

Track: Hands-on workshops

Abstract for 12725

Analytic geometry with Cabri 3D

Authors: Jean-Jacques Dahan

Affiliations: IREM of Toulouse

Keywords: Novice, Intermediate, Advanced, Undergraduate Level, K-12 Level Graduate Level, plane, line, circle, sphere, equation, experimentation, conjecture

We will show the tools which enable an analytic approach to the geometry of space with Cabri 3D. We will show that it is possible to better visually represent space with the help of equations in the same screen as the figure. The workshop will focus mainly on planes and lines and the algebraic possibilities opened by the equations of these objects.

Abstract for 12735

Introduction to Teaching with TI-Nspire CAS

Authors: Bernhard Kutzler

Affiliations: ACDCA - Austrian Center for Didactics of Computer Algebra

Keywords: Novice

Texas Instrument's new product TI-Nspire CAS carries the technology of the legendary TI-92 further into a new generation Math/CAS tool. Its innovative double-platform design (handheld + 100 % compatible computer software) and the seamless integration of the various components (computer algebra, graphing, dynamic geometry, geometry, spreadsheet, notes, data collection) make it a very powerful teaching and learning aid for teachers and students that is unique on the market and has great potential.

In this workshop participants will gently be introduced to the TI-Nspire CAS software and will learn how to use the product to perform algebraic computations, produce graphs, and generate a spreadsheet.

Abstract for 12748

Planning and creating an e-Activity on Poisson Process

Authors: Wei Ching Quek

Affiliations: Singapore Polytechnic

Keywords: Undergraduate Level, e-Activity

In this workshop, participants will use ClassPad Manager to create an e-Activity on Poisson Process. The issue of planning an effective e-Activity for learning Poisson Process will also be discussed.

Abstract for 12771

Motivating teachers and students to love statistics, using Autograph

Authors: Douglas Butler

Affiliations: iCT Training Centre (Oundle School), UK

Keywords: Intermediate, Statistics, Probability, raw data, grouped data, frequency density, discrete, continuous

The workshop will show Autograph's fantastic interface for interpreting data, and for taking the drudge out of learning statistics. You can easily explore difficult concepts, such as Frequency/Frequency Density (with non-uniform classes) and Discrete/Continuous variables. The important Central Limit Theorem will also be tested.

Abstract for 12772

Exploring Differential Equations and Vectors (2D/3D), using Autograph

Authors: Douglas Butler

Affiliations: iCT Training Centre (Oundle School), UK

Keywords: Intermediate, K-12 Level Graduate Level, Differential Equations, Slope Fields, 1st Order, 2nd Order, Vectors, 2D, 3D

Autograph uniquely allows ODEs to be entered implicitly, allowing a well structured approach to evolve from 1st order to 2nd order, including the idea of "complementary function" and "particular integral". Solution sets can be treated as dynamic objects. Vectors can likewise be taught from first principles in 2D, leading to a firm understanding of their use in 3D.

Abstract for 12790

Motion and "Magic" with Cabri 3D

Authors: Kate Mackrell

Affiliations: Cabrilog

Keywords: Novice

This workshop will introduce participants to creating a variety of different motions using Cabri 3D in order to model physical and mathematical structures and also to create amusing cartoons. Motion will range from direct motion, through motion by transformation, sinusoidal motion and motion generated by Lissajous curves. "Magic" is the means by which Boolean constructions enable objects to appear, disappear and exhibit different types of motion at different times. Some familiarity with Cabri 3D is desirable, but materials will also be provided for beginners.

Abstract for 12820

Learning about derivatives using a graphics calculator

Authors: Barry Kissane

Affiliations: Murdoch University

Keywords: Novice, Undergraduate Level, K-12 Level, calculus, calculators, teaching, learning

Graphics calculators offer a number of opportunities for introductory calculus students to explore significant concepts associated with derivatives. In this hands-on workshop, we will use the Casio fx-9860G graphics calculator to investigate some of these possibilities and to consider their implications for teaching and learning calculus and the curriculum in early calculus. It will be suggested that the development of the concepts is of key importance and should precede extensive work with symbolic manipulation. Previous experience with this calculator will not be assumed.

Abstract for 12826

Beyond graphing: Exploring matrices, sequences and series with a graphics calculator

Authors: Barry Kissane

Affiliations: Murdoch University

Keywords: Novice, Undergraduate Level, K-12 Level, matrices, sequences, series

Inexperienced users of graphics calculators frequently expect that their main advantage involves drawing and using graphs of functions. In contrast, this is a hands-on workshop to explore some of the ways in which a graphics calculator might support teaching and learning matrices, sequences and series, but with only limited emphasis on graphical representations. We will use the Casio fx-9860G graphics calculator to consider the ways in which sequences and matrices are represented on the calculator and can be manipulated to support mathematical thinking. No previous experience with this calculator will be assumed.

Abstract for 12860

Learning Algebra the Creative and Magical Way

Authors: Poh Yew Teoh

Affiliations: Creative Wizard Pte. Ltd., Malaysian Invention and Design Society, Malaysian Association of Professional Speakers

Keywords: , algebra, mathematical magic, card tricks, creativity

Algebra seems to be a subject that some students find it trivial but most find it difficult. In order to pursue mathematics to a higher level, students must certainly learn to use algebra, but perhaps first and foremost they should learn to see it, to discover it, to play with it and to be surprised by it. Since our students seldom see any application of algebra in their daily life, we, mathematic educators can develop their interest in algebra by adopting some creative approach such as mesmerizing them with mathematical magic. Many students have difficulty making the transition from arithmetic to algebra. Often this difficulty first appears when students attempt to create algebraic equations to represent word problems. In this workshop the participants will discover several amazing

mathematical magic using Flash and card tricks that can be explained by translating the magical phenomena into algebraic terms or equations. To further enhance the algebraic concept learnt, mathematics educators will see some examples as how we can prompt students to invent their own magic or to improve on the existing magic. Mathematical Content Covered: "Translating magical phenomena into algebraic terms or equations", "Simplifying algebraic expression", "Expansion and factorization", "Quadratic equations"

Target audience: Upper primary and lower secondary schools mathematics teachers as well as teacher trainers

Abstract for 12888

Enhancing Mathematics Teaching Through New Technology

Authors: Wee Leng Ng

Affiliations: National Institute of Education, Nanyang Technological University

Keywords: enhance teaching, undergraduate level, TI-Nspire

Handheld graphing technology, if used appropriately in the mathematics classroom, has the potential to enhance teaching and learning of mathematics by empowering students to learn across different visual representations of a mathematical problem. With the aid of such technology, teachers have the means to help students develop a deeper understanding of mathematical concepts, broaden their critical thinking skills and discover meaningful real-world connections.

In this workshop, participants will explore ways to enhance teaching of mathematics through the new TI-Nspire Technology.

Abstract for 12909

Problems that can not be solved without a graphing calculator in high school and upper level

Authors: Fatih YILDIZ, Ahmet Arduc

Affiliations: Mersa Electronical & Technological Products Co; Fatih Colleges Science Schools Math Teacher.

Keywords: Novice, Intermediate, Undergraduate Level, K-12 Level, ClassPad 300, Casio, Comprehensive teaching, Graphics calculators, new methods of teaching, new curriculum, easy learning, visual and easy mathematics.

The use and definite advantages of graphing calculators are already well known and no need to count their benefits. But there are still too many teachers that do not believe in the necessity of graphing calculators that they are almost compulsory to be used. Even in the developed countries, there are still so many schools that do not use any graphing calculators. Most of them have been using without a graphing calculator. Our goal is to prove with many examples faced in many problems in high school and upper math range, that these problems can not be solved and understood without a graphing capable tool.

Abstract for 12918

Graphic Calculator Activities for Malaysia Additional Mathematics

Authors: Mun Chou Fong

Affiliations: QED Education Scientific

Keywords: graphic calculator, activity, secondary mathematics

This author has the privilege to work with the Curriculum Development Centre of Ministry of Education in various graphic calculator workshops. The activities contained in the workshop are selected ideas and proposals presented by secondary teachers during these workshops for the past 5 years. The intention is to share with participants, classroom activities on algebra and statistics components as described in the Additional Mathematics, an elective subject designed to meet the need of students who are likely to pursue careers in science and technology. The workshop would be conducted in interactive manner as it progresses, and the author would hope to receive fresh ideas with regards to these activities.

Abstract for 12932

It is not just about the proof.

Authors: Anthony Harradine

Affiliations: Baker Centre, Prince Alfred College

Keywords: fun, problems, exploration, conjectures, Casio ClassPad, High School, University

In this workshop we will work together on a beautiful geometry problem. Our progress in understanding the problem will be helped by the use of interactive geometry software (the Casio ClassPad 300 Plus in this case). The problem is suitable for investigation by students in upper high school or first year of university. The workshop leader will conclude by arguing that the reason for sharing problems with students is about "much more" than just being able to write a proof. You will experience the "much more".

Abstract for 12933

Children doing mathematics like mathematicians?

Authors: Anthony Harradine

Affiliations: Baker Centre, Prince Alfred College

Keywords: Fun, Problem Solving, Working like a mathematician, Casio ClassPad, High School, 1st Year University

The humble quadratic function is something we all learn about in school. In this workshop you will work together on a problem that will engage your thinking and help you to see how we can use normal high school mathematics to have students behaving in a very similar way to mathematicians. To assist us in our thinking we will use the graphing abilities and CAS abilities of the Casio ClassPad 300 Plus, but in the end it is the mathematics that allows us to complete the task.

Abstract for 12940

Transformations via Cabri Jr and Transformation Graphing Applications

Authors: Judy O'Neal

Affiliations: North Georgia College & State University

Keywords: Novice, Intermediate, Undergraduate Level, K-12 Level, Pre-service and in-service teachers

When computer lab space is limited or unavailable, an alternative to Cabri or The Geometer's Sketchpad is needed to help pre-service and in-service teachers develop conceptual understanding of basic geometric concepts. Cabri Jr and Transformation Graphing Apps provide dynamic learning environments on the TI-84 Plus that students can hold in their hands wherever they are located while simultaneously facilitating increased guided discovery opportunities. This workshop will engage participants in a hands-on introduction to the capabilities of Cabri Jr and Transformation Graphing Apps and will incorporate engaging activities appropriate for investigating and assessing varied geometric concepts. Opportunities for participants to gain basic proficiency with the applications and to discuss their reactions will be provided. Calculators will be supplied for participant use.

Abstract for 12946

Probability and Statistics using the TI-84

Authors: Connie Schrock

Affiliations: Emporia State University, National Council of

Students need to be able to experiment with real data in order to learn the power of statistics as well as experience multiple ways to apply probability. The TI-84 is an effective tool to help students and teachers in the classroom. This workshop will engage participants in a hands-on use of the Probability Apps and the statistical applications that are preloaded on all TI-84 calculators. Participants will be able to participate in motivating activities appropriate for investigating and assessing data concepts. Many times teachers bypass real data or creating their own data in order to faster access material. Using technology allows teachers and students to quickly interpret and apply mathematics to make decisions. Participants will be encouraged to discuss the applications while becoming proficient with these applications. Calculators will be supplied.

Abstract for 12973

Using a Spreadsheet Tool to Understand Mathematical Functions

Authors: Brenda Lee

Affiliations: Wu Feng Institute of Technology

Keywords: Undergraduate Level, K-12 Level, Function, Spreadsheet

This workshop is organized as a hands-on seminar. In addition to PowerPoint presentation and demonstration of sample problems, the participants will be expected to play with their calculators and simulate the lecturer's procedures. During the workshop, the usage of CASIO ClassPad 300 Spreadsheet Tool will be demonstrated. It will be shown that its calculation power is sufficient for understanding mathematical functions and how functions can help us better understand our environment and our daily life.

Abstract for 12974

Using Calculator to Find Your Own Algebraic DNA

Authors: Brenda Lee

Affiliations: Wu Feng Institute of Technology

Keywords: K-12 Level, Algebra, Individualized activity

An instructional module has been created to help students learn different topics in mathematics. This module is based on each person's name to arouse interest in learning mathematics. It involves mathematical concepts such as number sense, algebraic thinking, geometry, and statistical reasoning, as well as other subjects such as art and logo design. It helps to solve typical problems of high-school and college science, mathematics, statistics and other courses. With its abundant contents we can provide our students the basic mathematical knowledge needed for further study in their own fields. In this workshop, using this module with the help of calculator, solving complex algebraic expressions can be quickly done with CAS. We will show how our students find their own individualized algebraic DNA and to appreciate that making mathematics is simple, attractive, realistic and personalized. The participants will be expected to play with their calculators and find their own individualized algebraic expressions.

Abstract for 13008

e-Activities at Work

Authors: Poh Tze Thiam Paul

Affiliations: Casio Singapore, Mathlodge, The Little Sheep Pte Ltd

Keywords:

This workshop aims to share with the participants how to create an e-Activity on the graphing calculator Casio fx-9860G/SD/Slim. All the mathematical functions available in the fx-9860 G/SD/Slim graphing calculator can be integrated easily into the e-Activities, hence make the e-Activity a versatile and useful tool for learning. In particular, graphing calculators are generally accepted in secondary school and junior college mathematics classrooms and with the built-in e-Activity, they also provide a cheaper and portable alternatives to computers. Participants will have hands-on experiences in creating an e-Activity during the workshop and no

prior knowledge of the graphing calculator is required. More explorations on the use of e-Activities for teaching and learning will also be demonstrated.

Abstract for 13013

Scientific Calculators in the Primary School

Authors: Yee Ping Soon

Affiliations: Mathlodge (Singapore)

Keywords: Novice

Recently the Ministry of Education (Singapore) announced the use of scientific calculator at the Primary School Leaving Examinations in the year 2009. This workshop aims to demonstrate a series of activities on the use of the scientific calculator which the facilitator has shared among the Singapore Mathematics teachers. Participants will have opportunities to have hands-on experiences. These activities will reflect the use of the scientific calculator as a teaching and learning, problem-solving and project tool.