

Ex. Find the maximum area for a rectangle whose perimeter is 10in.

1. Write the quantity to maximize/minimize as a function of one variable.

$P = 2L + 2W$	Subst. for L $A = LW$
$10 = 2L + 2W$	$A = (5 - W)W$
$10 - 2W = 2L$	$A = 5W - W^2$
$5 - W = L$	

2. Enter the function into the calculator using x for the variable.
From the home screen, press
Y=
Put the cursor on a blank function or delete what functions are there, and type
5 X - X X² where **X** is the X,T,θ,n key.
3. Set the viewing window. Use any information from the problem.
W has to be between 0 and 5 since it, L and the area have to be positive. Any number greater than 5 would cause L and the area to be negative.
Press **WINDOW 0 ENTER 5 ENTER**
4. Graph the function.
Press **GRAPH**.
5. If the graph disappears of the top or bottom of the screen, press **ZOOM 0:ZoomFit** (wait).
6. Have the calculator find the max/min.
Enter Max/Min mode.
Press **2nd CALC**.
If you want the max, as in this example, press **4:maximum**.
If you want the min, press **3:minimum**.
Set lower and upper bounds
A cursor appears at the center of the screen. Move it to the left of the max/min with the cursor keys.
Press **ENTER**. A triangle appears at the top of the screen.
A cursor reappears on the screen. Move it to the right of the max/min with the cursor keys.
Press **ENTER**. A triangle appears at the top of the screen.
Find the max/min.
A cursor appears in trace mode. Move it between the triangles.
Press **ENTER**.
7. The coordinates where the function is maximized/minimized will appear at the bottom of the screen.
For this example, "x=2.5000005 y=6.25".
8. Answer the question asked.
Since the max area was asked for, the answer is "The max area is 6.25in²."

Notes: In the above example, the value for x appears to have an approximation error. How could we find out if it is an error or not?

Make sure you answer the question asked. If the above question had been "What dimensions maximize the area?", the answer would have been "2.5in by 2.5in", the dimensions of a square.