

Using a scientific calculator as useful tool for understanding the basic concepts of calculus and for development of investigative and critical thinking among engineering students

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Despite the wide use of electronic calculators in schools, colleges and universities, educators have yet to reach a consensus how best to use them. Some claim that calculators cause harm in math education, while others are indifferent to the problem, ignoring the possible benefits of calculator's use by the students. Only a relatively small group of teachers regards calculator's use favorably. This group not only treat calculator as computations tool but see and use its abilities for enhances conceptual understanding of calculus and development of investigative and critical thinking (so needed for engineering students) too.

Here we present some ideas, we have used in teaching calculus at our college, to incorporate calculator in the process of developing investigative and critical thinking of the students. Since most of our students use the fx-991ES PLUS CASIO device, we have used this calculator in all our examples too.

There are some questions to ponder that we ask our students and shall discuss here:

What is the computing speed of the calculator?

What are the internal algorithms used by it?

What are the limitations and possible mistakes made by it?

How can we verify the results of symbolic calculations?

How can the calculator compute the derivative of a function?

How can the calculator compute the definite integral of a function?

Is it possible for the student successfully compete with the calculator in mathematical computation competitions?

References:

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