

Finding Maximums and Minimums on a TI-89/92

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 enter the function.

5 x - x ^ 2 ENTER

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 **F2:Zoom A:ZoomFit.**

6. Have the calculator find the max/min.

TI-92 | Enter the math submenu.

| Press **F5:Math.**

| If you want the max, as in this example, press **4:Maximum.**

| If you want the min, press **3:Minimum.**

| Set the lower bound.

| Use **(cursor left)** to move the cursor to the left of the max, or type a value of x that is definitely to the left of the max and hit ENTER.

| Set the upper bound.

| Use **(cursor right)** to move the cursor to the right of the max, or type a value of x that is definitely to the right of the max and hit ENTER.

7. The coordinates where the function is maximized/minimized will appear at the bottom of the screen.

For this example, "xc=2.499999 yc=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 from the TI-85 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.

About the only way to get rid of the triangles on the TI-85 is to zoom out then zoom in. But, be careful. this can change the center of the graph.