

Chapter 10 / **Example 14**

Find the area of a region bounded by curves

Find the area of the region between the curves $f(x) = x^3 - 3x^2 + 3x$ and $g(x) = x^2$.

Press **MENU** 5 **GRAPH** to display the equation entry screen.

Type $x^3 - 3x^2 + 3x$ and press **EXE** to enter the first equation as Y1.

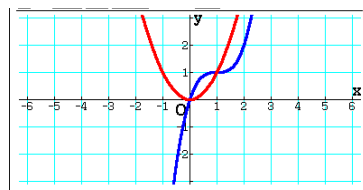
Type x^2 and press **EXE** to enter the second equation as Y2.

Graph Func : Y=
Y1: $x^3 - 3x^2 + 3x$ [—]
Y2: x^2 [—]
Y3: [—]
Y4: [—]
Y5: [—]
Y6: [—]
[SELECT] [DELETE] [TYPE] [TOOL] [MODIFY] [DRAW]

Press **F6** DRAW to display the graph screen

The GDC now displays the curves $Y1 = x^3 - 3x^2 + 3x$ and $Y2 = x^2$.

The default axes are $-6.3 \leq x \leq 6.3$ and $-3.1 \leq y \leq 3.1$.



To get a better idea of the best window to view the graph in, it is helpful to use a table of values.

Press **MENU** 7 **TABLE**. Press **F5** SET and change the settings so that the table starts from -2 and ends at 6.

Press **EXIT**.

Table Setting
X
Start: -2
End : 6
Step : 1

Press **F6** TABLE.

A table of values is displayed.

From the table, you can see that the graph can see which values of y you will need to use to display the curve.

X	Y1	Y2
0	0	0
1	1	1
2	2	4
3	9	9

3
[FORMULA] [DELETE] [ROW] [EDIT] [GPH-CON] [GPH-PLT]

Press **MENU** 5 **GRAPH**.

Press **SHIFT** **F3** V-WIN.

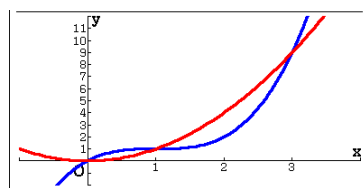
Set the axes to show $-1 \leq x \leq 4$ and $-2 \leq y \leq 12$

Set the scales to 1. Press **EXIT** when you have finished.

View Window
Xmin : -1
max : 4
scale: 1
dot : 0.01322751
Ymin : -2
max : 12
[INITIAL] [TRIG] [STANDARD] [V-MEM] [SQUARE]

Press **F6** DRAW to display the graph screen.

The GDC displays the curve $Y1 = x^3 - 3x^2 + 3x$ and $Y2 = x^2$ in a suitable window.



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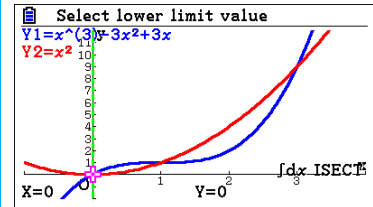
Find the area of a region bounded by curves

To find the area between the two curves

press **F5** G-SOLVE **F6** \triangleright **F3** $\int dx$ **F3** INTSECT

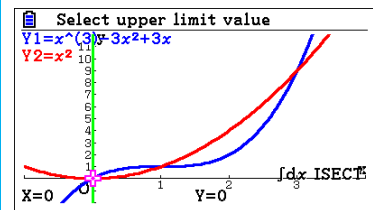
The GDC shows a cross and a line at the first intersection point and asks you to set the lower limit value.

Press **EXE**.

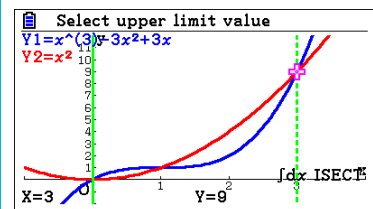


The GDC asks you to set the upper limit value.

Press **►** twice to move the cross and line to the third intersection point.



Press **EXE** when the third intersection point has been selected.



The GDC has calculated the area between the two curves.

The area is 3.0833 to 4dp.

