

Writing Diploma Exams Using Calculators

OVERVIEW

Calculators **are permitted to be** used when writing mathematics and science diploma exams. To ensure equity only calculators that have been approved by Alberta Education may be used when writing mathematics and science diploma exams.

Both **scientific and graphing** calculators, with no prohibited properties, (see *Calculator Use Rules*) may be used when writing **mathematics** or science diploma exam. To be approved by Alberta Education for diploma exam writing purposes, a graphing calculator must be a hand-held device designed primarily to perform mathematical computations, including logarithmic, trigonometric and graphing functions.

The following graphing calculator properties are permitted for math and science diploma exams:

- Function graphing and display capabilities, including displaying more than one function at a time and tracing a function
- Standard scientific calculator operations, e.g., sine, cosine, tangent, inverse functions, logarithms, power (x^n)
- Regression modeling functions

Alberta Education has **approved** the use of the following **graphing** calculators when writing math and science diploma exams; this list is updated annually.

Casio

- fx 9750 GII
- fx 9860 GIIs
- fx 9750 G Plus (no longer manufactured)

*NEW

Hewlett-Packard

- HP Prime

Sharp (no longer manufactured or supplied to Canada)

- EL-9900
- EL-9600
- EL-9600C

Texas Instruments

- TI-*n*spire CX Handheld
- TI-83 Plus, TI-84 Plus, TI-84 Plus Silver, or TI-84 Plus Pocket SE
- TI-84 Plus CE
- TI-83 (no longer manufactured), TI-83 Plus Silver (no longer manufactured)
- TI-*n*spire (with Touchpad or Clickpad) (no longer manufactured)
- TI-84 Plus C Silver (no longer manufactured)

*NEW

DIRECTIVES

The following directives apply to the use of calculators when mathematics and science diploma exams are being administered and written.

Principals

1. Principals shall ensure that, at the beginning of any mathematics or science diploma exam course, teachers and students are advised of the types of calculators that are currently approved for use when writing a diploma exam.
2. Prior to each diploma exam administration, the principal of a school or designated writing centre shall:
 - 2.1. communicate to students and teachers the expectations related to the use of calculators when writing diploma exams
 - 2.2. ensure that students are provided the opportunity to learn to clear and reset their own calculators
 - 2.3. ensure that teachers who are designated to supervise the administration of mathematics and science diploma exams are appropriately prepared for that role
3. Prior to each diploma exam administration, the principal of a school or designated writing centre shall establish appropriate procedures to ensure that:
 - 3.1. only approved calculators are brought into the exam room
 - 3.2. calculators used to write diploma exams are appropriately cleared and configured to safeguard test security and equity and to minimize distraction to students (see *Calculator Clearing and Checking Procedures*)

Exam Supervisors

1. Exam supervisors who supervise mathematics and science diploma exam administrations shall:
 - 1.1. understand and implement the directives, rules and procedures related to that role
 - 1.2. develop and implement procedures to ensure that only approved calculators are brought into the exam room and that they have been appropriately cleared and configured **before** and **after** the official scheduled exam administration period
 - 1.3. ensure that students are not sharing calculators
2. Prior to the commencement of the exam administration, exam supervisors shall review with students the diploma exam calculator use directives, rules and procedures, and students' responsibilities for implementing them

Students

1. Students who write mathematics and/or science diploma exams shall:
 - 1.1. understand all diploma exam calculator use directives, rules and procedures, and their responsibilities for implementing them

- 1.2. only bring an approved and appropriately configured calculator to the exam room **for their exclusive use**
- 1.3. demonstrate that their calculators are appropriately configured by clearing and resetting them **prior** to the commencement of, and **following**, the exam.

CALCULATOR USE RULES

1. Permitted Calculator Materials

Students may bring the following materials into the exam room, for their exclusive use, when writing a mathematics or science diploma exam:

- scientific calculators that are appropriately configured
- approved graphing calculators that are appropriately configured
- extra batteries

2. Prohibited Calculator Materials and Properties for Scientific and Graphing Calculators

The following calculator properties and materials are **not** permitted on any scientific or graphing calculator used in the exam room:

- programmed memory content
- symbolic manipulation capabilities
- ability to provide trigonometric calculation exact values
- ability to simplify radicals and rationalize denominators
- wireless communication capabilities
- built-in notes, libraries, or formulae (e.g. definitions or explanations in alpha notation)
- downloaded programs
- external (peripheral) devices and other support materials such as manuals, printed or electronic cards, printers, memory expansion chips or cards, external keyboards
- calculator cases

3. Calculator Configurations

Prior to the commencement of a diploma exam and **before leaving** the exam room, students must clear their calculators of all information that is stored in programmable or parametric memory and properly configure their calculators. Calculators must be set to operate in silent mode (see *Calculator Clearing and Checking Procedures*).

CALCULATOR CLEARING AND CHECKING PROCEDURES

The instructions required to clear the memories of approved graphing calculators and appropriately configure them are presented in the table below. To verify that nothing remains in programmed or parametric memory, after students have cleared them, a calculator's remaining memory value should be checked to ensure that it reflects its factory setting. The factory set memory values of approved graphing calculators are presented in the table below. The value of a calculator's remaining memory after clearing and resetting is dependent on the calculator's operating system. Because some calculator manufacturers use various operating systems for the same calculator model, their memory values upon reset may vary slightly from those shown in the table. If, after clearing, the memory values in a calculator are not reasonably close to the values presented in the table, then the calculators should be turned off and reset a second time. If the values fail to change, the calculators should not be used when writing the exam.

Teachers should ensure that the latest version of the calculator Operating System is used in their classrooms.

To prepare HP Inc. calculators (HP Prime) for diploma exam writing purposes, the *Exam Mode* feature must be used. For more information, refer to: http://h41112.www4.hp.com/ca/documents/HP_Prime_Custom_ExamMode_2015.pdf. If this link is broken, please refer to the Hewlett-Packard website or contact HP Calculators at calculators@hp.com. The following information for regression and the HP Prime may also be useful: Exponential Regression is in the form $y = B \cdot e^{M \cdot x}$ whereas Exponent Regression is in the form $y = B \cdot M^x$. When students are asked to determine an exponential regression function, they should pay attention to the *of the form* instruction in the question. Also, Logarithmic Regression on the HP Prime is in the form $y = m \cdot \ln x + b$, which is different than the form shown on the Mathematics 30-2 formula sheet.

To prepare Texas Instruments calculators (TI-*n*spire and *n*spire CX models), for diploma exam writing purposes, the *Press-to-Test* feature **must** be used. Note: Press-To-Test disables specific programs and apps and allows them to be restored after the exam. To use the *Transfer Press-to-Test Feature* on TI-Nspire:

1. Teacher sets up one TI-Nspire unit in Press-to-Test. See the link below for more details on the initial set up.
 - **For Math**, the *disable log template and summation functions* line is **unchecked** and all other lines are checked.
 - **For Science**, all lines are checked
2. When the unit reboots there is an option to Transfer Press-to-Test on the Press-to-Test Page
3. Using the mini to mini cable, connect the unit that has been configured to a student handheld unit and select the transfer option
4. You can then unplug and move on to the next student. It is not necessary to wait until the student calculator completes processing. Using this method, each calculator will be configured to the Press-to-Test format determined by the teacher

***NEW** To prepare Texas Instruments calculators (TI-83 and 84 models) for diploma exam writing purposes, the APPS program TestGuard or the Press-to-Test feature can be used in the latest operating system indicated:

- Press-to-Test (2.55 or higher)
- TestGuard (5.0 for CE models; 4.2 for all other TI-83 and 84 models)

For these models, calculator memory can also be completely reset instead using the steps outlined on pages 8 and 9.

To prepare Texas Instruments calculators for diploma exam writing purposes, we recommend referring to the step by step instructions for using TestGuard, Press-To-Test, or memory reset available at <http://education.ti.com/en/us/solutions/test-preparation-tools/tabs/exam-acceptance>. If this link is unavailable or you have questions, please contact 1-800-TI-CARES, ti-cares@ti.com, or your local representative.

Mode settings may be altered when calculator memories are cleared. Students should check the mode settings on their calculators before proceeding to write their diploma exam.

For further information about clearing calculators contact the Director, Diploma Program (see *Contacts* section).

Keystrokes to Clear, Configure, and Check Approved Graphing Calculators

Casio

Calculator Model	Keystrokes to Clear Memory	Keystrokes and Information Regarding Cleared Calculator
Fx-9750 GII	Select Menu Cursor to SYSTEM ICON EXE Reset menu F2 “Main Memory” F1 “reset memories yes” EXIT	Select Menu Cursor to MEM EXE Calculator will display: 61904 Bytes Free
Fx-9860 GII s	Select Menu Cursor to SYSTEM EXE F5: Reset F6: Next Page F1: Main & Storage F1: Yes, reset main and storage memories: EXITMENU	Select Menu Cursor to MEM EXE F1: Main Memory Calculator will display: 61904 Bytes Free
Fx-9750G Plus	Select Menu Cursor to MEM EXE Reset EXE F1 yes-Reset	Select Menu Cursor to MEM EXE Calculator will display: 28628 Bytes Free

Hewlett-Packard

Calculator Model	Keystrokes to Clear Memory	Information Regarding Cleared Calculator
HP Prime (firmware 1.3 or greater) *Note: this is a touch screen calculator	<ol style="list-style-type: none"> Press Menu, 3: Messages, Shift, Clear, tap  Press On and then ESC simultaneously <p>Configuration: Use the drop down menu to select Custom Mode</p> <p>Timeout: Set an appropriate length of time, ensuring that the calculator will remain in Exam Mode for the entire writing period</p> <p>Default Angle: No change</p> <p>Password: Entered by exam supervisor and not shared with the student</p> <p>Check Blink LED</p> <p>Tap  on the menu bar on the bottom of the screen and check each line listed below to disable features</p> <ol style="list-style-type: none"> System Apps: click  to expand this menu and check all lines except: <ul style="list-style-type: none"> - Function - Statistics 1Var - Statistics 2Var - Spreadsheet User Apps Physics Help Units Matrices Complex 	Remaining memory may vary depending on the applications that are locked on the unit. These applications are inaccessible while in Exam Mode

	H) CAS I) USB J) Notes and Programs K) New Notes and Programs L) Mathematics : click  to expand this menu and check “Trigonometry” line Tap 	
	3. Tap  and swipe the lock icon to the right to begin Exam Mode LED lights on top of the handheld unit will be on	

Notes: For HP Prime models

- Message screen does **not** get cleared when set in Exam Mode, therefore it is necessary to clear any information saved on the Message screen before **and** after the exam. (Please refer to Step 1 above.)
- To ensure the device remains in Exam Mode for the entire duration of the exam, it is suggested that the Timeout period be set longer than the allowable writing time for the student.
- To exit Exam Mode and clear all memory, use the following keystrokes:
 - To Exit Exam Mode: Press **On** and then **ESC** simultaneously
Input password, tap 
 - To Clear All Memory: Press **Shift**, , **Shift**, **Clear**, tap 
 - To Clear All Messages: Press **Menu**, 3: **Messages**, **Shift**, **Clear**, tap 

Sharp

Calculator Model	Keystrokes to Clear Memory	Keystrokes and Information Regarding Cleared Calculator
EL-9600 EL-9600C	2nd X0TN (Option) Log (Reset) 2 (All Memory) CL (Clear all data)	2nd X0TN (Option) ▼ Calculator will display: 18562 Bytes Free
EL-9900	2nd $\frac{+}{\times}$ $\frac{-}{\div}$ (Option) Ln (Reset) 2 (All Memory) CL (Clear all data)	2nd $\frac{+}{\times}$ $\frac{-}{\div}$ (Option) ▼ Calculator will display: 47447 Bytes Free

Texas Instruments

Recommended Operating Systems are indicated after each calculator in brackets. Students and teachers are encouraged to access the free updates to OS as needed using the TI website <http://education.ti.com>

Calculator Model	Keystrokes to Clear Memory	Information Regarding Cleared Calculator
TI-nspire (with Clickpad) (OS 3.9)	<p>With handheld off, hold down the “esc”, and “on” keys until the Press-To-Test dialog is displayed</p> <p>For mathematics exams only, uncheck only the line “disable log_bx template and summation functions”</p> <p>then select Press-to-Test and then select “ok”</p> <p>The handheld will reboot. After rebooting, a “Press-To-Test invoked” dialog box will appear on the screen and the LED light will blink amber if set for a math exam and the LED light will blink green if set for a science exam</p>	<p>Remaining memory may vary depending on the documents that are locked</p> <p>These documents are inaccessible while in Press-to-Test</p>
TI-nspire (with Touchpad) (OS 3.9) TI-nspire CX (OS 4.2 or higher)	<p>With handheld off, hold down the “esc”, and “on” keys until the Press-To-Test dialog is displayed</p> <p>For mathematics exams only, uncheck only the line “disable log_bx template and summation functions”</p> <p>then select Press-to-Test and then select “ok”</p> <p>The handheld will reboot. After rebooting, a “Press-To-Test invoked” dialog box will appear on the screen and the LED light will blink amber if set for a math exam and the LED light will blink green if set for a science exam</p>	<p>Remaining memory may vary depending on the documents that are locked</p> <p>These documents are inaccessible while in Press-to-Test</p>

Notes: For TI-nspire models

- Resetting the memory on TI-nSpire models is **not** sufficient as it fails to disable prohibited features
- Check that the calculator is in Press-to-Test mode by watching for the flashing ‘amber’ LED for math exams or ‘green’ LED for science exams on the top of the handheld unit
- The presence of an amber light does not ensure that the calculator has been correctly set for a math exam unless the calculator clearing instructions have been followed
- To exit Press-to-Test, the calculator must be connected to another TI-nspire using a mini-USB cable. Use the following keystrokes:

Push key  and key  simultaneously

Select **9** (Press-to-Test)

Select **1** (Exit Press-to-Test)

Calculator Model	Keystrokes to Clear Memory	Keystrokes and Information Regarding Cleared Calculator
TI-83 (OS 1.19)	2^{nd} + (MEM) 5 (Reset) 1 (All Memory) 2 (Reset)	2^{nd} + (MEM) 1 <p style="text-align: center;">Calculator will display: 61904 Bytes Free</p>
TI-83 Plus (OS 1.19) TI-83 Plus Silver (OS 1.19) TI-84 Plus (OS 2.55)	2^{nd} + (MEM) 7 (Reset) >> (All) ** Enter 1 (Reset)	<p>Remaining memory may vary depending on the model, operating system and age of the calculator.</p>

TI-84 Plus Silver (OS 2.55) ¹ TI-84 Plus Pocket SE (OS 2.55 or higher) ¹ Not available for purchase in North America		2^{nd} + (MEM) 2 Currently most operating systems will display: RAM Free 24317
TI-84 Plus C Silver (OS 4.0)	2^{nd} + (MEM) 7 (Reset) >> (All) ** Enter 1 (Reset)	Remaining memory may vary depending on the model, operating system and age of the calculator. 2^{nd} + (MEM) 2 Currently most operating systems will display: RAM Free 21840
TI-84 Plus CE (OS 5.1 or higher)	2^{nd} + (MEM) 7 (Reset) >> (All) ** Enter 1 (Reset)	Remaining memory may vary depending on the model, operating system and age of the calculator. 2^{nd} + (MEM) 2 Currently most operating systems will display: RAM Free 152891
Notes: <ul style="list-style-type: none"> • **The >> step above is very important: If not followed, the memory may not be properly cleared. • The application “Finance” is the only app that remains after following the clearing instructions. • If, after clearing the calculator, the screen is blank, the contrast needs to be reset. To do this, use the 2^{nd} and then ▲ repeatedly. • Press-to-Test or Test Guard can be used rather than the directions above for some of these calculators in order to preserve stored programs, applications and other data if desired (for directions on these methods see information on page 5) • On the TI-84 Plus models, Press-to-Test can also be enabled with the following keystrokes: With the calculator off, press the left arrow, right arrow, and On key simultaneously Select NO disable logBASE Select NO disable Σ(Press ZOOM (OK) 		

