

Chapter 11 / **Example 3****Area between a curve and the x-axis**

Consider the area  $A$  of the region enclosed between the curve  $y = -x(x-3)$  and the  $x$ -axis.

- a** Write down the definite integral that represents this area  $A$ .  
**b** Find  $A$ .

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

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

Graph Func : Y=  
 $Y1 = -x(x-3)$   
 $Y2 :$   
 $Y3 :$   
 $Y4 :$   
 $Y5 :$   
 $Y6 :$   
**SELECT** **DELETE** **TYPE** **TOOL** **MODIFY** **DRAW**

Choose appropriate axes to show the graph.

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

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

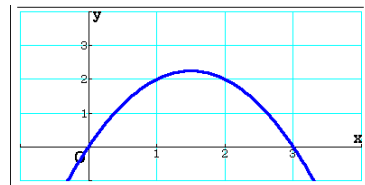
You can leave the other items as they are.

Press **EXIT** when you have finished.

View Window  
 Xmin : -1  
 max : 4  
 scale : 1  
 dot : 0.01322751  
 Ymin : -1  
 max : 4  
**INITIAL** **TRIG** **STANDARD** **V-MEM** **SQUARE**

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

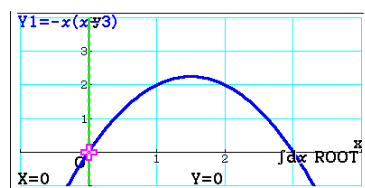
The GDC now displays the quadratic function  $Y1 = -x^2 + 3x$ .



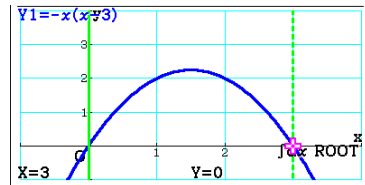
To find the zeros press **F5** G-SOLVE **F6**  $\triangleright$  **F3**  $\int dx$  **F2** ROOT.

The GDC shows the first zero at  $0,0$ . Press **EXE**.

The GDC asks you to find the upper limit.



Press **▶** to move to the next zero at  $3,0$ .



Press **EXE**.

The GDC shows the area defined by the integral and its value.

$$A = \int_0^3 -x^2 + 3x \, dx = 4.5$$

