

Chapter 11 / Example 4

Finding a limit with a GDC

The region bounded by the graph of $f(x) = x^2 + 3$, the x-axis and the vertical lines $x = -1$ and $x = a$ with $a > -1$ has area equal to 12.
Find the value of a .

The definite integral is $\int_{-1}^a x^2 + 3 dx$

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

Press **OPTN** **F2** CALC **F3** $\int dx$

Type $x^2 + 3$, the limits -1 and X and press **EXE** to enter the equation as Y1.

Graph Func : Y=
Y1 $\int_{-1}^x x^2 + 3 dx$ [—]
Y2: [—]
Y3: [—]
Y4: [—]
Y5: [—]
[SELECT] [DELETE] [TYPE] [TOOL] [MODIFY] [DRAW]

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

Set the axes to show $0 \leq x \leq 4$ and $0 \leq y \leq 20$ with a scale of 5

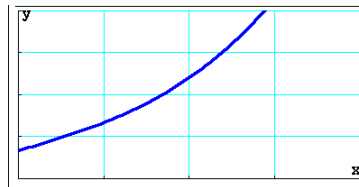
You can leave the other items as they are.

Press **EXIT** when you have finished.

View Window
Xmin : 0
max : 4
scale: 1
dot : 0.01058201
Ymin : 0
max : 20
[INITIAL] [TRIG] [STANDARD] [V-WIN] [SQUARE]

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

The GDC now displays the function $Y1 = \int_{-1}^x x^2 + 3 dx$.



To find the value of x for which the integral is equal to 12, press **EXIT** to display the equation entry screen.

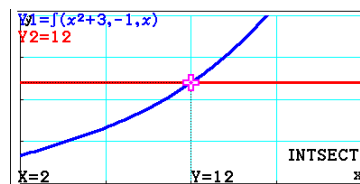
Type 12 and press **EXE** to enter the equation as Y2.

Graph Func : Y=
Y1 $\int_{-1}^x x^2 + 3 dx$ [—]
Y2 = 12 [—]
Y3: [—]
Y4: [—]
Y5: [—]
[SELECT] [DELETE] [TYPE] [TOOL] [MODIFY] [DRAW]

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

To find the intersection press **F5** G-Solv **F5** Intersect.

Press **EXE** to display the coordinates.



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Press **EXIT** to leave G-Solv mode and **F6** DRAW to display the graph screen again.

The GDC displays the intersection of the two straight lines at the point 2,12

$$a = 2$$

