

# Chapter 11 / Example 4

## Finding a limit with a GDC

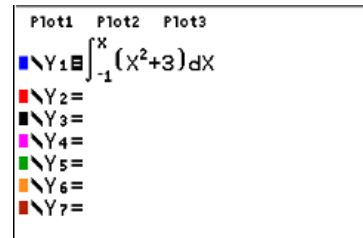
The region bounded by the graph of  $f(x) = x^2 + 3$ , the x-axis and the vertical lines  $x = -1$  and  $x = a$  with  $a > -1$  has area equal to 12.  
Find the value of  $a$ .

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

Press [F1] [Y=] to display the equation entry screen.

Press [ALPHA] [F2] 4:fnInt(.

Type the limits  $-1$  and  $x$ ,  $x^2 + 3$ , the variable  $x$  and press [ENTER] to enter the equation as  $Y_1$ .

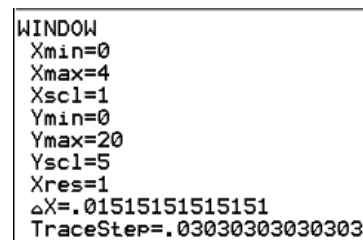


Press [F2] [WINDOW]

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

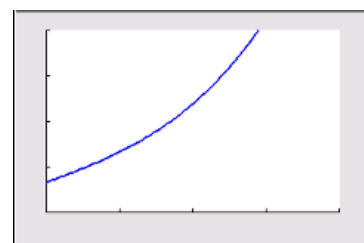
You can leave the other items as they are.

Press [F5] [GRAPH] when you have finished.



Press [F5] [GRAPH] to display the graph screen

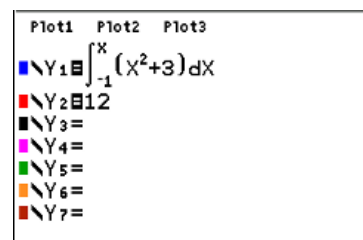
The GDC now displays the function  $Y_1 = \int_{-1}^x x^2 + 3 dx$



To find the value of  $x$  for which the integral is equal to 12 draw the line  $y = 12$  and find the point of intersection.

Press [F1] [Y=] to display the equation entry screen.

Type 12 and press [ENTER] to enter the equation as  $Y_2$ .

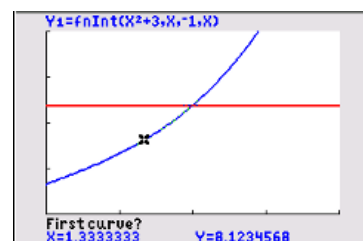


Press [F5] [GRAPH] to display the graph screen.

Press [2nd] [F4] [CALC] 5:intersect

To find the intersection you need to choose the two lines that intersect.

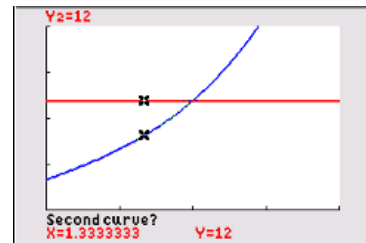
The GDC shows a cross on one of the lines and 'First curve?'. Choose  $Y_2$  and press [ENTER].



Chapter 11 / **Example 4****Finding a limit with a GDC**

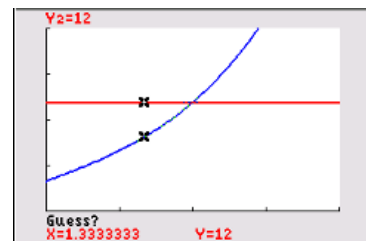
The GDC shows a cross on the other line and 'Second curve?'.

Press **ENTER**.



The GDC requires an initial guess for the position of the intersection. Choose the default position.

Press **ENTER**.



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

$$a = 2$$

