MTH100A - 20230807 - L01 - MON

NOTES

Opening Remarks:-

(i) ~~Transit~~ Transition from youth to adult -
take responsibility for decisions and actions, and the consequences thereof

(ii) Also, a transition from school to college/university, particularly in terms of learning.
In mathematics, there is now going to be an emphasis on rigour:-

(a) ~~definitions~~ terms are defined very precisely and definitions are adhered to strictly - often as general as possible.

(b) results and methods are ~~not~~ used only if they are well understood and their correctness has been strongly justified.

Opening Remarks - continued

- Another way to describe this difference - transition from "how" mathematics to "why" mathematics.

The standard term for a mathematical "justification of correctness is "proof". Proof has not been done much in school, and many students have a kind of fear about it. But doing proofs is well within your capabilities - it is necessary and important for you to overcome this fear.

Why is it particularly important for you? Because you are working with information, and what is key for you are algorithms.

What is an algorithm?

△ A finite sequence of valid steps to obtain a desired output (solution of a problem) from the given outputs.

And what is a proof?

△ A finite sequence of logical steps to obtain a TRUE statement from given or known TRUE statements.

These are not exactly the same, but very, very similar. That is why there is a very strong correlation b/w being strong in university mathematics and being strong in into engineering. Designing and validating new algorithms is essential for research & innovation.

(Atta slide 1)

For Slide 3:

Why LA in Sem 1 ?

A good course for the transition:-

(i) Involves a mixture of "how" and "why" – has some proofs but also a lot of ~~procedures~~ algorithms/procedures.

(ii) The course as a whole, and also the ~~proofs do not~~ proofs do not require much in the way of prior background –

- some knowledge of sets and set operations
- some knowledge of number systems: $\mathbb{Z}$, $\mathbb{Q}$ $\mathbb{R}$ and operations within them
- helps to have some practice with matrices and determinants

Slide 3 – continued

Why LA at all ?

(i) Mayank Story (AI)

(ii) Image Processing :– An image is nothing but a matrix. Screen consists of pixels –

typical resolution :–

~~colour → B/W → Grayscale~~

width x height (in pixels)

– 1024 x 768

or 1920 x 1080

Colour – Each pixel can have either 1 – bit = 2 colours

or 8 bits = 2^8 = 256 colours

or 24 bits = 2^{24} or 16.77 colours

(iii) Page Rank Algorithm.

→ NEXT – WASHINGTON ACCORD – OBE = Outcome Based Education