MATH 210 Assignment 1

Jupyter Notebooks, Markdown Language, LaTeX and Basic Python

INSTRUCTIONS

⬦ Create a new Jupyter notebook and set the kernel to Python 3

⬦ Answer each question in the Jupyter notebook and clearly label the solutions in your notebook

⬦ There are 25 total points: each question is worth 3 points and 1 point will be awarded for the overall presentation of your notebook

⬦ Submit the `.ipynb` file to Connect by **11pm Friday January 15**

QUESTIONS

1. Make a list of your top five favourite cities that you've lived in, visited or would like to visit. For each city, provide a link to a webpage (for example, `vancouver.ca`) with more information and include a picture of (some part of) the city.

2. What is your favourite course that you've taken so far at UBC? Find the course in the UBC Student Services Centre Course Schedule

    https://courses.students.ubc.ca/cs/main?pname=welcome&tname=welcome

    Copy and paste the course description into your notebook, choose at least two important words in the description and make them **bold**.

3. Write LaTeX code to display the system of linear equations:

$$\begin{bmatrix} 5 & 2 & 1 \\ 3 & 7 & 5 \\ 2 & 0 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 3 \end{bmatrix}$$

4. Write LaTeX code to display the Maxwell-Faraday equation:

$$\oint_{\partial \Sigma} \mathbf{E} \cdot d\boldsymbol{\ell} = -\frac{d}{dt} \iint_{\Sigma} \mathbf{B} \cdot d\mathbf{S}$$

    (Hints: `\mathbf`, `\ell` and `\boldsymbol`)

5. Write LaTeX code to display the Black-Scholes equation:

$$\frac{\partial V}{\partial t} + \frac{1}{2}\sigma^2 S^2 \frac{\partial^2 V}{\partial S^2} + rS\frac{\partial V}{\partial S} - rV = 0$$

6. Choose a definition, equation or theorem from any of your math courses (past or present) which you find interesting. Write LaTeX code to display the definition, equation or theorem, write a short description of it and explain why you find it interesting. (The definition, equation or theorem should include several nontrivial mathematical symbols.)

7. (a) Compute $\sqrt{44^2 + 117^2}$

   (b) Compute the remainder of 93832549 divided by 838

   (c) Evaluate the comparison expression $1 + 2 + 2^2 + 2^3 + 2^4 + 2^5 + 2^6 < 124$

8. Determine (using only the modulo operator % and some reasoning) whether or not 167 is a prime number.