Graphical Times.
Volume 18, Issue 65, 2018.

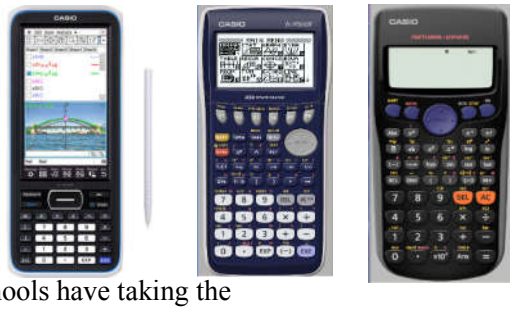
Welcome back to the new school year, term 1, 2018! It's been an awesome Summer, enjoying what daytime lengthening and nights shortening brings with it. We hope that you have had a restful break and recharged for the new academic year.

What's in here!

Included in this terms newsletter are calculator activities for the Classpad, graphic and scientific calculators:

- **Worksheet for the Classpad and similar models: Simultaneous Equations**
- **Worksheet for the FX9750GII and similar models: Peano Axioms and Programming**
- **Worksheet for the FX82AU+II and similar models: Combinations**
- **Term 1 Back to school pricing and the remainder of term 1, 2018 pricing.**
  [Please note that BTS pricing is valid until 28/2/2018.]

Workshop opportunities



Workshop opportunities: If you would like to have a workshop for teachers and or students then please contact with ***Graphic Technologies***. A large number of schools are taking up this opportunity either singularly or as a cluster of schools (with both the graphic calculator and the ClassPad), to look at how the graphic calculator and CAS could impact on and be integrated into classroom practice.
With NZQA acknowledging that Year 11, 12 & 13 students without the use of a graphical calculator are being disadvantaged. A large number of schools have taking the opportunity to upskill teachers and students in using these mathematics/statistics hand-held and emulator classroom technologies.

Worksheets downloaded off the web

Visit Monaco Corporation and Graphic Technologies websites to view and download worksheets and activities or past newsletters. There are links to other mathematics education websites too! For teachers we currently offer a large number of 'classroom ready' resources available and are designed primarily for the FX82AU, FX82AU+II, FX9750GII, FX9750G, FX9750G+, CFX9850GB, CFX9850GB+, CFX9850GC+, FX9750GA, FX9750GA+ and FX9750GII and the ClassPad300, 300+, 330A, 330A+ and the fx-CP400 series. More have been added to the website since the last newsletter. **Please visit:** www.casio.edu.monacocorp.co.nz and http://graphic-technologies.co.nz

Program to support the use of the FX82AU+II and FX9750GII

A reminder of the Casio Education NZ Top Schools Program which supports schools using the FX82AU+II and FX9750GII calculators. The goal for the programme is to have all senior students in New Zealand using a graphics calculator, so that no one is disadvantaged during NCEA examinations. Professional development courses are offered in conjunction with Graphic Technologies in supporting this initiative. Register now for 2018, if you have not already done so. Further details of the program can be uploaded from: www.casio.edu.monacocorp.co.nz

Mathematics and Statistics faculty circulation [Pass it on to . . .]

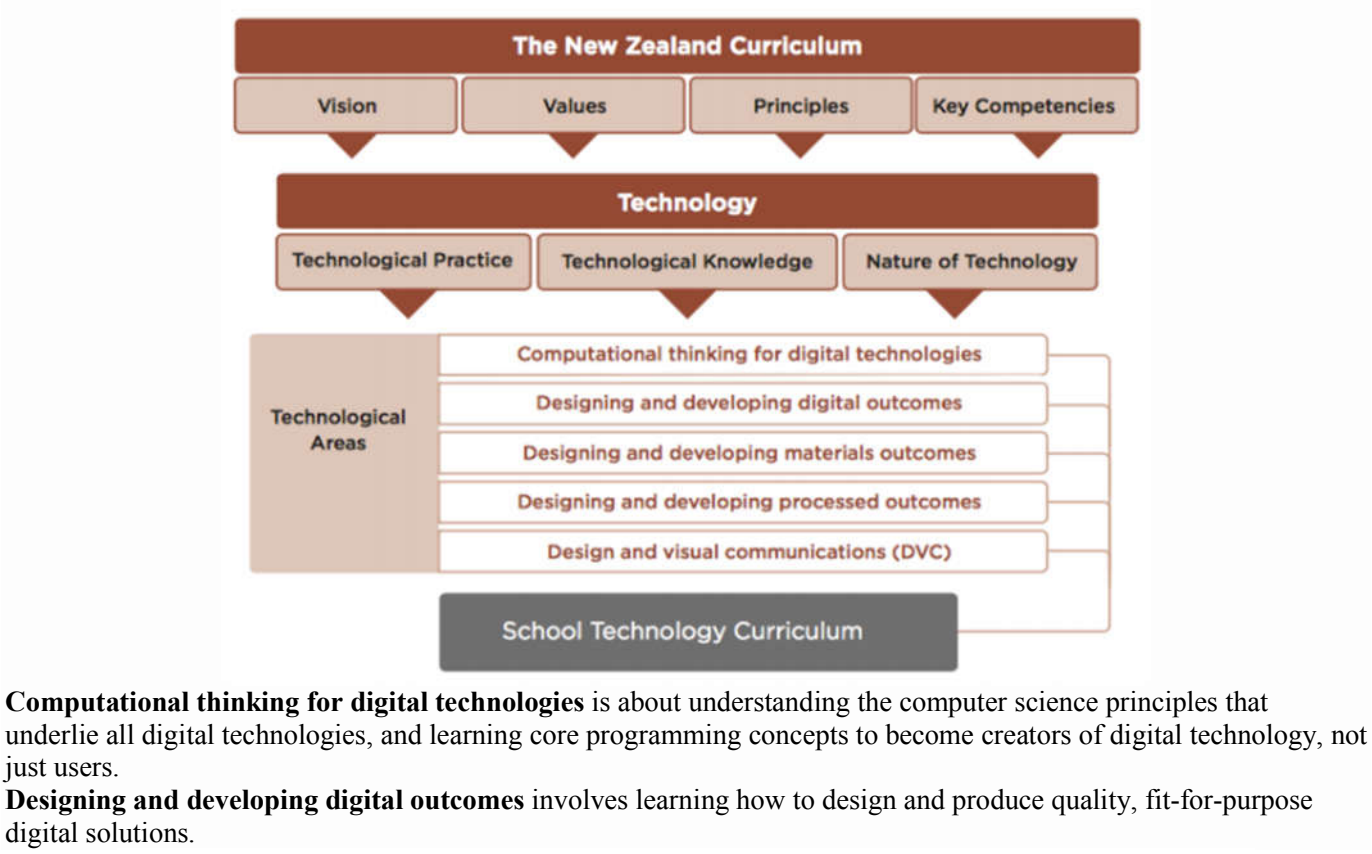
	→		→		→		→		→		→
	→		→		→		→		→		→

Classpad updates

The ClassPad II [fx-CP400] features a much larger, backlit screen than the previous models, while keeping the same functionality. Major differences for this handheld are the 3D graphing and applications have been replaced by E-Con EA200 for data logging. Connectivity is much easier, and the ClassPad II acts as a USB drive when plugged into a PC. **eActivities** are a great way to store procedures, activities and worksheets. These can be downloaded and sent to the handheld model using the USB cable (SB-67). Programs can be written and downloaded to extend the functionality of the ClassPad II. eActivities, files and programmes can also be transferred from calculator to calculator using the SB-62 cable. Online User manuals: http://support.casio.com/manualfile.php?rgn=5&cid=004002012
Visit: http://www.classpad.com.au/index.html

The new Technology Curriculum Strand (Optional from 2018, compulsory from 2020)

http://nzcurriculum.tki.org.nz/Curriculum-resources/Digital-Technologies-Hangarau-Matihiko



Computational thinking for digital technologies is about understanding the computer science principles that underlie all digital technologies, and learning core programming concepts to become creators of digital technology, not just users.
Designing and developing digital outcomes involves learning how to design and produce quality, fit-for-purpose digital solutions.

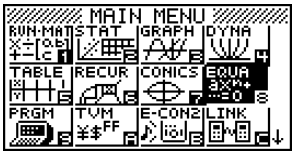
The first two of the five technological areas focus on developing students' capability to create digital technologies for specific purposes.
In years 1–8, these two areas are usually implemented within other curriculum learning areas, integrating technology outcomes with the learning area outcomes. By the end of year 10, students' digital technological knowledge and skills

enable them to follow a predetermined process to design, develop, store, test and evaluate digital content to address a given issue. They can independently decompose a computational problem into an algorithm that they use to create a program incorporating inputs, outputs, sequences, selections and iterations.
By the end of year 13, students who have specialised in digital technologies will design and develop fit-for-purpose digital outcomes, drawing on their knowledge of a range of digital applications and systems and taking into account a synthesis of social, ethical and end-user considerations. They use accepted software engineering methodologies to design, develop, document and test complex computer programs. [Abridged.]

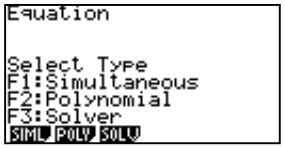
Useful websites for DT & HM

http://education.govt.nz/ministry-of-education/specific-initiatives/equipping-students-with-skills-for-digital-technologies-and-hangarau-matihiko-learning/
http://nzcurriculum.tki.org.nz/content/download/167461/1235900/file/Technology%20in%20the%20New%20Zealand%20Curriculum%202017.pdf
http://nzdigitalcurriculum.weebly.com/
http://technology.tki.org.nz/Technology-in-the-NZC/Strengthening-digital-technologies
https://educationonair.withgoogle.com/live/2016-dec/watch/keynote-au/keynote-7
https://edu.google.com/resources/programs/exploring-computational-thinking/
http://barefootcas.org.uk/
http://csunplugged.org/
https://computationalthinkingcourse.withgoogle.com/course
http://nzdigitalcurriculum.weebly.com/computational-thinking.html
https://education.govt.nz/assets/Documents/Ministry/consultations/DT-consultation/DTHM-Curriculum-Factsheet-for-Industry-2017.pdf
https://education.govt.nz/assets/Documents/Ministry/consultations/DT-consultation/DTHM-Curriculum-Factsheet-for-Parents-2017.pdf
https://education.govt.nz/assets/Documents/Ministry/consultations/DT-consultation/DTHM-Curriculum-Factsheet-for-Students-2017.pdf
https://education.govt.nz/assets/Documents/Ministry/consultations/DT-consultation/DTHM-Curriculum-Factsheet-for-Teachers-2017.pdf

FX9750ii – Use of the 'Solver' feature in EQUAtion Mode



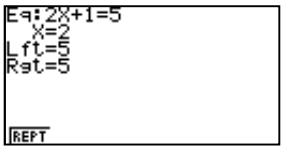
Select **EQUA** mode from the **MAIN MENU** by using the arrow keys to highlight the EQUA icon or pressing 8.
N.B. Any algebraic or trigonometric equation can be solved in this area of the calculator. Make sure that you are in the correct setting, e.g. degrees or radians for trigonometry. Only one solution is found, hence multiple solutions to equations should be solved in the **GRAPH**ing icon from the **MAIN MENU. This is because all graphic calculators use the Newton-Raphson method to find solutions to equations.** The CASIO FX9750Gii uses an enhanced version of the Newton-Raphson method so that the process is faster at finding the solution.



F3 for **SOLV**er

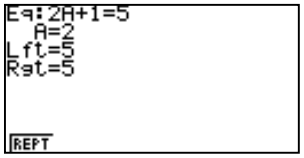
Enter in the equation here.

Example:
Solve 2x + 1 = 5
Enter the equation, then…



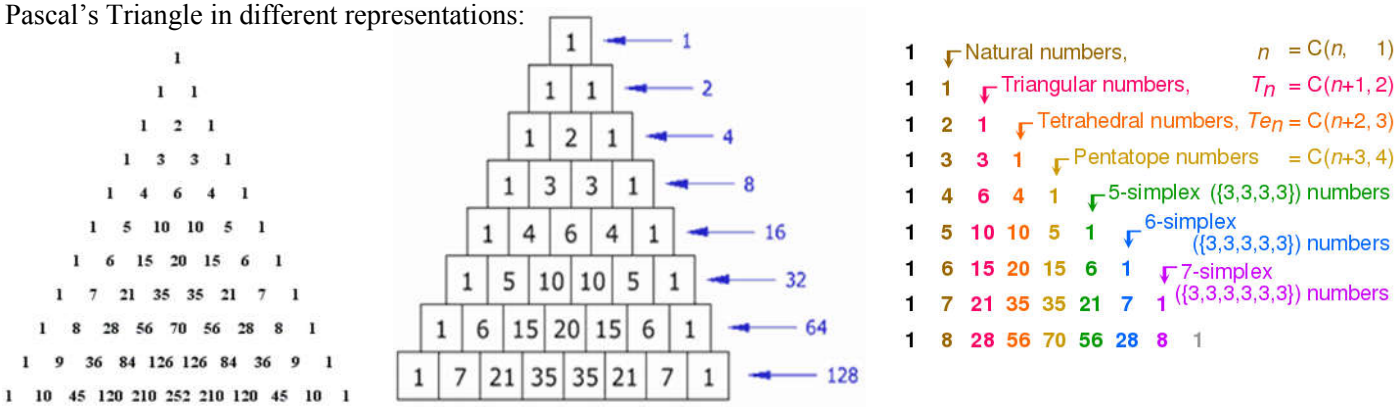
press [**EXE**] to store followed by [**F6**] to solve the equation.

You are able to use any letter of the alphabet [A~Z and θ and τ) as the 'dummy' variable in the equation. The example below uses 'A' as the variable: 2A + 1 = 5 is shown.



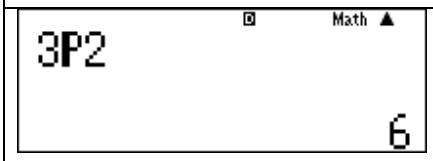
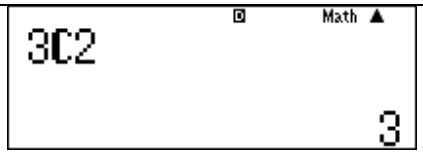
FX82AU+II – ^nC_r and ^nP_r

Pascal's Triangle in different representations:



https://en.wikipedia.org/wiki/Pascal%27s_triangle

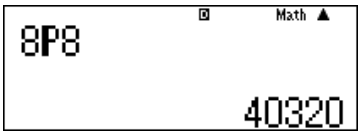
To access ^nP_r and ^nC_r is via [**SHIFT**] then [×] for 'nPr' and [÷] for 'nCr'.
For permutations (^nP_r), the order of selection **is** important, **but** for combinations (^nC_r) the order **is not** important.

Example 1:	**Example 2:**
From 3 'pick' 2, let the 3 items be, A, B and C. So, possible permutations are AB, AC, BA, BC, C and CB. There are six different possibilities.	From 3 'choose' 2, let the 3 items be, A, B and C. So, possible combinations are AB, AC and BC. There are three different possibilities.
	
$^3P_2 = 6$	$^3C_2 = 3$

Example: How many arrangements are there of 8 people standing in a line?

Positions:	1st	2nd	3rd	4th	5th	6th	7th	8th
	___	___	___	___	___	___	___	___
	8 ways	7 ways	6 ways	5 ways	4 ways	3 ways	2 ways	1 way

Answer: $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 8!$
or $^8P_8 = 40320$



Example: How many ways can we choose a committee of 7 people from a group of 11 women and 8 men if there have to be 3 men and 4 women on the committee?

Answer: $^{11}C_4$ = number of combinations of women.
$^8C_3$ = number of combinations of women.
Total number of ways of getting this committee is: $^{11}C_4 \times {}^8C_3 = 18480$

A last word!

Well again, that's all I can fit onto the 4 pages! Enjoy term 1! Hope to see you at some workshops or hear from you! If you would like to contribute or have suggestions as to what you would like to have discussed via this medium, please do not hesitate to contact us either by snail-mail, email, website, telephone, text or fax.

Derek Smith
Graphic Technologies
73 Viewmont Drive
Lower Hutt 5010

Phone: 04 569 1686
Fax: 04 569 1687
Mobile: 027 460 2871
Website: http://graphic-technologies.co.nz
Email: graph.tech@xtra.co.nz