Graphical Times.
Volume 16, Issue 59, 2016.

Welcome back to term 3! We hope that the July break has given you the opportunity to be a restful one.

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: Mobile geometrical art**
- **Worksheet for the FX9750GII and similar models: Creating pictures using piecewise graphs**
- **Worksheet for the FX82AU+II and similar models: Patterning**
- **Term 3 pricing: Valid until the end of Term 3, 2016.**

Workshop opportunities.

Workshop opportunities: If you would like to have a workshop for teachers and or students then please make 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 12 & 13 students without the use of a graphical calculator are being disadvantaged, a large number of schools have taking up the opportunity to up skilling 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 CASIO® FX82AU, FX82AU+ii, FX9750Gii, FX9750G, FX9750G+, CFX9850GB, CFX9850GB+, CFX9850GC+, FX9750GA, FX9750GA+ and FX9750Gii and the ClassPad300, 300+, 330A, 330A+ and fx-CP400series. 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' supporting schools using the FX82AUplus II scientific and FX9750GII graphic calculators. The goal of 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 for 2017, if you have not already done so. **Details of the program can be uploaded from:** www.casio.edu.monacocorp.co.nz

Classpad update.

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 presentation 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

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

	→		→		→		→		→		→
	→		→		→		→		→		→

into a PC. **eActivities** are a great way to store procedures. These can be downloaded and sent to the handheld model using the USB cabling (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 cabling. Visit: http://www.classpad.com.au/index.html

Graphic Technologies Special Promotions for Term 3, 2016.

Some pricing specials, valid until the end of June, 2016.

Product	Price per unit (excl GST)
FX991ES plus emulator software single licence	$45.00
FX82A+II emulator software single licence	$45.00
FA-124USB cable [high-speed data communication between PC and the FX9750GII] USB connectivity for file sharing. For every order of 10 FX9750Gii purchased during term 3, 2016, you will receive one free FA-124USB cable. Buy 10 FX9750GII get 1 FA-124USB, buy 20 FX9750GII get 2 FA-124USB, etc	$10.00

Information on installing the software to utilise the FA-124USB can be viewed here: https://edu.casio.com/education/support_software/dl/PC_links/FA-124_E.pdf

Terms 2 &3 2016 - Casio XJM242 Data Projector Promotion.

The winning school is [YOUR SCHOOL NAME COULD BE HERE] and will be receiving this prize in October, 2016. One to give away to schools who purchase products totalling $200 (excl GST) or more.

Features include:

• ecologically sound and energy saving
• a mercury-free light source
• $2 \times$ optical zoom
• Lamp-free technology with up to 20,000 hours continuous performance
• WLAN capability
• USB 2.0 for FX9750Gii graphic calculator can be connected directly into the projector [XJA145]
• USB data files can be connected directly into the projector
• is the size of a ream of A4 paper!

For terms 2 and 3, 2016 promotion, orders of $200 (excl GST) or more received between 2nd May and 1st October, 2016, will go into the draw for winning a XJM242, 2500 ansi lumen, wide screen data projector.
See http://www.casio-projectors.eu/euro/products/xjm240/ for more technical details. See term 3's pricing list for more products and specials.

FX82AU+II Activities - Waiting time investigation

On average, how long do customers wait in your school cafeteria queue before they have completed their purchases, or in a bank or the supermarket queue?
To make sure your results are statistically worthy, it is important to choose a random sample of customers to time.

You also need access to a clock, stopwatch or wrist watch to measure the time
in minutes and seconds for each customer observed and your Casio fx82AU+II calculator.
In groups of 3 assign each student to the roles of timer, recorder or customer selector.
The 'customer selector' uses the calculator's random number generator to choose the
customers who will be observed.
The 'timer' measures the time from when the selected customer joins the queue until their
transaction has been completed.
The recorder record the time for at least 30 randomly selected customers.
Set the calculator to statistics by pressing [**MODE**] then [**2**] (for **STAT**) then **[1]** for 1VAR.
Use the [° ' "] button to enter the waiting times in minutes and seconds, for example, to
enter 2 minutes and 35 seconds press [**2**] [° ' "] [**35**] [° ' "] [**=**]and the calculator will
display the amount automatically as 2.5833 minutes.
After you have entered all the times into the statistics list on the calculator, press [**AC**].
Then press **SHIFT** then **1** (for **STAT Options 1~5**).
Calculating the summary statistics.
The screen options show that pressing [**4**] (**Options 1~5**) will give the mean. Press [**5**] (for
Options 1~5).then to find other summary statistics of the times. The calculator will show the
times as a decimal.
Press [° ' "] to show the time in minutes and seconds.
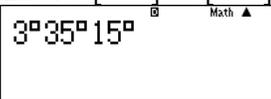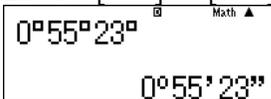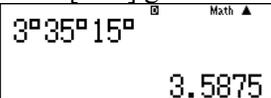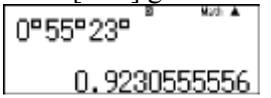Compare the results from different student groups in the class. Are they the same?
If they are different suggest a reason for the differences.
Compare the results of other summary statistics, are they similar or different? Why?
Use the information to determine whether customers have waited too long. If the times are too long, can you suggest a
way to shorten the time? Who would be interested in your statistical results for this investigation?
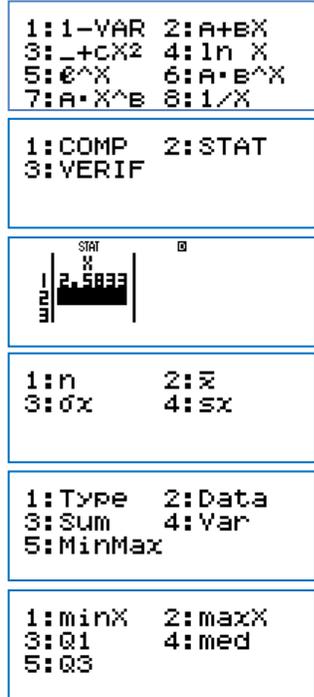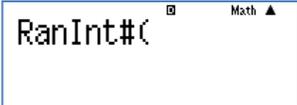
Conversions examples from ° ' " to a decimal.

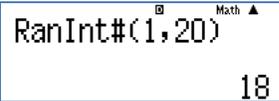| Example 1:	Example 2:
Convert 3 hours 35 minutes 15 seconds to a decimal number.	Convert 55 minutes 23 seconds to a decimal number.
Enter 3 [° ' "] 35 [° ' "] 15 [° ' "] then [=]. `3°35°15°`	Enter 0 [° ' "] 55 [° ' "] 23 [° ' "] then [=]. `0°55°23°` `0°55'23"`
Press [° ' "] gives: `3°35°15°` `3.5875`	Press [° ' "] gives: `0°55°23°` `0.9230555556`
Answer: 3° 35' 15" = 3.5875 hours.	**Answer:** 0° 55' 23" = 0.9230555556 hours.

Using the [Ran#] and [RanInt] key.
[Ran#] generates a random number from 0.000 to 0.999, that is, 1000 distinct random numbers.
**[RanInt]** generates random integers between a lower bound and an upper bound number specified by the user.
Both **[Ran#]** and **[RanInt]** are accessed through the [**.**] key. **[Ran#]** is in yellow and is accessed by pressing
[**SHIFT**] [**.**] and **[RanInt]** is in red and is accessed by pressing [**ALPHA**] [**.**].

Example 1: [Ran#]	Example 2: [RanInt]
`Ran#`	`RanInt#(`

Using Ran# will generate a 3-digit numbers	Using the RanInt(1,20) this will generate the numbers 1, 2, 3, 4, 5, ..., 18, 19 or 20 randomly.
Ran# 　　　　　　0.766	RanInt#(1,20) 　　　　　　18
Each time you press the [=] key a new random 3 digit number is generated.	Each time you press the [=] key a new random integer is generated.

FX9750GII Activities - Dice simulation
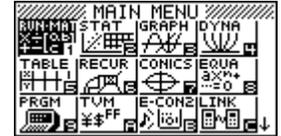
1. When you roll a pair of normal, 6-sided dice together and add the numbers showing face up, what is the most likely total?

Enter the formula **RanInt#(1,6) + RanInt#(1,6)** into your calculator. Each time you press [**EXE**] the calculator will simulate a roll of the pair of dice.

Headers for your Table are: Trial Number |Total of the dice　　　　　| Tally | Frequency
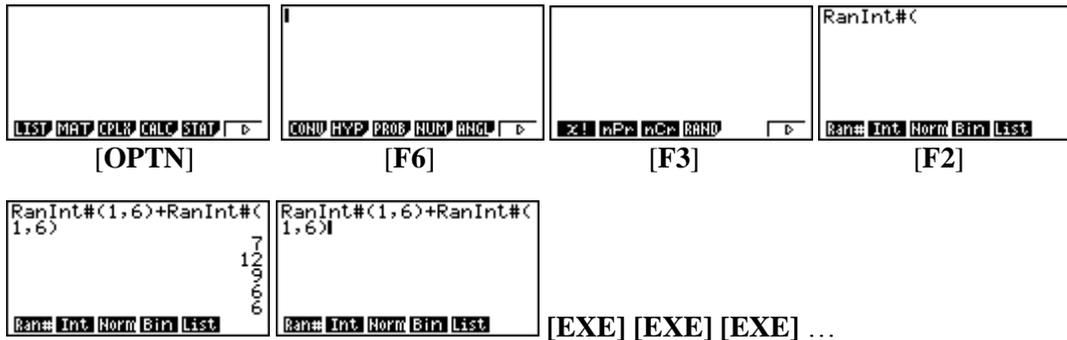　　　　　2 3 4 5 6 7 8 9 10 11 12

Record the number displayed by your calculator each time you press [**EXE**] in the table.

Simulate the dice rolls at least 40 times.

Discussion questions could be:　　What is the most common total when the numbers on a pair of dice are added?
　　　　　　　　　　　　　　Why does this number occur more than other numbers?
　　　　　　　　　　　　　　What are the two rarest totals? Why?

[**OPTN**]	[**F6**]	[**F3**]	[**F2**]

[**EXE**] [**EXE**] [**EXE**] …

2. Derek and Wiremu are rolling a pair of normal six-sided dice. Derek thinks that a sum of 7 will occur twice before a sum of 6 and a
    sum of 8 happens. Wiremu doesn't agree. He thinks that a sum of 6 and a sum of 8 will occur before two sums of 7. Your task is to determine who is right!

    Enter the formula **RanInt#(1,6)◄ RanInt#(1,6)◄ RanInt#(1,6) + RanInt#(1,6)** into the calculator. When you press [**EXE**] ignore any values that are not 6, 7 or 8. Record whether two sums of 7 or a sum of 6 and a sum of 8 happens first. After each simulation AC the screel then use the up arrow to place the coding back on the screen and pres [EXE] etc again.

    Carry out at least 30 simulations and illustrate your results in a table.
    Two sums of 7 A sum of 6 and a sum of 8 (or a sum of 8 and a sum of 6).
    What event occurs first most often: two sums of 7 or a sum of 6 and a sum of 8? Why?
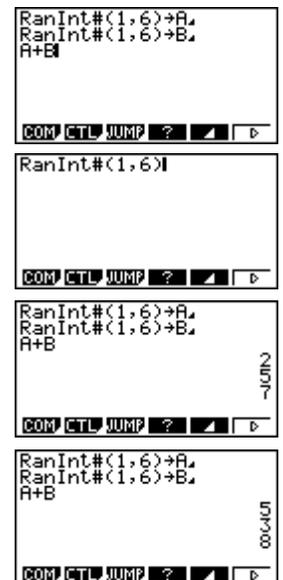
A last word!

Well again, that's all I can fit onto the 4 pages! Enjoy term 3! 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.

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