

MAT 137Y: Calculus!
Problem Set 4 - Common errors

[Q1] By playing with the graph, it is easy to guess what the answers must be. However, you still need to justify that your answers are correct: you do not get credit for guessing.

In this question, many of you were aware of the answer you were looking for and tried to “force” it. Another way to describe this is to call it bluffing. For example, in Q1c you are looking for the condition “ $a > 2b$ ”, you do what you can, and then you pretend that the condition “ $a > 2b$ ” follows from it. Please do not do this. Never do this. It is dishonest, it has no place in math, and it is also very transparent. It is much better to write something like “Based on the graph I conjecture that the condition is $a > 2b$ but I have only been able to prove the following ...”

In particular, in Q1c, I do not think it is possible to solve the problem unless you arrive to explicit expressions for x^2 and y^2 in terms of a and b (these are equations (4) and (5) in the sample solutions). If you do not have both equations, it does not follow that we need $a > 2b$ to add the 4 new points. For example, many of you only had an expression for x^2 (equation (4) in the sample solution). From that condition alone you can only conclude that $a > 2b$ OR $a < b$.

Similarly, in Q1a many of you “cancelled out the x ”, effectively removing the solution $x = 0$ and later in the problem added the case $x = 0$ out of the blue, probably because you saw it in the graph. That is not a valid way to reason.

[Q2a] Always remember to justify your answers. In this question in particular, too many of you choose to write no explanations. I do not know why.

[Q2c] Use correct notation, please. If you are defining a set, use set building notation properly.

[Q2f] The difficulty of this problem is getting the right sign and justify it. The rest of the derivation is repeating exactly what you saw in Video 4.7, so it is not worth any points. All the credit goes to the correct sign and the correct justification for it.