Kilts and CAS

Session 131

Friday 25 February 2011

1:15 –2:15pm

Nevil Hopley,
Edinburgh, Scotland

T3 National Trainer

Strictly Limited Offer of Royal Stewart Tartan TI-Nspire Cases at the end of this talk.

This talk will have a....

Beginning

What was the motivation?
What were the hurdles?

Middle

Activities I have created and used.
Other stuff to watch out for when using CAS.

End

Where to next?

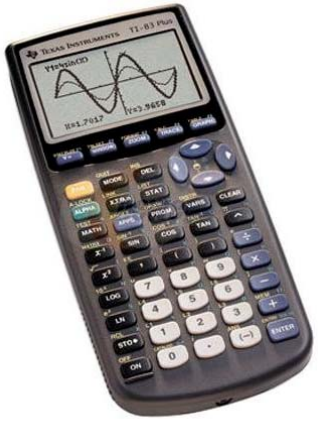
And you can download all that you see today from

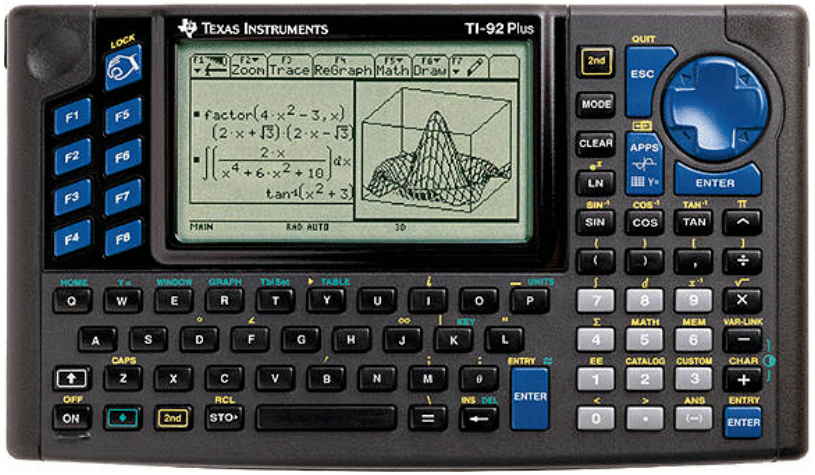
www.CalculatorSoftware.co.uk/cas

A Gamble? An Uphill Struggle?

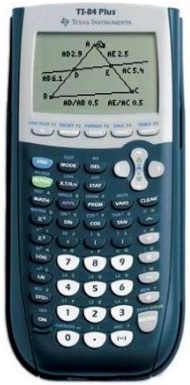
Why now?

Previously…





Not the same as…



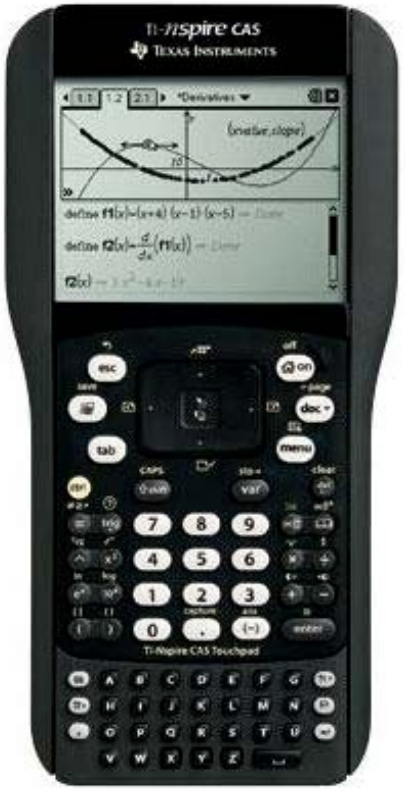
Scottish Qualification Authority Module

"Modelling with Mathematics"

linking CAS and Dynamic Geometry

.....shelved!

Two Flavours of Same Handheld

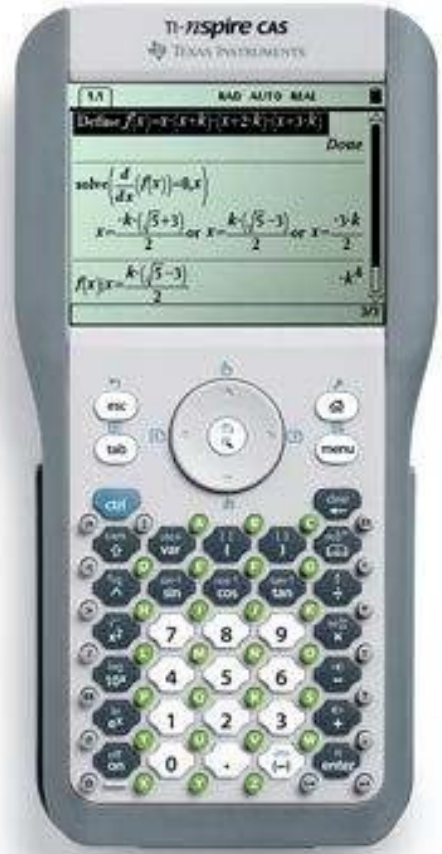


No Compatability or Use-ability Hurdles to Overcome

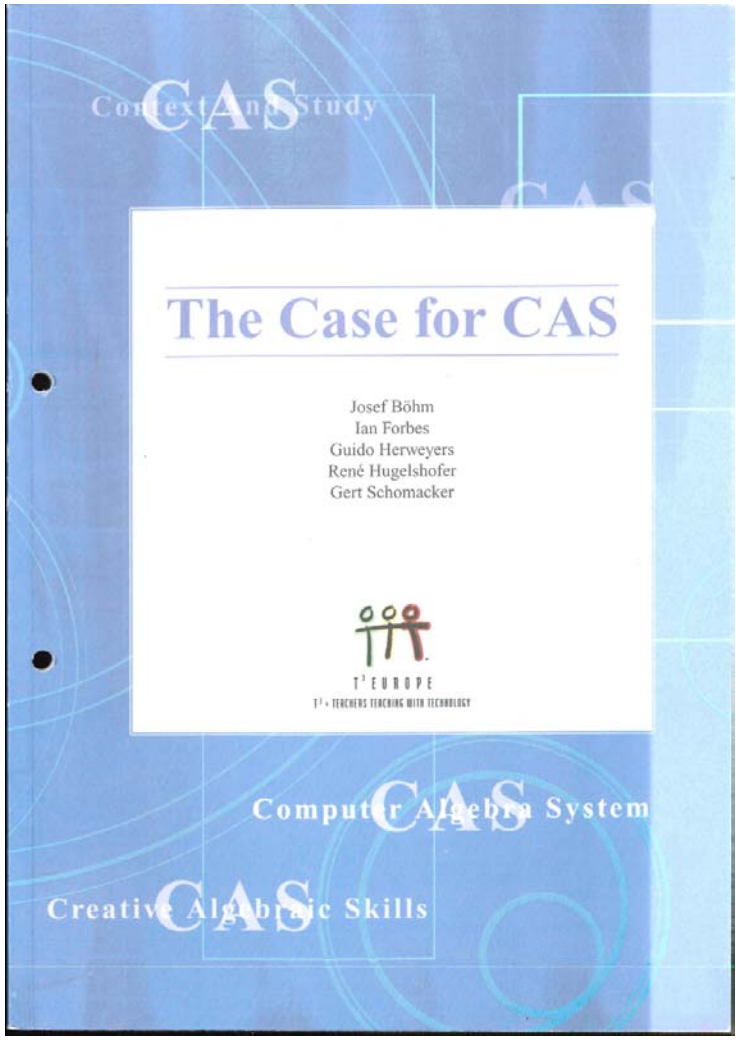
What first?

Nspire Navigator Pilot Site, October 2008

32x



What was out there?



The Case for CAS

www.t3ww.org/cas

Mainly calculus and optimisation activities.

2009 T3 International Conference
Seattle, WA

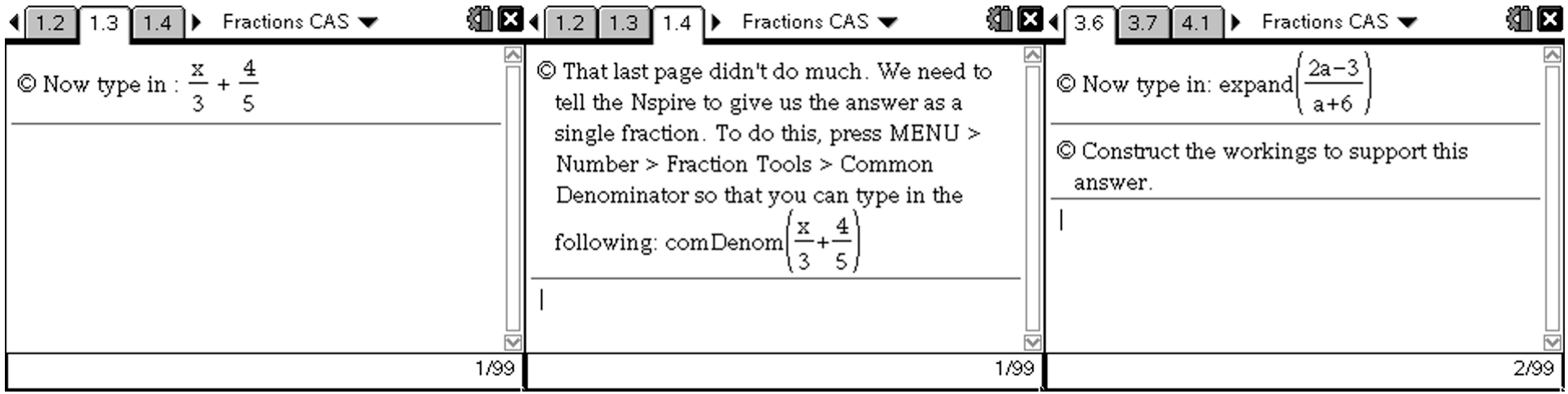
2010 T3 International Conference
Atlanta, GA

Lynn Adsit
Russell Boyle
Jim Breunlin
Peter Fox
Jessica Kachur
Kim Schjelderup

Then I was off ! …. but to do what?

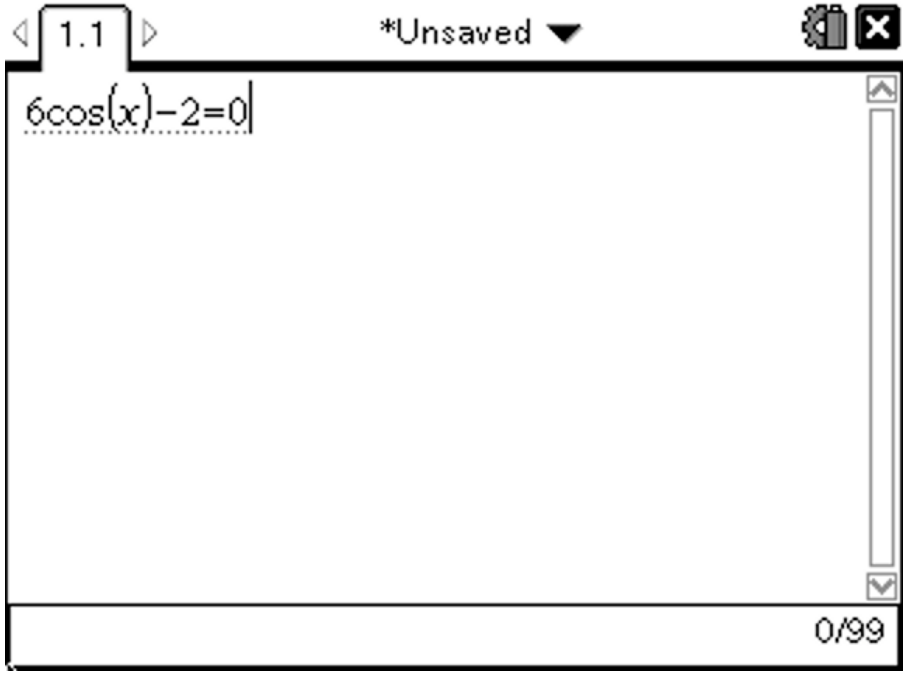
Nspire **CAS**, not just Nspire.

Algebraic Fractions with class of 13 year olds

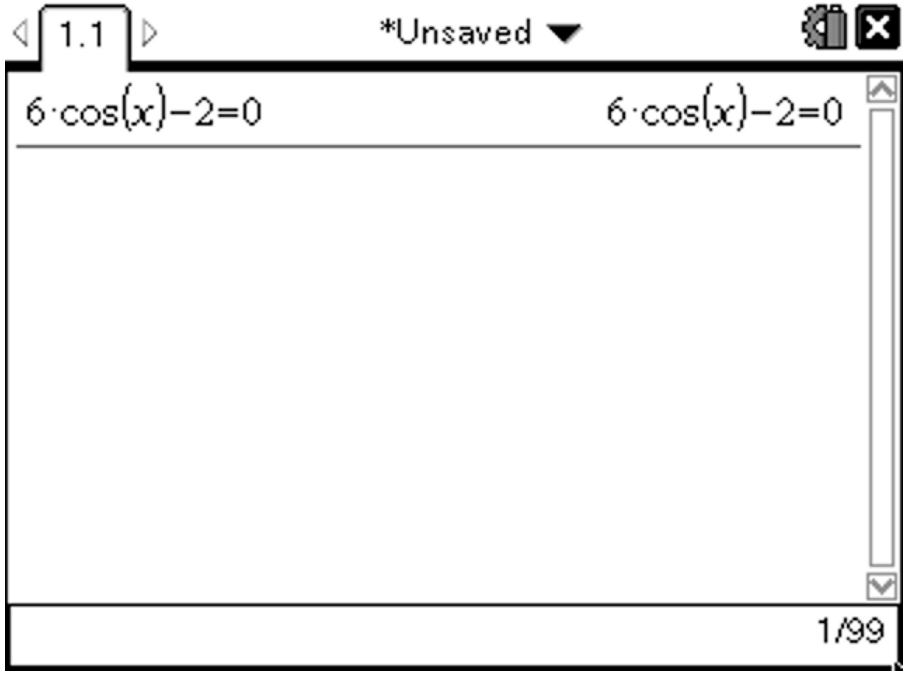


My first attempt!

Solving Trigonometric Equations - 1

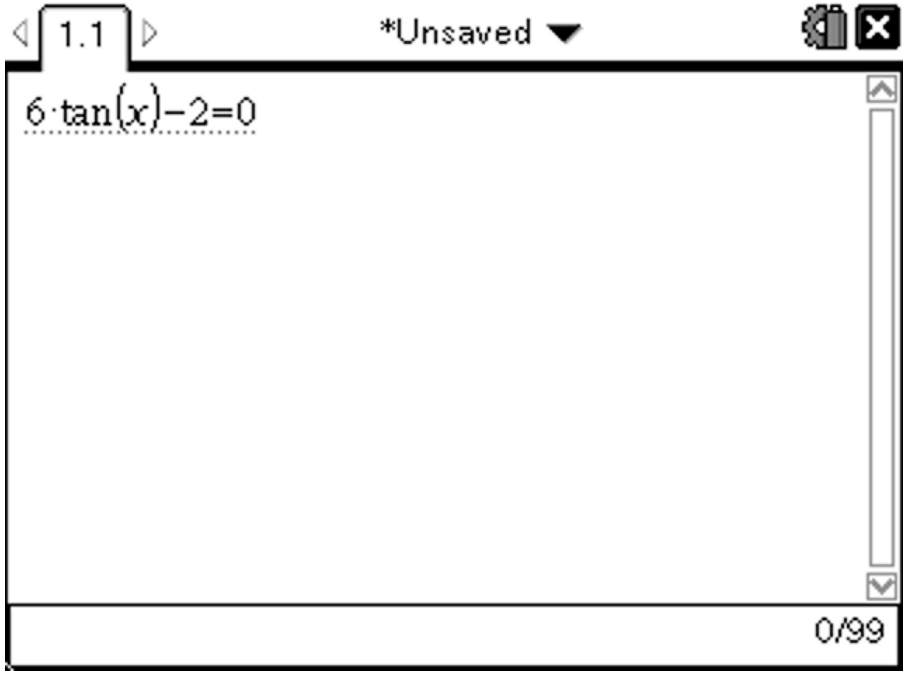


Solving Trigonometric Equations - 2

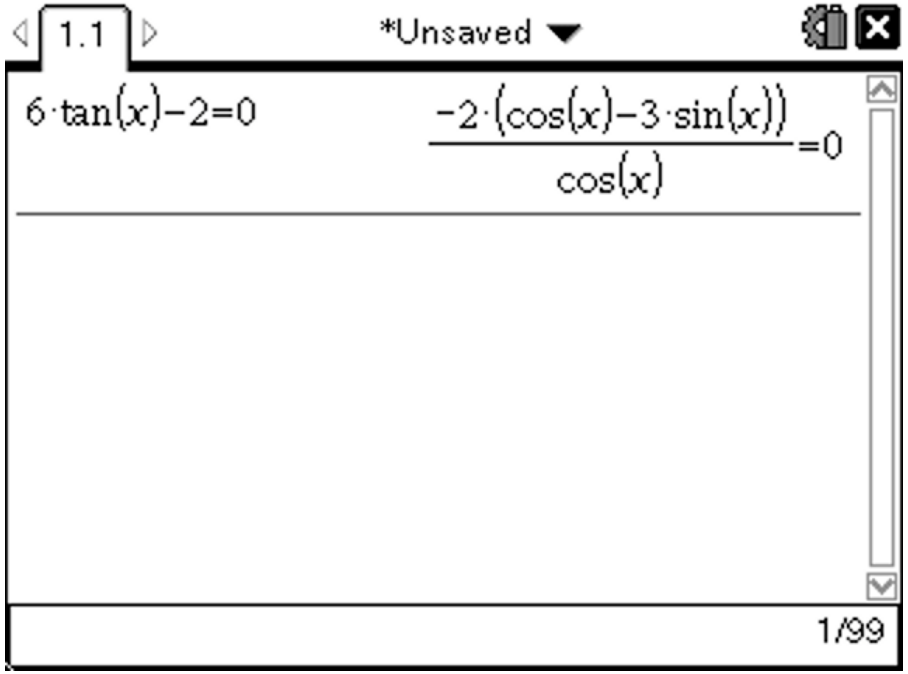


Inclusion of dot for multiplication really emphasised the processes going on.

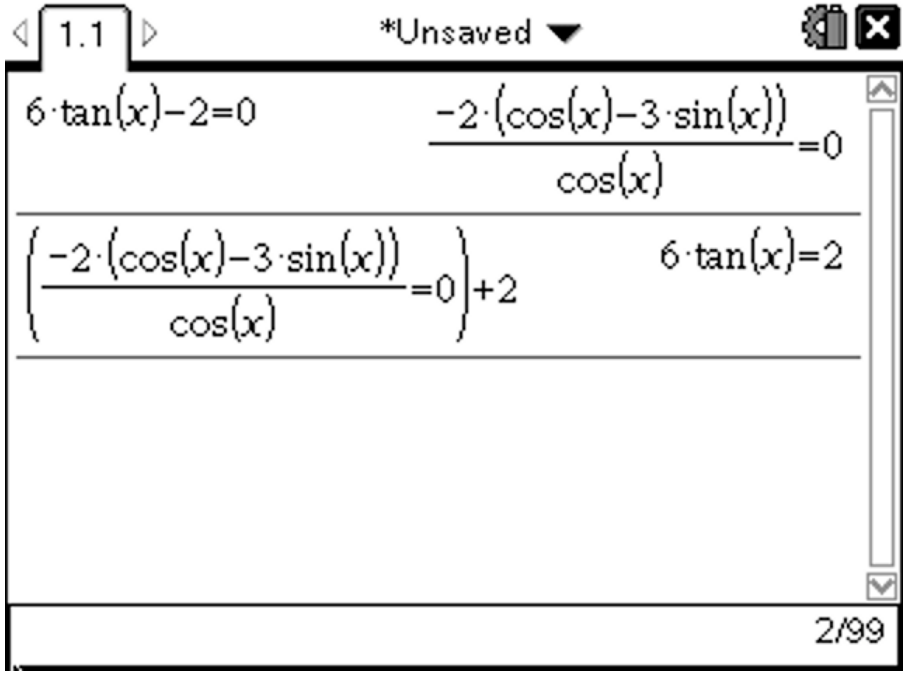
Unexpected Things - 1



Unexpected Things – 2



Unexpected Things – 3



Experiment as much as you can beforehand!

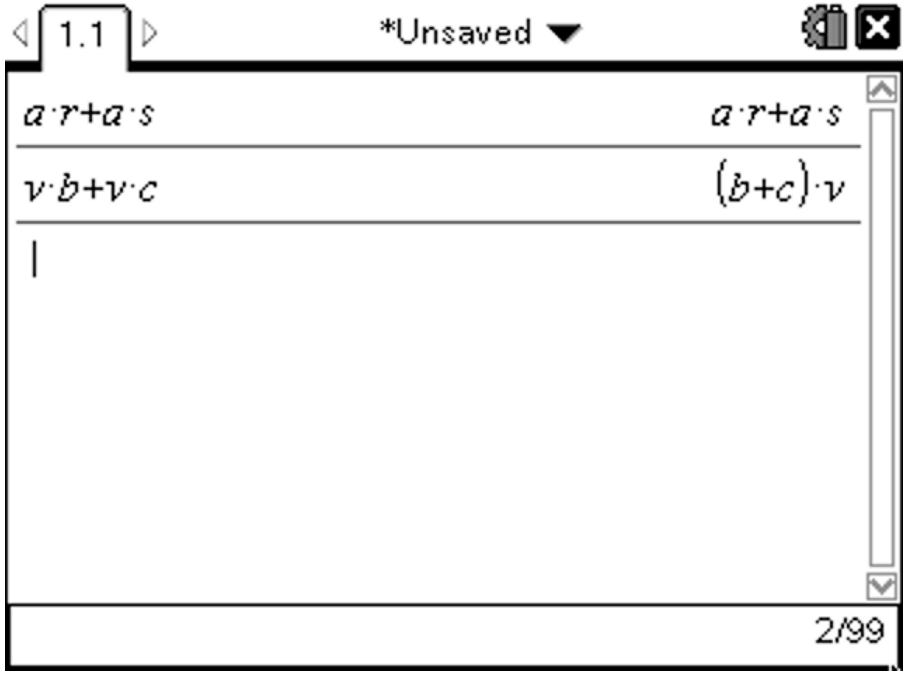
Rearranging Equations

Nspire CAS's auto-simplication of expressions

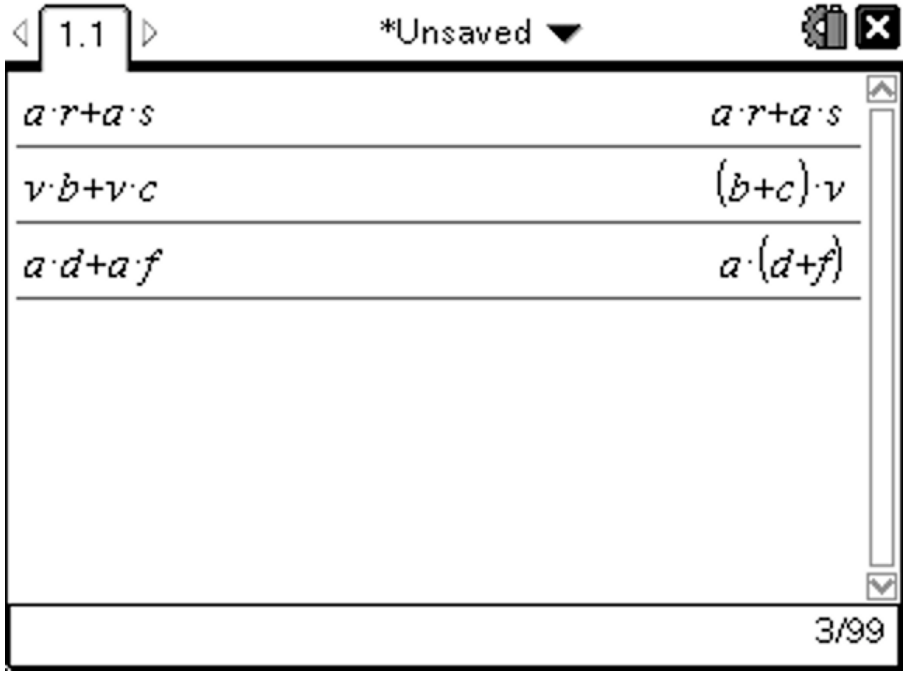
What do **we** do when we think about rearranging formulae?

I **now** know why students find rearranging so tricky!

Unexpected Things – 4



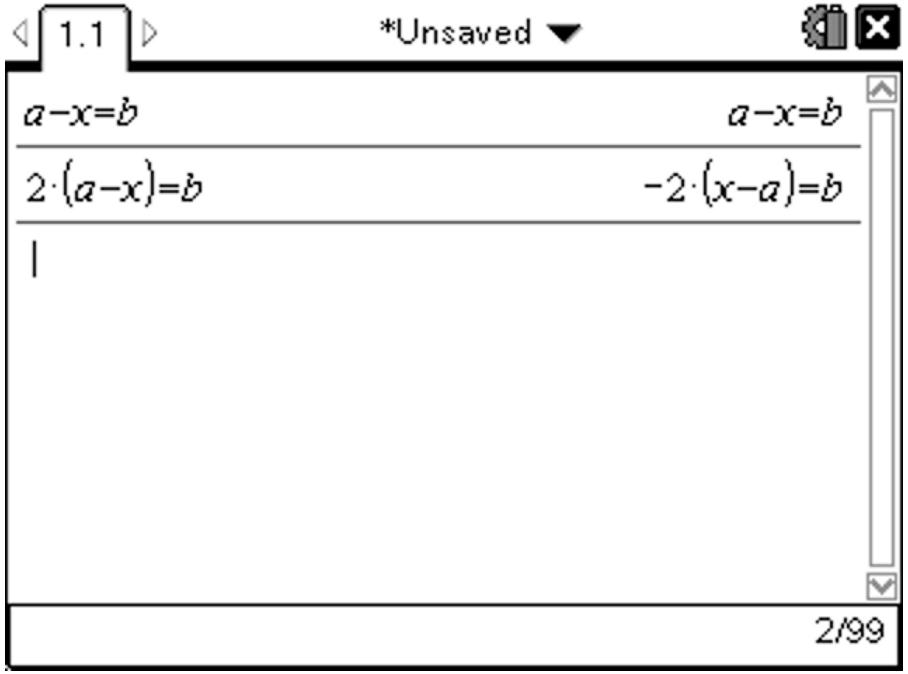
Unexpected Things – 5



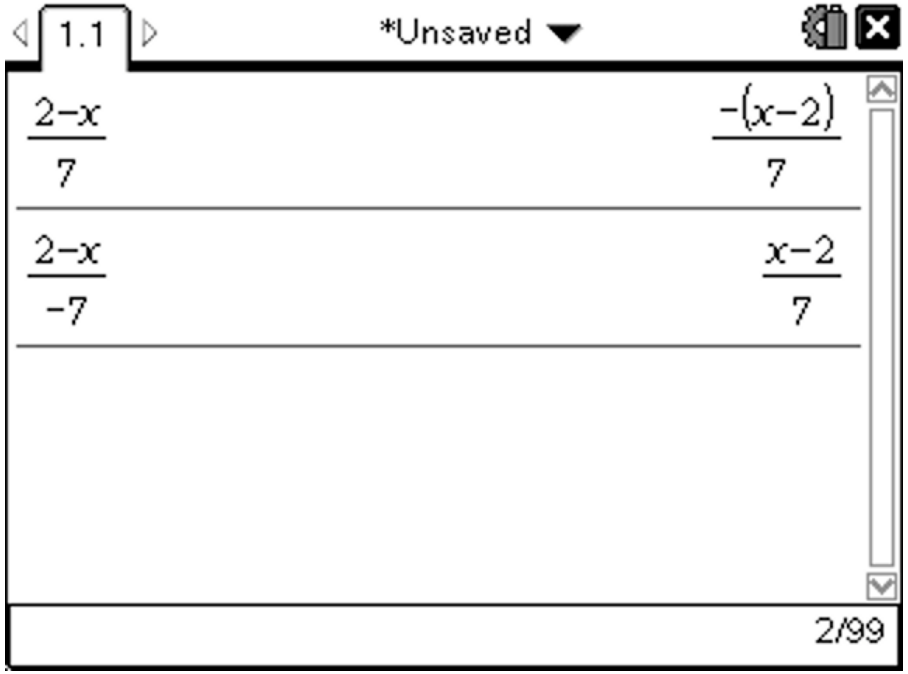
a .... q are constants
r .... z are variables

...with thanks to Peter Flynn, Melbourne, Australia.

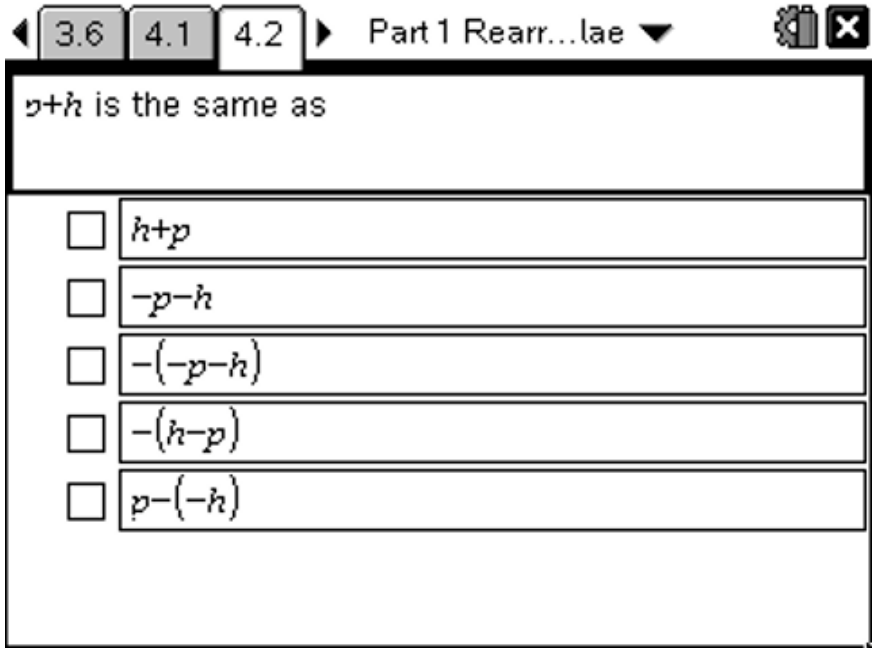
Unexpected Things – 6

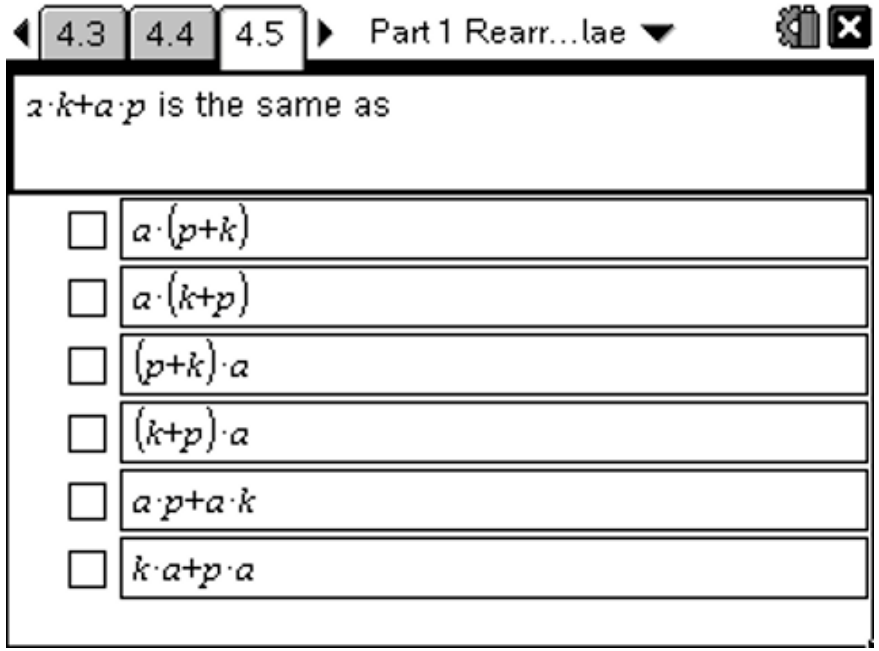


Unexpected Things – 7



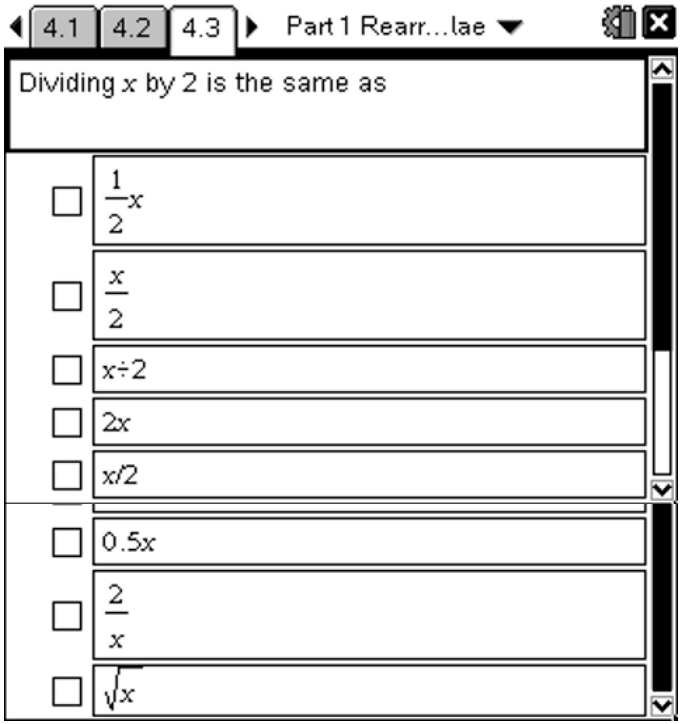
Part 1 – Preparation for CAS - 1

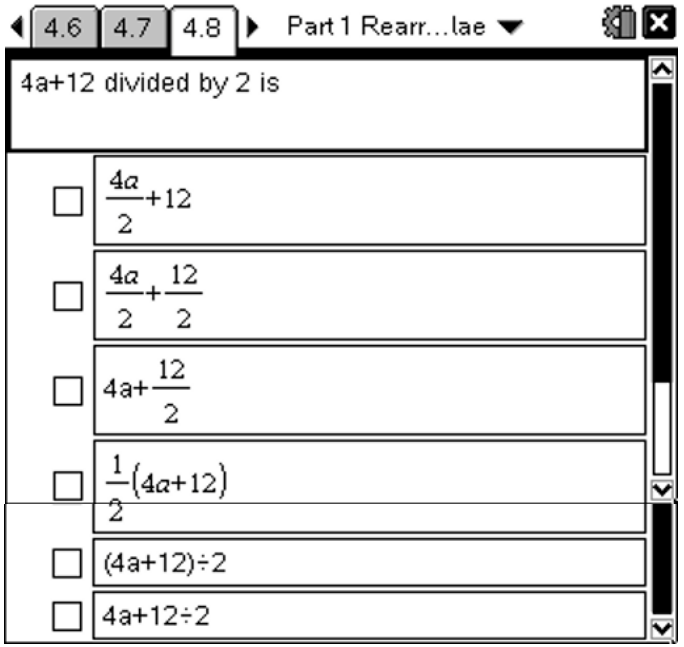




www.CalculatorSoftware.co.uk/cas

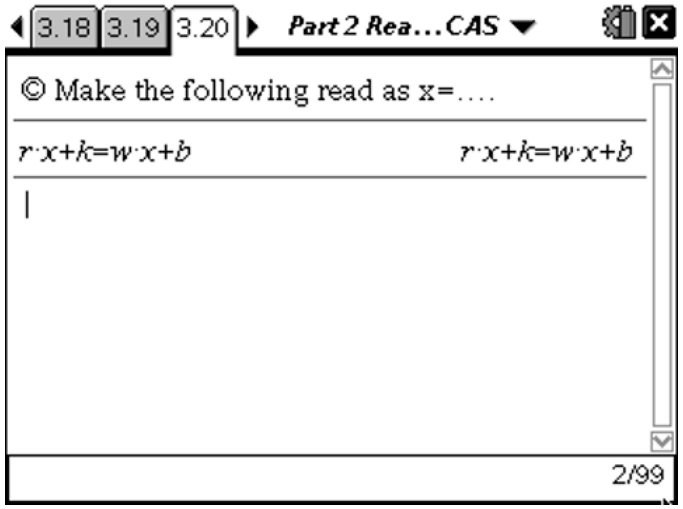
Part 1 – Preparation for CAS – 2





www.CalculatorSoftware.co.uk/cas

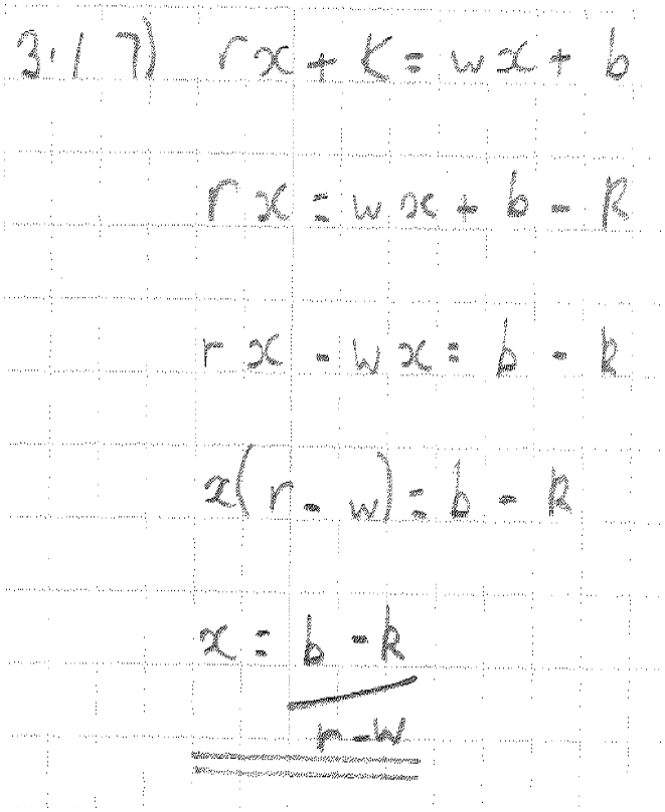
Part 2 – Rearranging Formulae Using CAS



Video of Kai solving this.

www.CalculatorSoftware.co.uk/cas

Kai's Jotter



Kai's Test Homework (2 weeks later)

14) $R = \frac{rs}{r+s}$

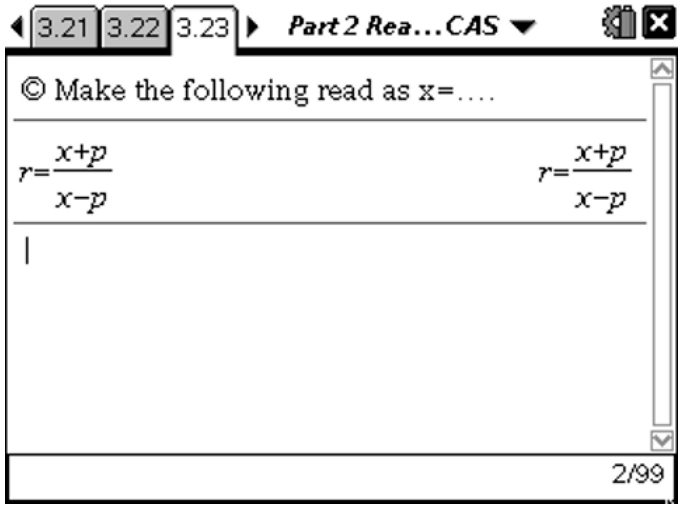
$R(r+s) = rs$

$Rr + Rs = rs$

$Rr = rs - Rs$

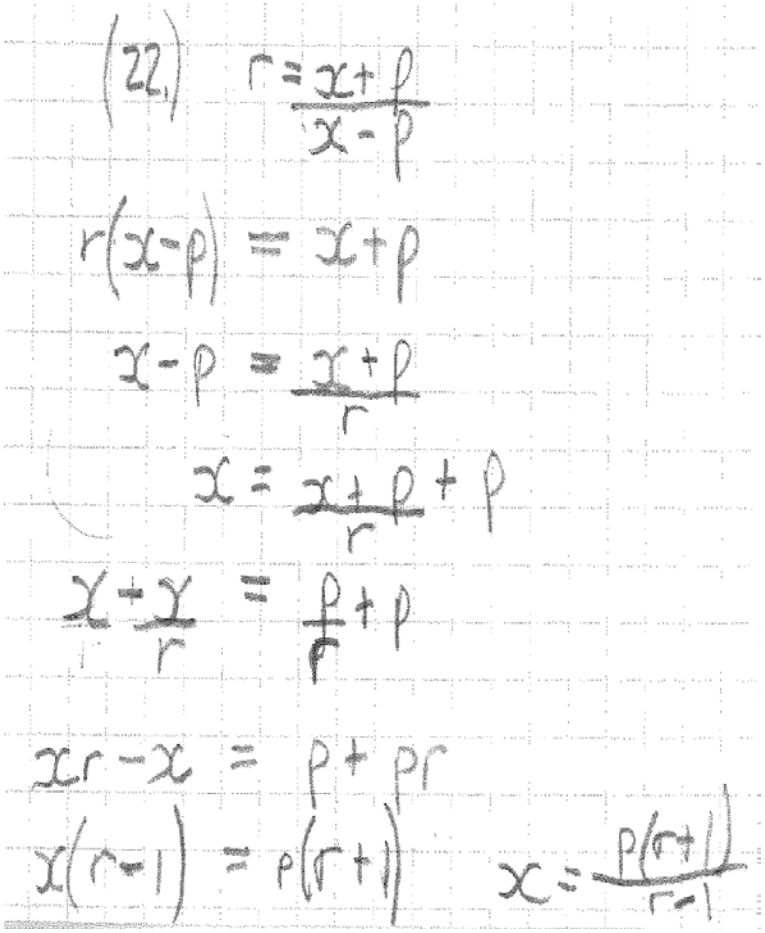
$Rr = s(r - R)$

$\frac{Rr}{(r - R)} = s$

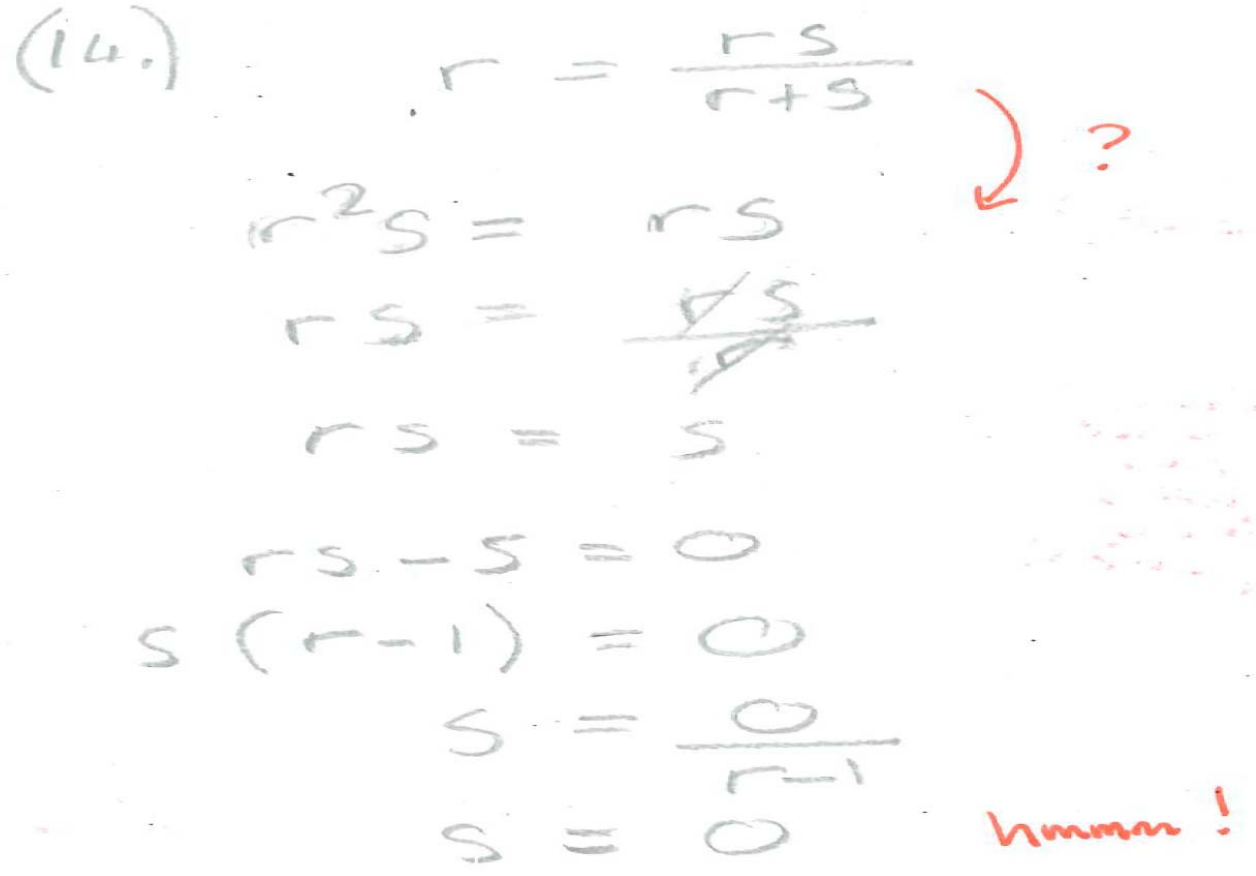


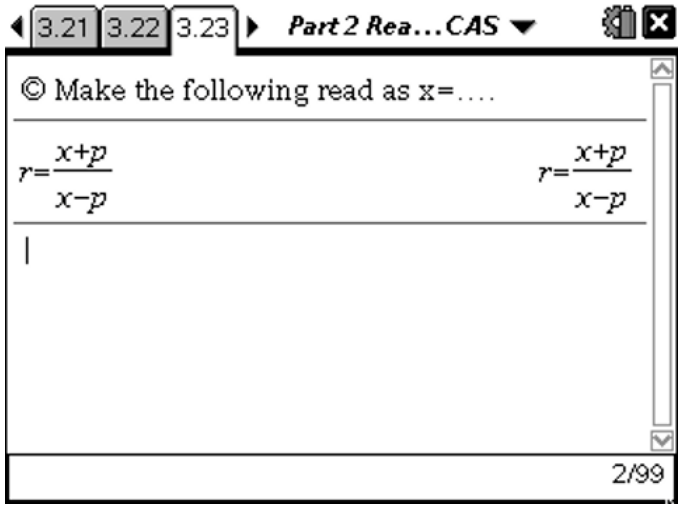
Video of Thomas solving this.

Thomas's Jotter



Thomas's Test Homework (2 weeks later)

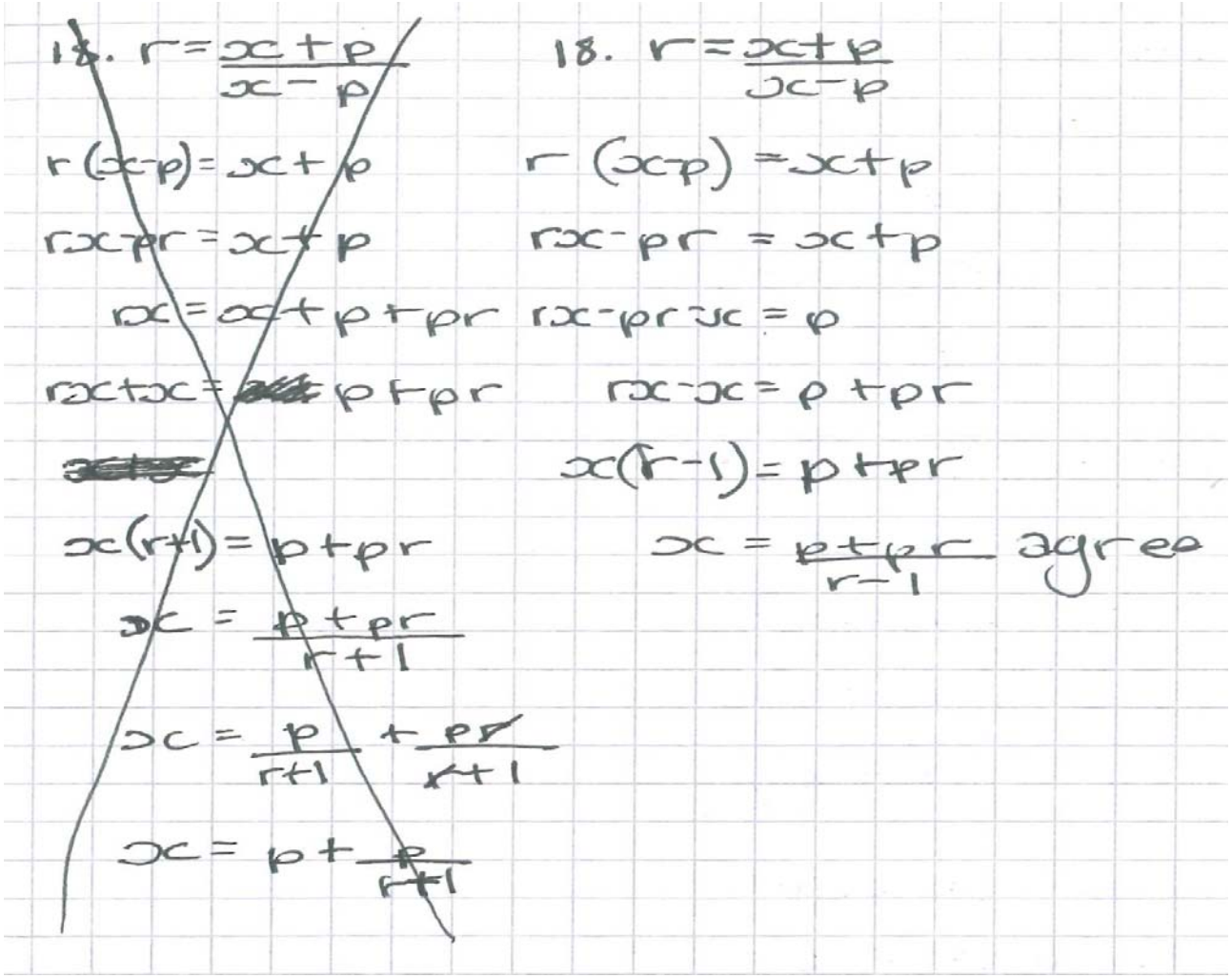




Video of Elizabeth solving this.

www.CalculatorSoftware.co.uk/cas

Elizabeth's Jotter



Elizabeth's Test Homework (2 weeks later)

14. $R = \frac{rs}{r+s}$

$R(r+s) = rs$

$Rr + sR = rs$

$sR = rs - Rr$

$-rst \quad sR = -Rr$

$s(R-r) = -Rr$

$s = \frac{-Rr}{r-r}$] R-r ?

Ghasi's Test Homework (2 weeks later)

$$S = 2\pi r(r+h)$$

$$S = 2\cdot\pi\cdot r^2 + 2\cdot\pi\cdot r\cdot h$$

$$S - 2\cdot\pi\cdot r^2 = 2\cdot\pi\cdot r\cdot h$$

$$\frac{S - 2\cdot\pi\cdot r^2}{2\cdot\pi\cdot r} = h$$ ✓

$$L = M(1+at)$$

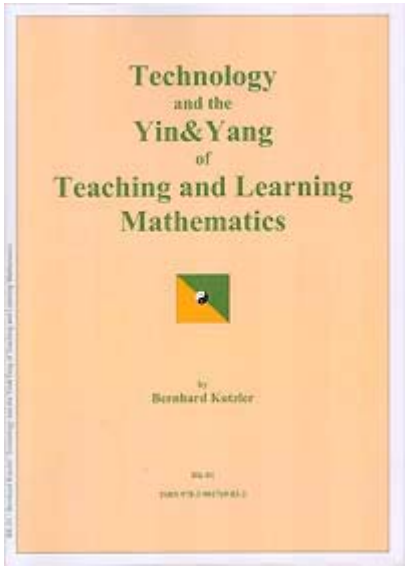
$$L = M + M\cdot a\cdot t$$

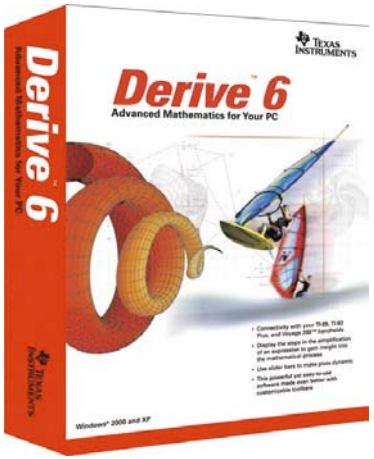
$$L - M = M\cdot a\cdot t$$

$$\frac{L - M}{M\cdot a} = t$$ ✓

My Experience versus Others' Experience

I met Bernhard Kutzler in November 2010....

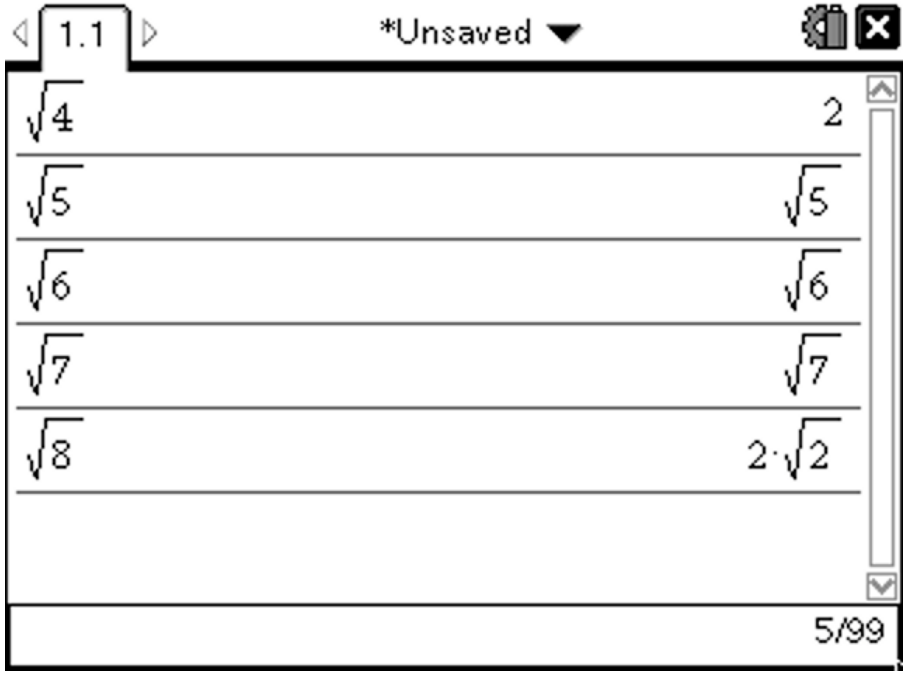




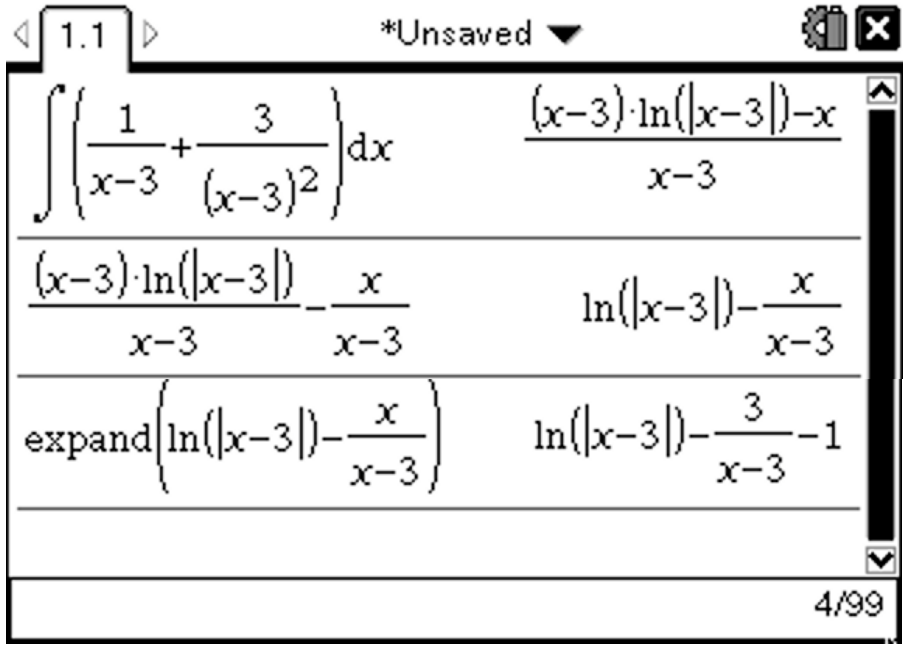
'Educators Notes'

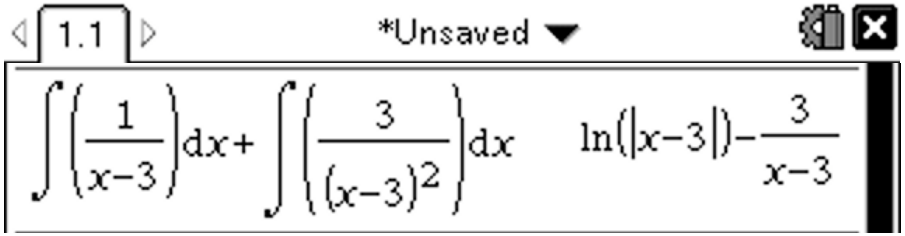
Powerful arguments and theory for promoting students to explore and learn from mistakes.

Introducing Surds with 15 & 17 Year Olds



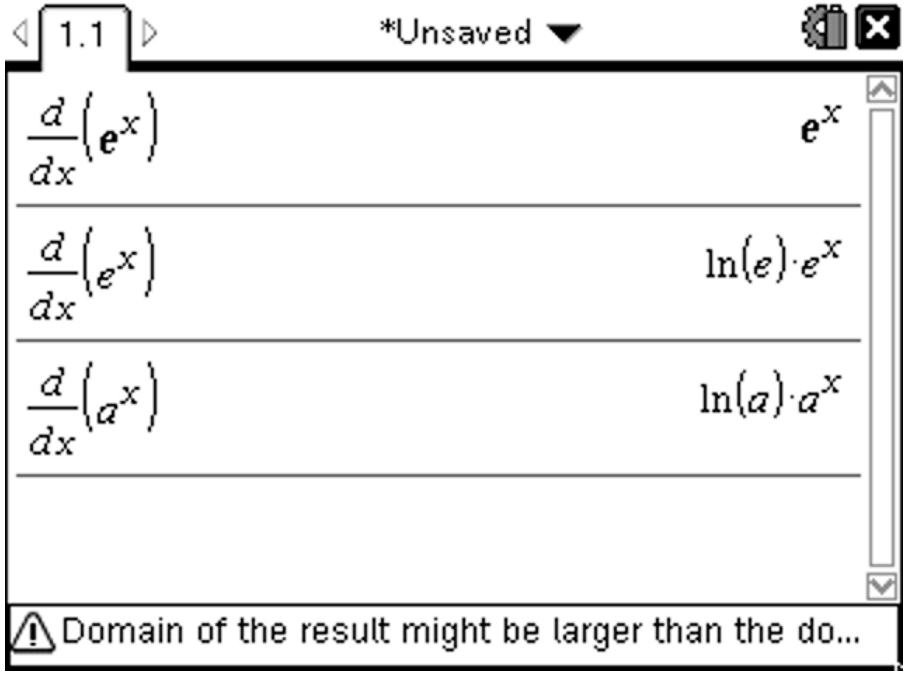
Unexpected Things with Integration





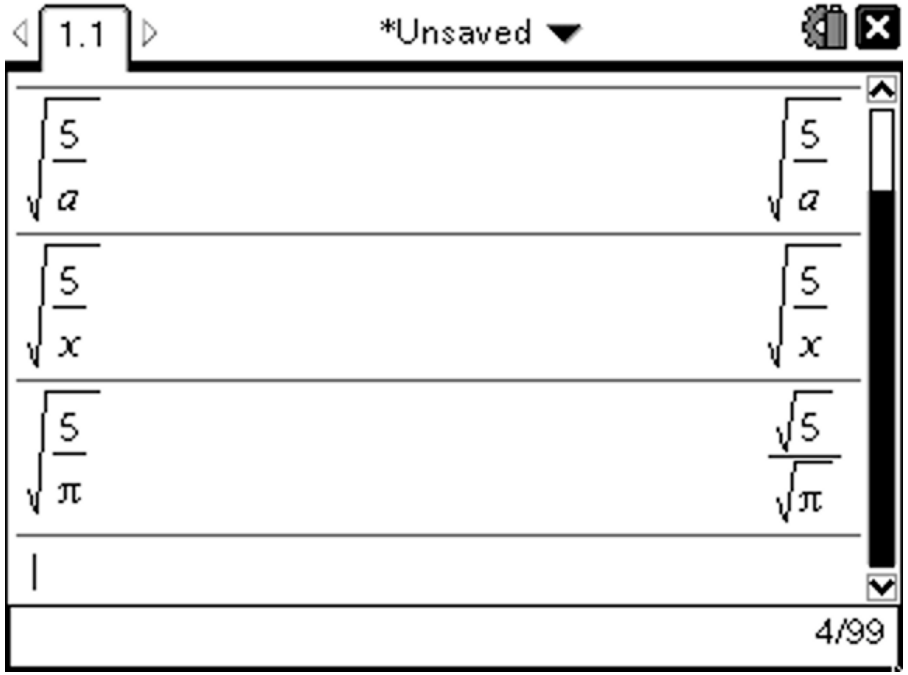
Should we request from TI that the constant of integration is included in the output from indefinite integrals?

Typos with Differentation



When is e the same as ***e***?

π is not treated like a Constant or a Variable



Where to Next?

- Write more CAS-specific activities for each topic that I come to teach, to allow students to explore and discover on their own.

- Re-read all the resources I collated from past conferences. I already see their role much better now, from 'the other side'.

- Recommend that schools buy Nspire CAS for their class-sets, as they'll never go into exam halls. They are **most** effective in the classroom where the learning happens.

Only 5 in the whole world!

Suggested minimum donation of $10……

All proceeds to

CANCER RESEARCH UK

Want More of Kilts & CAS?

www.CalculatorSoftware.co.uk/cas

Want More from Me?

Session 330
"Two Minute Treasures"

Tomorrow.
In this same room.
10:00-11:00