

**Learning Activity 45 : To solve two similar sets of linear equations; the first using traditional algebraic methods and the second using the CAS calculator.
Learning Behaviours: Reflecting on learning approach.**

Teacher: RNP

DATE: 12/5/06

Class: 10 Maths Methods

Learning Activity DescriptionTwo similar sets of linear equations to solve. Students to solve the first set algebraically and the second set using the CAS calculator. Students to then answer a questionnaire to elicit their feelings and opinions on.

Discussion Tool: questionnaire

Students answered a questionnaire designed to elicit their view on the CAS calculator. Questions were written after studying students' initial reactions to the CAS calculator. Students were asked to answer True or False to the following questions:

I could do all the first set of equations manually (with scientific calculator)

I could do all the first set of equations manually (without any sort of calculator)

I could do all of the second set with the CAS calculator

I could do all the first set of equations without any sort of calculator

The CAS calculator is good for complex calculations

I cannot do the problems manually

The CAS calculator makes maths easier

The CAS calculator has deskilled me

I feel I have learnt new skills with the CAS calculator

I am afraid I won't be able to do the problems manually anymore.

The CAS calculator is too easy

There is no point being in class the CAS calculator does it all.

I am gaining confidence using the CAS calculator

I am confident my answers using the CAS calculator are correct

Where possible I check the answers the CAS calculator gives

I use my brain less when we use the CAS calculator in class

I enjoy using the CAS calculator

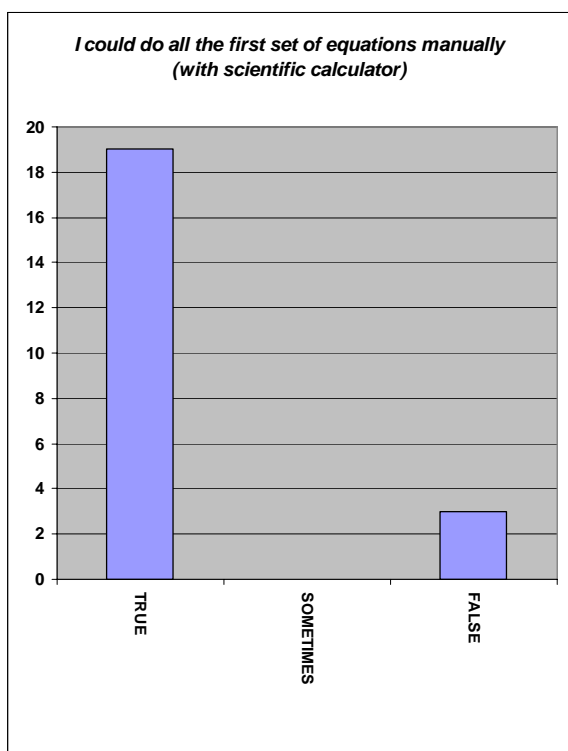
Student Comments:

See summary of student responses as graphs below.

Teacher Journal:

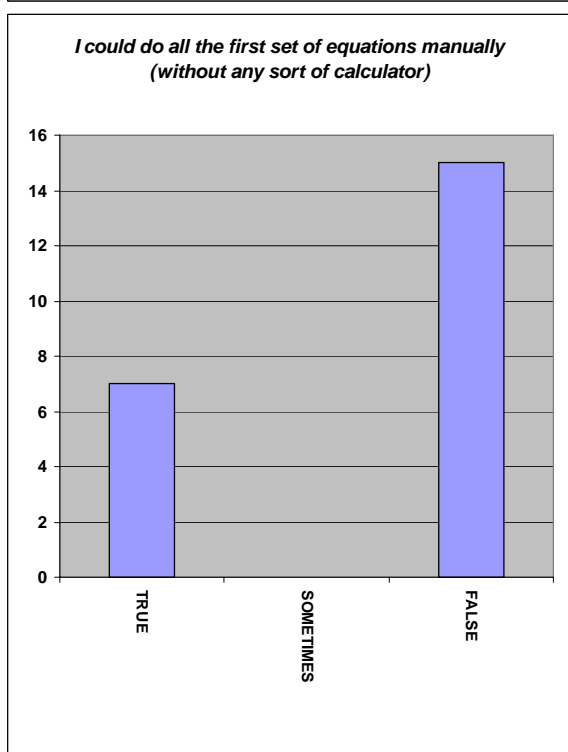
See analysis of student responses below.

Analysis of student responses to final questionnaire



Students had been solving linear equations in the traditional fashion for approximately three weeks.

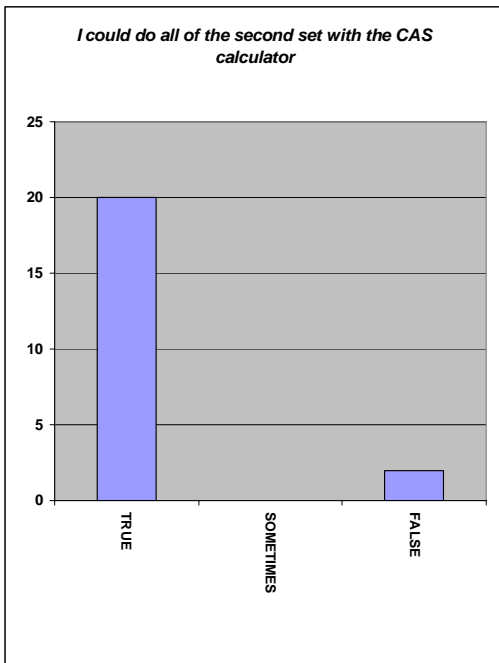
Overwhelmingly students believe they can solve linear equations without the need to rely on the CAS calculator.



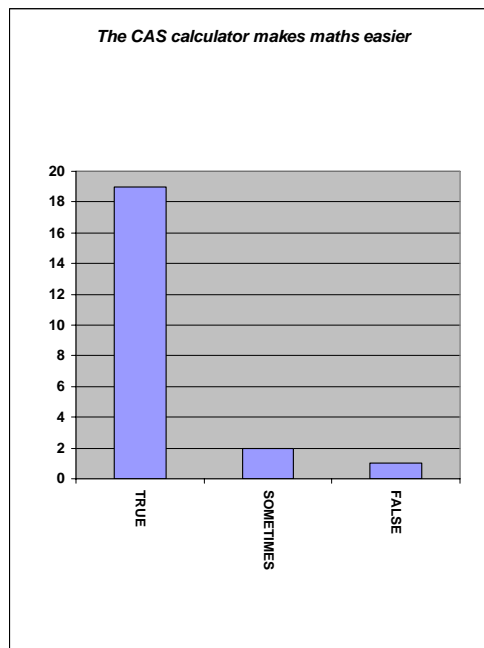
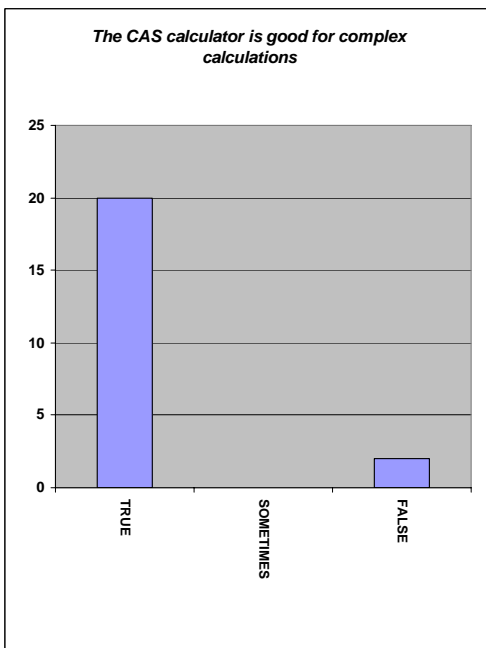
One of the equations the students were required to solve by traditional methods involved 3 figure decimals.

$$\frac{0.932x - 0.032}{7.423} = 14.14$$

It is no surprise that students admit they could not do the long multiplication and division involved to solve this equation without at least the use of a scientific calculator.

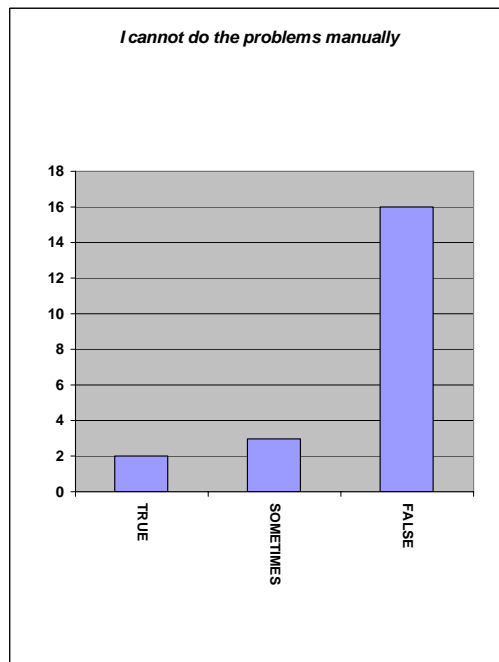
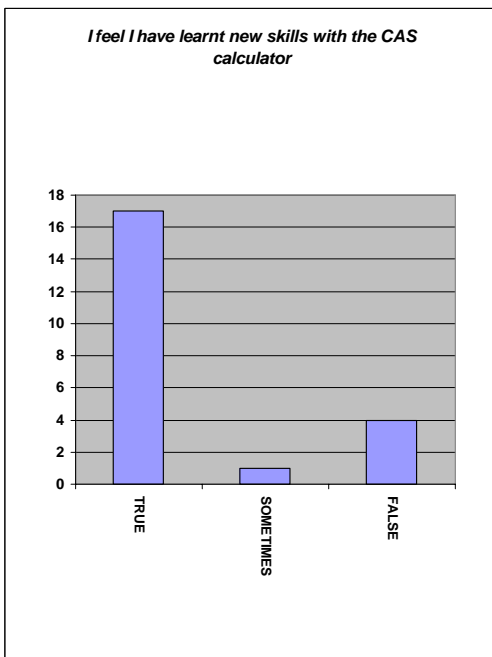
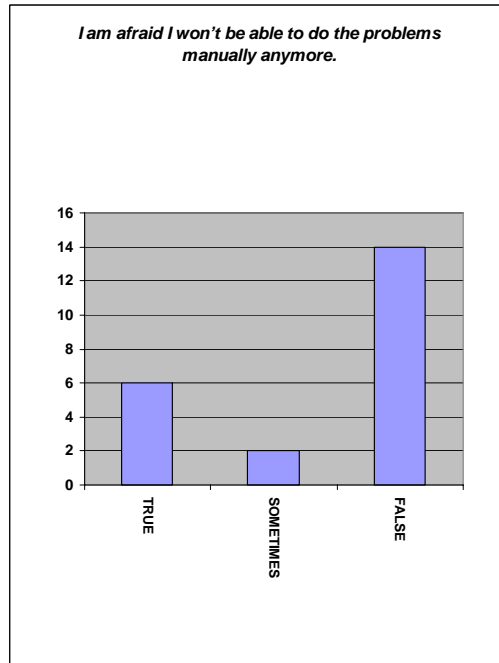
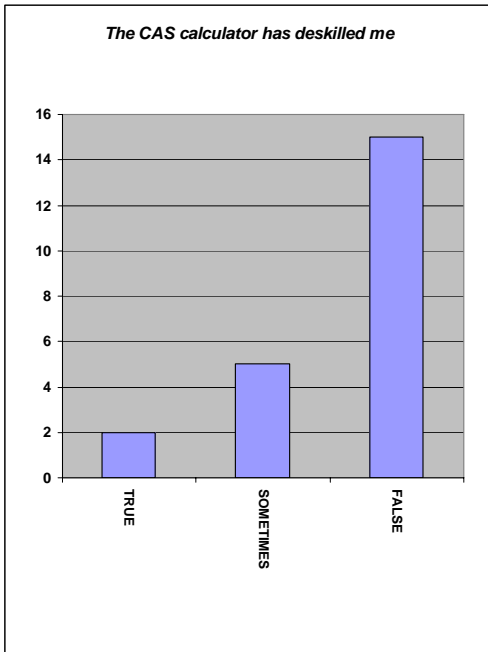


Students are confident of their ability to use the CAS calculator to solve linear equations.



Students recognise that the CAS calculator has no problem with equations involving long multiplication and division of decimals.

Students believe the CAS calculator makes maths easier.

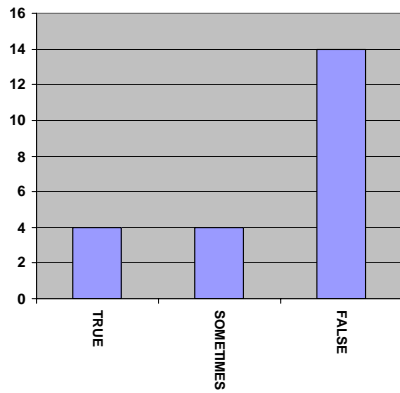


After the first session with the CAS calculator students were apprehensive that the CAS calculator might deskill them. Student responses to these questions indicate that students can solve linear equations manually even though the CAS calculator has been used regularly in class throughout this unit of work.

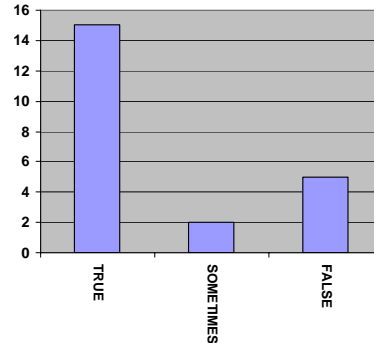
Students do not believe they have been deskilled.

Students even feel they have learnt new skills by using the CAS calculator in class.

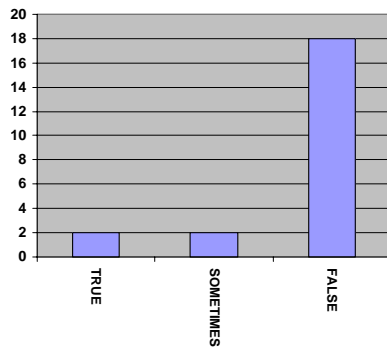
The CAS calculator is too easy



I use my brain less when we use the CAS calculator in class

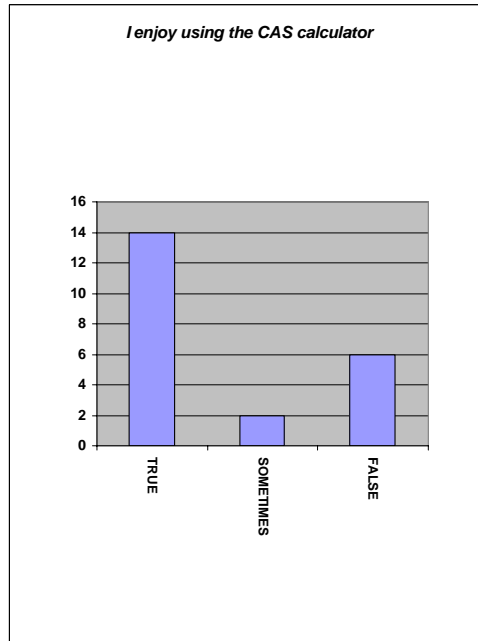
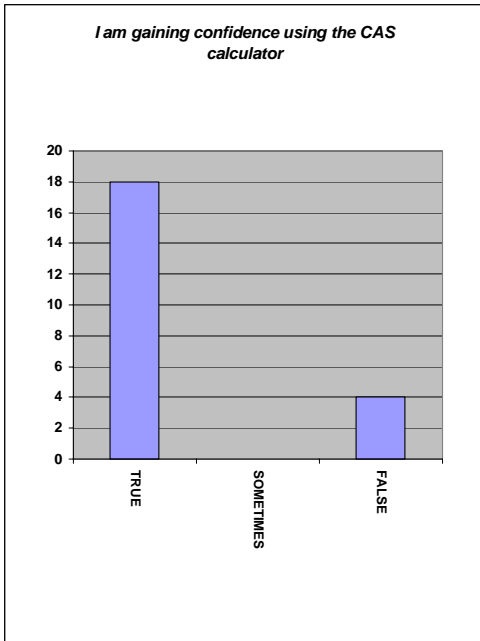


There is no point being in class the CAS calculator does it all.



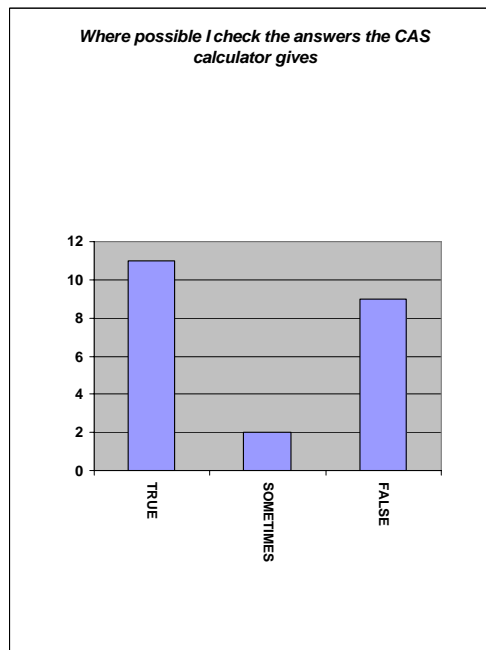
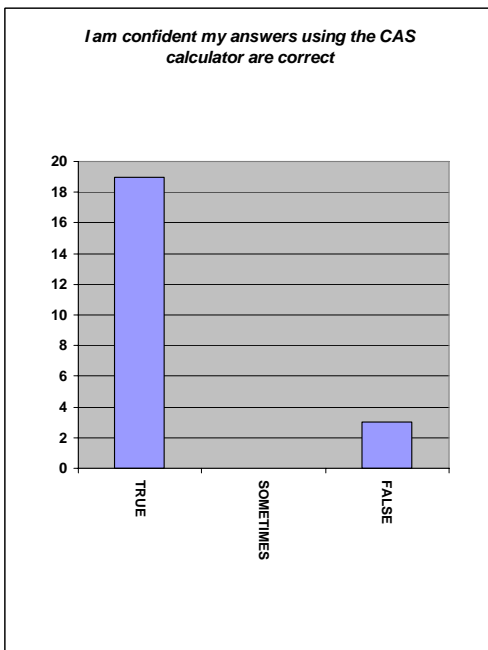
After the first session with the CAS calculator, students expressed the belief that the CAS calculator might make the maths too easy, that it would be pointless doing maths, the calculator would do it all for them.

Student responses to these questions indicate that the majority of students believe the CAS calculator does not make the maths too easy.



Some students exhibited cyberphobic type reactions, fear of the new technology. Confusion.

I was pleased to see most had overcome their fear of the technology and had gained confidence in using the CAS calculator and actually enjoyed using it.



Throughout the unit, whenever students were using the CAS calculator I tried to encourage them to check the reasonableness of their answers.

Most seem confident the answers are correct, however not all check their answers where possible. I assume some are confident the CAS calculator gives correct answers simply because it is an answer coming from a calculator.

**SOLVE MANUALLY,
SHOW YOUR WORKING SET OUT CORRECTLY**

NAME:

1. $3x + 7 = 34$	2. $\frac{x}{2} + 6 = 10$
3. $3x + 2 = 5x - 6$	4. $\frac{0.932x - 0.032}{7.423} = 14.14$

SOLVE WITH THE CAS CALCULATOR,

5. $4x - 7 = 29$	6. $\frac{x}{5} + 7 = 11$
7. $3x - 2 = 5x + 8$	8. $\frac{8.932x - 8.032}{74.23} = 1.414$

Response sheet **Name:**

We spent approximately three weeks learning how to solve linear equations similar to the above.

Answer true or false to the following questions

I could do all the first set of equations manually (with scientific calculator)	True	False
I could do all the first set of equations manually (without any sort of calculator)	True	False
I could do all of the second set with the CAS calculator	True	False
The CAS calculator is good for complex calculations	True	False
I cannot do the problems manually	True	False
The CAS calculator makes maths easier	True	False
The CAS calculator has deskilled me	True	False
I feel I have learnt new skills with the CAS calculator	True	False
I am afraid I won't be able to do the problems manually anymore.	True	False
The CAS calculator is too easy	True	False
There is no point being in class the CAS calculator does it all.	True	False
I am gaining confidence using the CAS calculator	True	False
I am confident my answers using the CAS calculator are correct	True	False
Where possible I check the answers the CAS calculator gives	True	False
I use my brain less when we use the CAS calculator in class	True	False
I enjoy using the CAS calculator	True	False

Any comments

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