the parabola that passes through the midpoints of the 4 template sizes that you have made?

[Hint: You only need 3 co-ordinate points to generate the equation via the STAT icon from the MAIN MENU.]

What is the volume that this shape holds when symmetric?

[Hint: Use integration and solids of revolution in the RUN icon from the MAIN MENU.]

What is the equation of the 3-D shape that would cover this shape?

[Hint: $z = f(x,y)$.]

