MATH 121 HW 3 NOTES

The total was scored out of 12 (Q1=1, Q2=2, Q3=4, Q4=2, Q5=3) and the average was 10/12.

A few comments:

- For Q1, if you’re trying to find the mean value, you should comment that the functions are continuous (and thus integrable) so that the mean actually makes sense!

- For Q2, (a) is just FTOC, (b) uses chain rule and (c) uses product rule and chain rule. Some of you had some trouble with part (c).

- For Q3a, you NEED to treat the case $b = 1$ separately! Parts (b)-(f) were pretty well done for the most part. Of course there are always some computational errors...this is where the Webwork comes in. You will have to do these types of basic computations on exams, so make sure you’re comfortable with them.

- A lot of people had trouble with question 4. First, note that $f^2$ is continuous (since $f$ is) and so the integral makes sense. You really need to treat the case $a = b$ separately (then any value of $C$ minimizes $H$). And here it is not enough to just find where the derivative is equal to 0. You need to argue that this actually is the minimum. So you can use a whole slough of tools, but you should address it. Also, some people way overcomplicated this. I think it would benefit everyone to read the solutions to this one. I think only one of you actually discussed the case $b < a$ (I know we usually only consider $b \geq a$ but sometimes its useful to not restrict to this case). This earned $+1/2$ point bonus for their efforts.

- For Q5b, the case $C < 0$ really required a bit of care. You should argue that $M_i^C = |C|m_i$ and work from there. For part (c), the fact that $f$ and $g$ are integrable gives you two distinct partitions $P_1, P_2$ such that $U(f, P_1) - L(f, P - 1) < \epsilon/2$ and similarly for $g, P_2$. Then you should let $P = P_1 \cup P_2$ and proceed.