



## European Schools

Office of the Secretary-General

Pedagogical Development Unit

Brussels, 30 June 2015

**MEMORANDUM: 2015-06-M-6-EN**

A – To – An                      Directors of the European  
Schools

De – From – Von              Giancarlo MARCHEGGIANO

**Objet- Re – Betreff                      Decision taken by the group of experts concerning the arrangements for acquisition and the procedure for purchase of the technological tool with the characteristics required by the mathematics syllabuses, as approved by the Board of Governors at its meeting of 14-16 April 2010, by the parents and by the teachers**

On behalf of the group of experts responsible for choosing the technological tool to be deployed in the context of the mathematics syllabuses, I am writing to inform you, by means of this memorandum, of the decision taken by the group, which convened at the European School, Brussels III on 24 June 2015.

### **DECISION**

*In accordance with the arrangements for acquisition of the technological tool with the characteristics required by the mathematics syllabuses, as defined in document 2010-D-242-en-3 and the annexes thereto, approved by the Board of Governors, and following an analysis of developments in the hardware and software available, the group of experts in charge of choice of the technological tool, which convened at the European School, Brussels III on 24 June 2015, has chosen to accompany the mathematics syllabuses for secondary years s4, s5, s6 and s7 of the European Schools as from the beginning of the*

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European Commission, Bât. Joseph II 30, 1049 Brussels - Belgium  
Office: JII/30 - 02/124. Telephone: direct line +32 (2) 295 37 48. Fax: +32 (2) 295.62.70

<http://www.eursec.eu>

E-mail: [giancarlo.marcheggiano@eursec.eu](mailto:giancarlo.marcheggiano@eursec.eu)

*2015-2016 school year in September 2015, **TI-Nspire CAS software, version 4.0.X.X or higher.***

*The calculator authorised and supporting this software is the **TI-Nspire CX CAS.***

At the same time, and again within the framework set by the Board of Governors for the arrangements for acquisition of the technological tool to be deployed, as foreseen by the mathematics syllabuses, the group of experts has requested us to communicate to you, in the form of a memorandum to the Directors of the European Schools, the text below, so that it is included in the list of books for the 2015-2016 school year for the mathematics courses in years s4p4, s4p6, s5p4, s5p6, s6p3, s6p5, s6ma, s7p3, s7p5 and s7ma. This memorandum will replace the memorandum with the reference number 2014-06-M-2 dated 13 June 2014.

**TEXT FOR THE LIST OF BOOKS FOR 2015-2016**

*In accordance with the characteristics required by the mathematics syllabuses for years s4, s5, s6 and s7 and by decision of the group of experts, which convened on 24 June 2015, at the beginning of the 2015-2016 school year in September 2016, each student must have the **TI-Nspire CX CAS calculator, equipped with version 4.0.X.X or higher of the software.***



Giancarlo MARCHEGGIANO  
Deputy Secretary-General

Annexes: Justifications of the group of experts supporting the choice of the technological tool and of the related software for the 2015-2016 school year

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<http://www.eursc.eu>

E-mail: [giancarlo.marcheggiano@eursc.eu](mailto:giancarlo.marcheggiano@eursc.eu)

## Choice of the technological device – Comparative study of the market offer on 24/06/2015

### 1. Preliminary remarks

Before examining the comparative table which follows, it should be said that all the current technological tools, using different devices, were considered, the market offer being wide-ranging and varied. A distinction therefore needs to be made between the following families and sub-families of products:

- 1) software which it is possible to implement on a computer;
- 2) software associated with a device of the smart phone, tablet or other type (iPad, for example);
- 3) scientific and graphing calculators:
  - a) not offering Computer Algebra System (CAS) functionalities;
  - b) offering CAS functionalities:
    - i) associated with a calculator emulator, software to be installed on a computer and allowing a reproduction of the calculator to be displayed on the computer screen;
    - ii) associated with the same functionalities, enhanced by a classic and ergonomic presentation of a ‘traditional’ software program.

Returning to point 4 of the specifications, which concerns the special conditions concerning the use of technology during an examination (ref. 2010-D-571-en-3), it is clearly apparent that the tools referred to in points 1) and 2) have to be ruled out straightaway, as it is simply impossible to avoid all fraud connected with the possibilities of communication between two such devices.

As for scientific and graphing calculators not offering formal calculation functionalities, they quite simply do not allow present-day programs to be used and also have to be ruled out.

Thus the comparison which follows is confined to the three products currently on the market which match the characteristics detailed in points 3) b) (i) and ii)), namely the following devices:

- TI-Nspire CX CAS from Texas Instruments;
- ClassPad II Fx-CP400 from Casio;
- HP Prime from Hewlett-Packard.

## 2. Comparison

	<b>TI-Nspire CX CAS</b>	• <b>Casio Fx-CP440</b>	• <b>HP Prime</b>
<b>Computer software</b>	Real software with emulator function Offers simplified use and a high definition screen	Simply a less user-friendly calculator emulator	Simply a less user-friendly calculator emulator
<b>Operating systems</b>	Windows and Mac OS	Windows and Mac OS	Windows
<b>Text editor with interactive mathematics boxes</b>	Yes	No	No
<b>Programming language</b>	Yes Supports applications developed using Lua	Yes	Yes
<b>Examination mode</b>	Yes	Reset only (loss of all documents and of settings)	Yes, but less well suited to examination conditions in the ES
<b>Training of teachers</b>	Great experience, development of the software and of the calculator in collaboration with teachers	Centralised training structure, more product-oriented	?
<b>Databank of teaching material</b>	Yes (including in particular material developed by teachers in post in ES)	Yes	Yes, but small amount

<b>Interdisciplinary use</b>	Availability of many plug-in data collection modules	Availability of plug-in data collection modules	Availability of plug-in data collection modules
<b>Screen</b>	Colour with resolution of 320×240 pixels	Colour touch screen (stylus) with resolution of 320×528 pixels (see Keyboard section below)	Colour touch screen with resolution of 320×240 pixels

	<b>TI-Nspire CX CAS</b>	<b>• Casio Fx-CP440</b>	<b>• HP Prime</b>
<b>Keyboard</b>	• Alphanumeric and multifunction keys	Alphabet via touch screen (can be configured to AZERTY, QWERTY, etc.), the virtual keyboard then taking up half the screen	• Alphanumeric on multifunction keys
<b>Computer/calculator connection (wired or wireless)</b>	Port USB Docking station (transfer of data and recharging of batteries) TI-Navigator (wifi)	USB port	USB port Wireless connection kit
<b>ES languages available</b>	DK, DE, EN, ES, FR, IT, NL, POR, SUO, SW	DE, EN, ES, FR, SUO	DE, EN, ES, FR, NL, POR

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### **3. Comments**

Relating this comparative study to the one produced in 2010 brings to light the fact that whilst the offer is becoming more extensive, the characteristics of the different devices currently available are tending to converge.

Furthermore, no financial criterion has been used here: the discounts offered by dealers for grouped orders, such as the ones placed by the Parents' Associations, vary according to the countries and the number of calculators ordered and make it impossible to draw any general conclusion. It can merely be observed that the retail prices noted, which also vary according to the countries, do not reveal any significant difference.

### **4. Conclusion**

Given:

- the current market offer,
- all the points presented above,
- the reasons, both technical and pedagogical, as set out in the preamble to the syllabuses in official document 2010-D-441-en-5,

the group of experts has chosen for the 2015-2016 school year the TI-Nspire CX CAS device from Texas Instruments, although this choice may be reconsidered periodically in accordance with paragraph 7 of that document.

## Justification for the choice of version 4.0.0.235 of the software

The choice of version 4.0.0.235 of the software allows equality of opportunity for students to be ensured, in conformity with the outline reply given in the document '*Arrangements for acquisition of the 'calculator' foreseen by the new mathematics syllabuses*' (ref. 2010-D-242-en-3).

The reason is that calculators purchased and delivered at the beginning of the school year will come with that version of the software. Working with two versions would thus lead to distortion in terms of equality of opportunity, bearing in mind that version 4.0.0.235 of the software:

- enhances the level of security of *Press-to-Test* mode through correction of security vulnerabilities in version 3.9.0.463 (the last one indicated in the reference memorandum, namely 2014-06-M-2-EN) as part of the combating of hacking (possibility of fraud);
- corrects bugs (a problem inherent in any technological tool) and allows reliability to be increased, including at the mathematical level;
- through the new functionalities introduced, allows better implementation of certain points in the syllabuses which are likely to be assessed in tests and examinations.

Now, because of its smaller memory, which no longer allows upgrading of the software to version 4.0.0.235 (or higher), the TI-Nspire CAS TouchPad calculator can no longer be improved (correction of security vulnerabilities, correction of known and future bugs and new functionalities), thus adversely affecting the principle of equality of opportunity for students.

Finally, it should be noted that the colour screen of the TI-Nspire CX CAS calculator, the only one that supports version 4.0.0.235 (or higher) of the software, enables a far higher level of user comfort to be offered compared with that of the TI-Nspire CAS TouchPad, with its harder to read black and white screen, something which could be disadvantageous on pages containing graphs.