Virtues of CBT

Contextual Based Learning (CBT) has many virtues, knowing why we are learning how we are will help your studying and learning process.

You can see a video on this content here:

YouTube link: `https://www.youtube.com/watch?v=x37Ngx7n9RQ`

It usually surprises people to learn that most mathematicians have spectacularly terrible memories. In a setting where most of your "math" education is centered around endless memorizing of symbols and symbol manipulation, it may seem like you're suppose to memorize everything. In fact, this is the *exactly opposite* of how math should be learned.

In reality, memorizing something is very different than learning it. Often you start with memorizing, but think about this; if you were to see a word, let's say the word "toast", you know what that means. But, do you know what it means because you memorized it? Or do you know what it means because you've simply seen and used it so much that you "just know it"? Chances are, when you read that word you just sort of "knew" what it meant, and it might have even evoked an idea of tasty (or awful... if you're some kind of barbarian) breakfast food. In contrast, if you read the word "$\grave{\alpha}\pi o\pi\upsilon\rho i\alpha\varsigma$", chances are that not only would you not know that it's ancient greek for "toast", but you *would know* that it's not English. Is that because you've memorized every English word? Or have you memorized every Non-English word? That's pretty unlikely, rather you've probably *learned* how to recognize if something is English or not (such as the funky alphabet).

This is the fundamental difference between memorization and learning. If you learn something then it becomes "obvious" what contexts make sense for that thing, and what contexts don't. **Mathematics is the language of deductive reasoning**, and just like English, it should be obvious when what you've written makes sense and when it doesn't. Thus if you ever find yourself in the situation of writing something down because "that's what I'm suppose to do" and can't give any better justification, chances are that you've memorized something, but haven't learned it yet. This also means you should talk to your TA or myself in order to transition from "memorizing" to "learning" the concepts of this class. It will save you vast amounts of brain space and effort (after all, consider how many words you know, and how relatively little effort you have to spend to maintain that knowledge).

Question 1 *What is the point of CBT? (Select all that apply)*

Learning outcomes:

Select All Correct Answers:

(a) *To put content in context to improve retention.* ✓

(b) *To give a technique that is better for memorizing information.*

(c) *To aid in learning, rather than memorizing, information.* ✓

(d) *To help build intuition and understanding of content, allowing one to connect new content to already understood content.* ✓

Problem 2 *What is the difference between "bottom-up" and "top-down" approach to mathematics?*

Multiple Choice:

(a) *The bottom-up approach is only taught in grade school, but top-down is taught exclusively in college.*

(b) *The top-down approach is used in most disciplines, but is rare in mathematics.*

(c) *Bottom-up approach emphasizes techniques in an effort to have students understand the big picture by piecing techniques together.*

Top-down emphasizes the big picture, filling in techniques as needed; view techniques as tools rather than the goal. ✓

(d) *Top-down approach emphasizes techniques in an effort to have students understand the big picture by piecing techniques together.*

Bottom-up emphasizes the big picture, filling in techniques as needed; view techniques as tools rather than the goal.

Problem 3 *What is the difference between learning and memorizing?*

Multiple Choice:

(a) *Nothing.*

(b) *Memorizing information is better for longer term retention.*

(c) *Learning information is only useful in disciplines that lack percision or specifics, whereas memorizing is more useful in those percise or specific discipline.*

(d) *Learning something is understanding it in context;*

allowing you to retain an approximately accurate recall of the knowledge and flexibile application of that knowledge in a variety of circumstances.

Memorizing something aims for perfectly accurate recall of a piece of knowledge;

often at the expense of shorter retention duration and lack of ability to manipulate that knowledge in a variety of context. ✓