

Learning Activity 3 : To use the Classpad300 as a tutor for the topic of solving linear equations.

Learning Behaviours: Watch attentively a demonstration, Follow written instructions, Eradicating errors, Drawing on related knowledge.

Teacher: RNP

DATE: 21/4/06

Class: 10 Maths Methods

Learning Activity Description

Here we will be using the CAS calculator essentially as a CAI (Computer Assisted Instruction) device. Using the calculator to facilitate the learning process. (Note : this activity requires the use of the algy.exe software.)

I provided the students with a feedback sheet with a number of questions designed to elicit their feelings, opinions, reactions to using the CAS calculator in this way, ie as a computer assisted instruction device. Learning Activity 3 : To use the Classpad300 as a tutor for the topic of solving linear equations.

Discussion Tool: Feedback sheet

Student Comments:

DID YOU ENJOY USING THE CLASSPAD300 IN THIS WAY (IE AS A TUTOR TO CORRECT YOUR WORK AND GIVE YOU A CHANCE TO AMEND YOUR ANSWER)?

“yes it was ok it tells us if we were right or not straight away and it tells us where we went wrong”

“I did enjoy it because it fixes your small mistakes and you don’t have to wait for a teacher to correct your work. So you know if you’re doing it right.”

“it’s good you can find out your mistakes by using the computer instead of asking the teacher”

“it was ok, it helped me get the right answer and kind of shows you where you made the mistake.”

“I prefer to work it out on paper.”

“Yes, but it doesn’t explain where you go wrong, you would still need adult help.”

“It tells you if your answers are correct or not and helps you do the equation step by step.”

“It shows you where the mistake is making it faster to correct the mistake.”

“I could find out where I went wrong without asking.”

WHAT ARE YOUR THOUGHTS ON USING THE CLASSPAD300 AS A TUTOR?

“I think it would be ok but verbal communication is still important when you learn.”

“I would prefer a real person”

“Yes it is good”

“A way of getting help faster.”

“A teacher is more effective than this because they can show you mistakes the calculator cannot.

“I don’t like it.” I prefer having a teacher that can explain.”

“It was good and helpful.”

“It can tell you real early in the sum if you are going wrong.”

“It cannot explain what you have done wrong and how to correct it.”

“You still do all the work and you can find out what you did wrong.”

IS IT A HELPFUL AID TO LEARNING TO SOLVE LINEAR EQUATIONS?

“yes, you end up finding out by yourself what you did wrong”

“Yes because it tells you if it’s wrong at the starts you don’t have to do it all again.”

“Kind of helps you but it doesn’t tell me fully what’s wrong.”

“No it doesn’t explain things clearly enough.”

DOES THE CLASSPAD300 ADD VARIETY TO THE WAY YOU LEARN ABOUT SOLVING LINEAR EQUATIONS?

“Yes, you end up finding out by yourself what you did wrong.”

“Yes it gives another dimension.”

“Yes but it takes longer to type things in. It’s a good different thing to do though”

ANY OTHER COMMENTS ABOUT TODAY’S LESSON?

“It was better than working out of the book.”

Teacher Journal:

This lesson went well in that students were fully engaged. The worksheet meant they had to produce something by the end of the lesson, they were not just aimlessly experimenting.

I see using the CAS calculator in this way (as Computer Assisted instruction) as a good thing.

- It is a way of adding variety to the way students learn algebra.
- It makes the students think about what they have done wrong. The CAS system shows them where the mistake is, not how to correct the mistake. Students need to draw on their past knowledge to determine the correct way to solve the equations.
- Students gain instant feedback on whether a problem has been solved correctly, and if not, they are shown exactly where the mistakes are.
- Student’s don’t have to rely on the teacher to check their work.

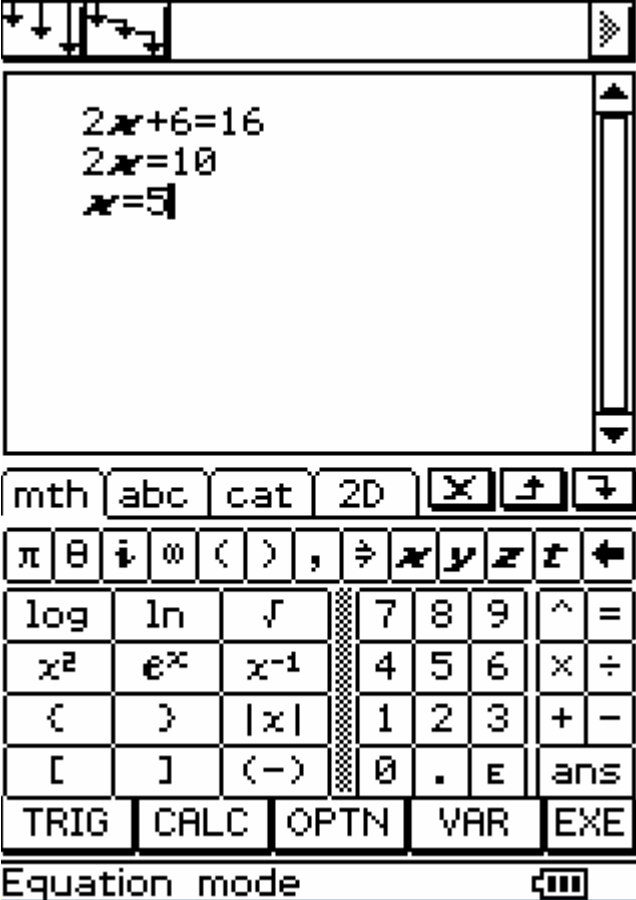
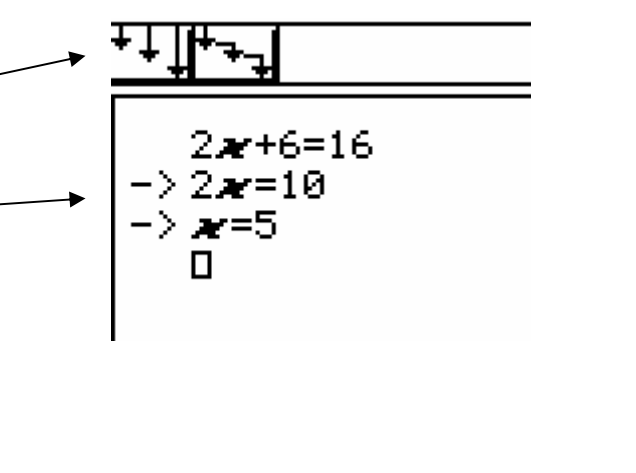
Student’s comments on the use of the CAS calculator for computer assisted instruction were on the whole very positive.

THE CLASSPAD300 AS A TUTOR

Aim: To use the Classpad300 as a tutor for the topic of solving linear equations.

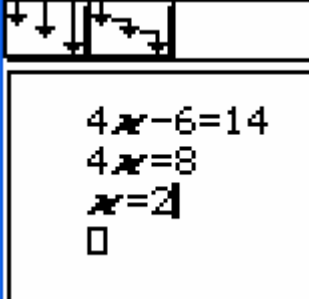

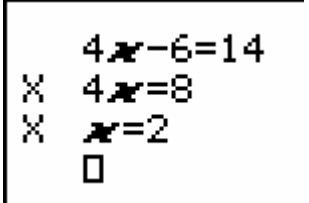

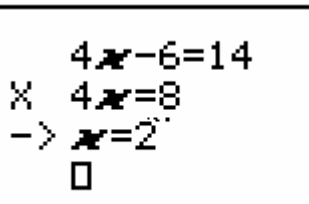
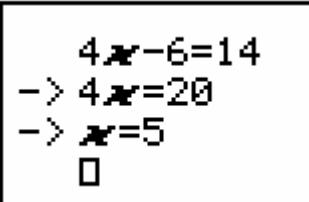
- Start up the program algy.exe
- The calculator can run in Equations or Expressions mode.
- Set the calculator to Equations mode.

EXAMPLE: Solve $2x+6=16$ using the Classpad300 as a tutor

<p>Type in the equation to be solved ...$2x+6=16$</p> <p><i>(To solve we would subtract 6 from both sides.)</i></p> <p>On the next line type in the result of subtracting 6 from both sides i.e. $2x=10$</p> <p><i>(To complete the solution we would divide both sides by 2.)</i></p> <p>On the next line type in the result of dividing both sides by 2, i.e. $x=5$</p>	 <p>The screenshot shows the Classpad300 interface in Equations mode. The display area contains three lines of text: $2x+6=16$, $2x=10$, and $x=5$. Below the display is a grid of function keys including mathematical symbols, trigonometric functions, and basic arithmetic. The status bar at the bottom indicates 'Equation mode'.</p>
<p>Click on either of these buttons to correct the steps of your solution.</p> <p>The arrows indicate that each step is correct. If all steps are correct, the problem is solved correctly.</p> <p>(A mistake is marked X)</p>	 <p>This screenshot shows the same Classpad300 interface, but with arrows pointing to the correction buttons (marked with a cross) above the display. The display now shows the solution steps with arrows indicating correctness: $2x+6=16$, $\rightarrow 2x=10$, $\rightarrow x=5$, and a final empty line. The status bar still shows 'Equation mode'.</p>

Example 2: A solution with errors ...

Solve $4x-6=14$

<p>Type in the equation $4x-6=14$</p> <p>Type in the following steps to solve the equation</p>		<p>Mistakes have been made in this solution</p>
<p>Correct the problem by clicking on this button.</p>  <p><i>This button compares each step with the equation at the very top.</i></p>		<p>The correction shows that compared to the first equation both steps are UNTRUE statements</p>
<p>Correct the problem by clicking on this button.</p>  <p><i>This button compares each step with the step before.</i></p>		<p>The correction shows that the first step is incorrect, but that the second step would be the correct thing to do IF the first step had been correct.</p>
<p>You can go back and change a step and then correct your working again.</p> <p>The correct setting out is shown at right.</p>		<p>The correction shows that all steps are correct and hence the problem is solved correctly.</p>

**SOLVE THE FOLLOWING EQUATIONS
USING THE CLASSPAD 300 AS A TUTOR**

Equation to solve	Final Solution (show steps)
$2x + 7 = 17$	
$\frac{x}{2} + 4 = 8$	
$4x + 5 = 2x + 13$	
$2(x + 3) = 10$	

$$2(x - 7) = 6(x + 1)$$

$$\frac{2x}{5} - 6 = -2$$

$$\frac{x + 2}{4} = 3$$

$$5x + 4 = x - 8$$

Check the answers to three of the above problems by doing the problem with pen and paper or substitution of the answer for x into the original equation.

**LESSON: THE CLASSPAD300 AS A TUTOR
FEEDBACK SHEET**

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