Colby

MA121B: Spring 2019
Homework 3

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Some thoughts and advice:

- You should expect to spend at least several hours on problem sets. A lot of practice problem-solving is essential to understand the material and skills covered in class. Be organised and do not leave problem sets until the last-minute. Instead, get a good start on the problems as soon as possible.
- When approaching a problem think about the following: *do you understand the words used to state the problem? what is the problem asking you to do? can you restate the problem in your own words? have you seen a similar problem worked out in class? is there a similar problem worked out in the textbook? what results/skills did you see in class that might be related to the problem?*

  If you are stuck for inspiration come to office hours, or send me an email. However, don't just ask for the solution - provide your thought process, the difficulties you are having, and ask a coherent question in complete English sentences.
- Form study groups - get together and work through problem sets. **This will make your life easier!** You must write your solutions *on your own* and *in your own words*.
- If you would like more practice then let me know.
- You **are not allowed** to use any additional resources. If you are concerned then please ask.

Do **not submit** solutions to the following problems. These are practice exercises that you should complete. They may appear as quiz problems.

1. 1, 3, 5, 7, ,9, 11, 12 from Section 1.7

Submit solutions to the following problems on **Wednesday, February 27th**.

1. 19, 20, 23, 24, 27, 31, 37, 38, 39, 41-44 in Section 1.7
2. Use the Intermediate Value Theorem to show that there is a number c with $1 \le c \le 2$ such that $f(c) = 0$ for $f(x) = x^4 + x - 3$. *[Remember to state why the IVT applies to this function.]*
3. Let $f(x) = \begin{cases} x^2 - 9, & x < 3, \\ x - 3, & 3 \le x \le 5, \\ 2, & x > 5 \end{cases}$.
   (a) Show that $f(x)$ is continuous at $x = 5$.
   (b) Show that $f(x)$ is continuous at $x = 3$.
   (c) Let c be any real number. Show that $f(x)$ is continuous at $x = c$. Deduce that $f(x)$ is continuous. (*Since you've already shown $f(x)$ is continuous at $x = 3$, you will have three additional cases to consider: (1) $c < 3$, (2) $3 < c < 5$, (3) $c > 5$.*)
4. 11, 12, 14, 15 in Section 2.2