

# Graphical Times.

## Volume 8, Issue 32, 2009.

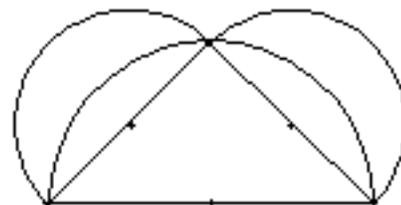


Welcome back to term 4! I hope you have had a restful break and been able to read a few non-mathematical books. We hope you enjoy the read in this terms newsletter. The 11th New Zealand Mathematics Teachers Conference was recently held in Palmerston North and those who attended I hope that you had an enjoyable 4 (or 5 days) refreshing and recharging for this term, met up with old acquaintances and shared some good teaching stories and practices.

A reminder to the NZAMT11 conference attendees that the conference offers expire 10<sup>th</sup> October 2009 so be quick!

The NZAMT logo is an interesting design. See: <http://nzamt.org.nz> to view it, I am sure that you have this webpage bookmarked anyway!

It looks like this:



The first correct entry received proving that the area of the lune is equal to  $\frac{1}{2}$  the area of the right isosceles triangle will receive a free single user licence for the Classpad.

Great to see more people are ordering via the website. Again, this term we are offering:

**The first 20 schools to purchase via the website this term will receive an 'extra something' in their order.**

'Back to skool' promotions will be released late November 2009 and will be current until 28<sup>th</sup> February, 2010.

### What's in here!

Included in this terms newsletter are:

- Calculator activities for the Classpad 330+ and Casio graphic calculator.
- Worksheets for the Classpad 330 +: Geometry- line bisectors and the circumcircle.
- Term 4 pricing list.

N.B. The Graphic Technologies Catalogue is available on request, please email us @ [graph.tech@xtra.co.nz](mailto:graph.tech@xtra.co.nz), to receive your copy.

### Specials for Term 4 promotions.

Graphic Technologies has been able to secure further special pricing on the FX82BU, the Classpad 330+ and the FX991ES. **FX82BU Scientific calculator:**

FX82BU scientific calculator (Minimum order is 10) 	10 - 30	\$18.00
	31 - 50	\$17.00
	51 - 100	\$16.00
	101 - 200	\$15.00
	200 +	\$14.50

**Pricing is exclusive GST per unit.**

**Classpad 330+ CAS calculator:** Purchase a class set of 30 units - \$7000 + GST. (\$233.33 + GST per unit).

ClassPad330+ 	1 - 2	\$240.00
	3 - 5	\$238.00
	6 - 10	\$236.00
	11 - 29	\$235.00
	<b>Class set of 30 special</b>	<b>\$7000.00</b>

**Pricing is exclusive GST per unit.**

### Mathematics Department Cycle [Pass it on to ... ]

	→		→		→		→		→
	→		→		→		→		→

## The FX991ES

**Graphic Technologies** is New Zealand's sole reseller of this calculator. This calculator has 'Natural Textbook display'. A NON-PROGRAMMABLE calculator **Allowed and recommended for the Cambridge Examinations**

FX991ES scientific calculator Promotion (Recommended for Cambridge Examinations)		1 - 2	\$80.00
		3 - 5	\$79.00
		6 - 10	\$78.00
		11 - 29	\$74.00
		<b>Class set of 30 special</b>	<b>\$2190.00</b>
<i>Graphic Technologies</i> wants you to get your hands on one! <b>Pricing is exclusive GST per unit.</b>			

**All pricing is valid until 23<sup>rd</sup> December 2009 or while stocks last!**

**See the Pricing list above or the Graphic Technologies 2009 catalogue for more details on these calculators.**

## EA-200 Data logger and EA-2 Motion Sensor.

These connect to the graphic calculator or Classpads and as a special NZAMT11 and term 4 promotion we are offering a 50% discount on these two accessories (**While stocks last, so be quick!**). The EA200 can connect up to 7 graphic calculators or ClassPad330's for data transfer from probes and motion sensor.

### **CASIO MOTION SENSOR**

Emits Ultrasonic pulses  
 Detects Pulses returned  
 Can connect to EA100

### **EA200 CASIO DATA LOGGER**

Data Analyser  
 Includes Temperature, Optical and Voltage Probe  
 Data collection at up to 50,000 points per second

Product	EA-200 Data Logger	EA- 2 Motion Sensor
		
<b>Price (exclusive GST) per unit</b>	\$250.00	\$250.00

**N.B. Both of these models have an RRP of \$799.00.**

## 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 ClassPad330+, to look at how the graphic calculator and CAS could impact on and be integrated into your classroom practices.

## Worksheets downloaded off the web.

Visit Monaco Corporation's or Graphic Technologies website to view and download worksheets. There are links to other informative mathematics education websites too. For teachers we currently offer a large number of 'classroom ready' resources available are designed primarily for the CASIO® FX9750G, FX9750G+, CFX9850GB, CFX9850GB+, CFX9850GC+ FX9750GA+ models of graphical calculators and the ALGEBRA 2.0. There is also a variety of activity sheets designed for the ClassPad300, 300+ and 330A models. All of the activities and worksheets are designed for beginners to advanced users of the GC and CAS. More have been added to the website since the last newsletter.

Visit: [www.monacocorp.co.nz/casio](http://www.monacocorp.co.nz/casio) and <http://graphic-technologies.co.nz>.

## Websites of mathematical interest.

The BBC have an excellent radio show on statistics called "More or less". The web page is here:

[http://news.bbc.co.uk/1/hi/programmes/more\\_or\\_less/default.stm](http://news.bbc.co.uk/1/hi/programmes/more_or_less/default.stm). You can download the podcasts from here:

<http://downloads.bbc.co.uk/podcasts/radio4/moreorless/rss.xml>. Recent episodes include interviews with David Spiegelhalter, and topical items on the numbers behind swine flu and the credit crunch.

What's the fuss about the number 9!

[http://www.teachertube.com/viewVideo.php?video\\_id=108197&title=Math\\_Game\\_Crazy\\_9s](http://www.teachertube.com/viewVideo.php?video_id=108197&title=Math_Game_Crazy_9s)

<http://www.mathopenref> Where geometrical constructions are demonstrated with supporting statements.

Rabbits and Wolves: This website <http://www.shodor.org/interactivate/activities/rabbits/index.html> and associated applet allows you to simulate how nature keeps its balance! It shows how wolves and rabbits would behave in their natural setting.

Associated Interactives are: [Lesson on Chaos](#)

[Discussion on Chaos](#)

[Discussion on how prevalent chaos is in science](#)

[Game of Life Activity](#)

[Fire! Activity](#)

[A Better Fire Activity](#)

Buffon's Needle Experiment websites: <http://www.angelfire.com/wa/hurben/buff.html>

<http://www-groups.dcs.st-andrews.ac.uk/%7Ehistory/Mathematicians/Buffon.html>

<http://www.mste.uiuc.edu/reese/buffon/buffon.html>

<http://www-stat.stanford.edu/~susan/courses/sl16/node43.html>

[http://www.trpl2u.com/pi2\\_eng.html](http://www.trpl2u.com/pi2_eng.html)



## CASIO Support Classroom E-mail News, What's New.

### **New Calculator Emulation Software**

CASIO has newly announced the following New software

fx-Manager PLUS: FA-9860A Ver.2.0 [Single License]

fx-Manager PLUS: FA-9860B Ver.2.0 [School License]

You can get more information by going through the following CASIO Educational webpage.

[http://edu.casio.com/products/peripheral/9860mgr\\_v20/](http://edu.casio.com/products/peripheral/9860mgr_v20/)

### **Download the latest resources**

N.B. You need to use your ID (E-mail address) and your password.

1. ClassPad Handheld OS updater to Version 3.04

2. Program-Link software FA-CP Version 1.02 for ClassPad 330

3. ClassPad Manager updater to Version 3.04

4. ClassPad Font Set for Version 3.04

5. fx-9860G Manager PLUS updater to Version 2.0

Visit the CASIO Educational website/ CASIO Online

Service (Downloads) page: <http://edu.casio.com/dl/>

[Enter] >> [Accept] >> [Guest]

Select the following item for ClassPad 300 series, and then click [NEXT].

OS Update for Version 3.

Click underlined item to download the file.

Visit the following web page of the features of OS

Version 3.04:

[http://edu.casio.com/products/classpad/cp\\_v304/](http://edu.casio.com/products/classpad/cp_v304/)

Program-Link software FA-CP Version 1.02 for ClassPad 330. This installer can be downloaded by going through the following CASIO Educational website.

The Font Set helps you to create documents with certain keys and icons in ClassPad series.

Download the Font Set file and unzip it to fonts-directory of your Windows computer.

Access the following ClassPad product information pages.

ClassPad HOME: <http://edu.casio.com/products/classpad/>

ClassPad 330 Handheld:

[http://edu.casio.com/products/classpad/cp\\_v302/](http://edu.casio.com/products/classpad/cp_v302/)

ClassPad Manager software:

[http://edu.casio.com/products/classpad/cpm\\_v300/](http://edu.casio.com/products/classpad/cpm_v300/)

Click the text link of "ClassPad Font Set (.ZIP)" to download the Font Set.

Click the text link of "Character Table (.pdf)" to browse or download the character table of the fonts.

If you want to know what you can do with a ClassPad, please get 30 Day Trial of ClassPad Manager V.3.0. Just input a few information on the webpage:

and you can use the software within 30 days for free.

[http://edu.casio.com/freetrial/freetrial\\_form.php](http://edu.casio.com/freetrial/freetrial_form.php)

## Classroom Activities.

### **1. Linking $y =$ and $dy/dx =$ and $d^2y/dx^2 =$**

The calculator can differentiate at a value of  $x$  only

i.e. differentiate at a point, but can draw the graphs of

$y =$        $dy/dx =$        $d^2y/dx^2 =$

Use the calculator in GRAPH mode.

The first derivative  $d/dx$ , used for finding the slope of a graph at a given point.

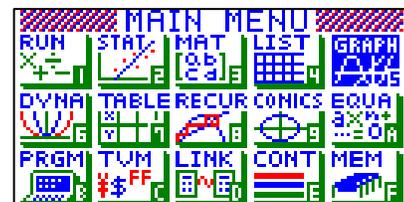
The second derivative  $d^2/dx^2$ , used for finding the concavity of a graph at a given point.

**Note:**  $d/dx$  ( $d^2/dx^2$ ) can be found in **OPTN** then press the **F2**, then either **F1** or **F2**.

### **Example:**

(a) Draw the graph of  $y = x(x - 2)(x + 1)$

(b) Draw the graph of the derivative of  $y$  i.e.  $dy/dx$



(c) Draw the graph of the second derivative of y i.e.  $d^2y/dx^2$

Enter the equations into the Y1, Y2 and Y3 areas, pressing EXE to store the equations.

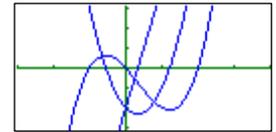
Make sure that the x and y axis are set up correctly so that you are able to see the main features of the graphs been drawn. Use the **V-Window** [Shift] [F3] to change the domain and range values.

$$Y1 = x(x - 2)(x + 1)$$

$$Y2 = d/dx(x(x - 2)(x + 1),x)$$

$$Y3 = d^2/dx^2(x(x - 2)(x + 1),x)$$

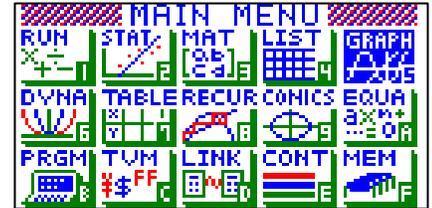
Press [F6] to draw the graphs.



## 2. Telephones and algebra

Monthly rates for mobile phones.

Name of Plan	Access fee (\$)	Minutes included (\$)	Each additional minute (\$)
Orange	17.95	0	0.73
Green	27.95	15	0.53
Blue	49.95	60	0.35
Rose	75.95	150	0.35

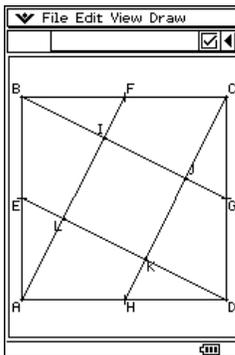


Which is the best plan, and over what time interval? Can you solve this problem in the **GRAPH** icon?

## CAS Activities

Even if your students do not have access to the ClassPad, they can still benefit from watching a teacher or another student use or demonstrate activities, Their impact on the class is phenomenal! All you will need is a laptop or PC, data projector and the ClassPad Manager software. As you are writing your lesson plan, create a few short eActivities to supplement your lesson. Your students will gain a stronger understanding of the topic, the visual and kinaesthetic learners will appreciate it and the entire class can participate. The ClassPad Manager makes a great classroom tool.

### A square deal! From the last newsletter!



Construct a unit square ABCD.

Construct the midpoints E, F, G and H.

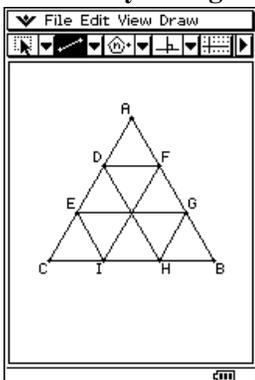
Complete the construction shown above.

Show that the area of  $\triangle ALE : \triangle AIB$  is a ratio 1:4

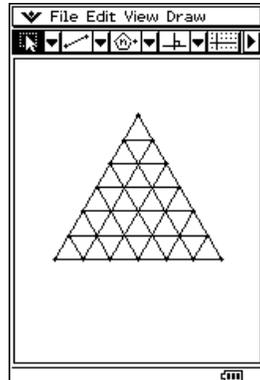
Show that the area of  $\triangle DLA = \square IJKL$

Prove this is true for all similar constructions in a square.

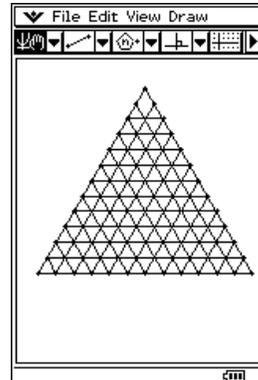
### How many triangles do you see?



Here!



Here!



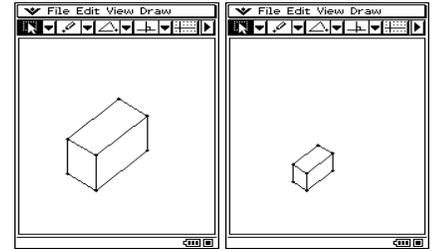
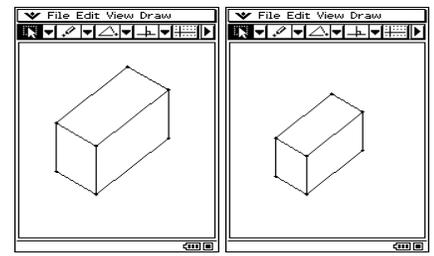
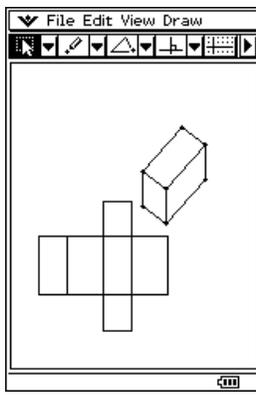
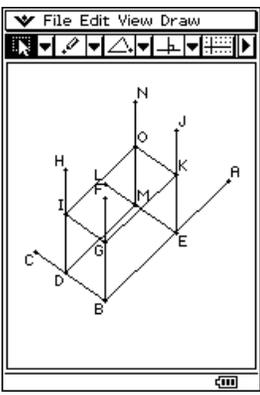
And here!

Can you find a pattern? Can you generalise? [Hint: consider both triangles orientated in both  $\blacktriangle$  and  $\blacktriangledown$  directions.]

### Constructions and animations.

From here to there! Below and to the right, are four screen captures of an animated cuboid and its associated net.

Can you replicate this construction and animation?

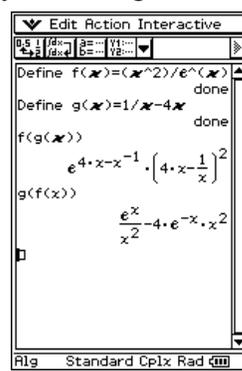
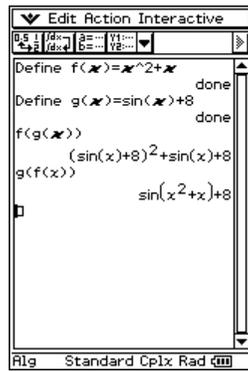
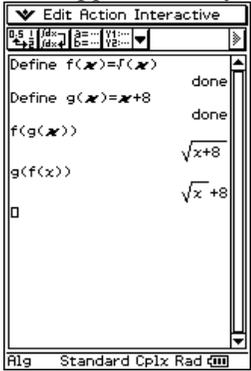


## Functions and Graphs

- **Composite  $f \circ g$  and  $g \circ f$**  Functions of functions.
- **Inverse Functions** What about inverse of functions?  $f(f^{-1}(x))$  and  $f^{-1}(f(x))$ .

### Composite $f \circ g$ and $g \circ f$

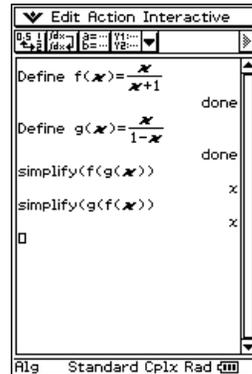
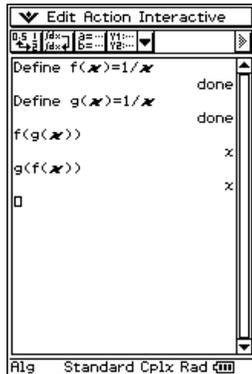
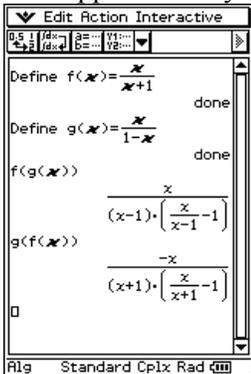
What happens when you take the function of a function? Are they interchangeable?



Try some for yourself!

### Inverse Functions

What happens when you take the inverse of a function within a function? Or vice versa?



Try some for yourself!

What happens when you have an equation that does this?  
Explore...

$$f(n+2) = f(n+1) - f(n)$$

## A last word!

Well again, that's all I can fit onto the 5 pages! Enjoy the 'spring into summer' term! Hope to see you at some workshops or in 2010 via this newsletter or otherwise! 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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