Delaware System of Student Assessments (DeSSA)

Calculator Types and Policy for Smarter Mathematics Assessments

Starting with fall 2014, Delaware will implement the Smarter Balanced Calculator Policy without modification for Grades 3-8 and 11. The Department requires the students to use the online calculator for their respective grade level as the items and their statistics used for Smarter Math and ELA are being shared across consortium member states. The Smarter Balanced calculator policy for 2014–2015 remains the same as for the 2014 Field Test.

For students taking the online Smarter Balanced mathematics test in 2014–2015, no external calculators are permitted unless students' accommodations are explicitly stated in the *Smarter Balanced Usability, Accessibility, and Accommodations Guidelines* and the *Delaware Accessibility Guidelines* documents.

Students and educators should already be familiar with these devices as they are the same as the ones being used for the practice tests. Furthermore, these calculators were already available for the prior assessment system but at different grades so it is important to carefully read this memo.

Calculator Restrictions:

- Grades 3–5: **No** calculator
- Grade 6: Basic (**four-function only**) – online
- Grades 7–8: Scientific– online
- Grade 11: Scientific/graphing – online

Grades 3-5

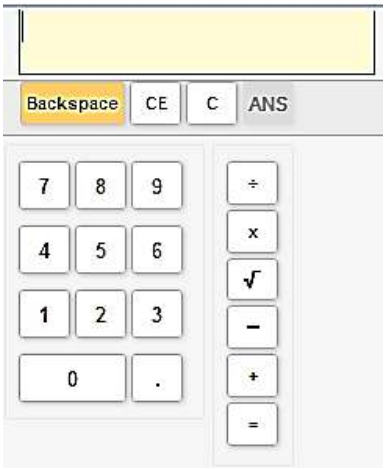
The Smarter Balanced summative mathematics assessments at grades 3-5 DO NOT allow for calculator usage.

Grades 6-8

The Smarter Balanced summative mathematics assessments at grades 6-8 are divided into two sections: Calculator Available and Calculator Not Available.

At ***grade 6***, the Smarter Balanced summative mathematics assessment allows an embedded online four-function calculator during the Calculator Available section.

The online calculator for grade 6 will look like this:



Basic (Four-Function) Calculator The basic calculator includes a number pad and buttons for adding, subtracting, multiplying, and dividing. It also includes the square root feature.

Function keys include:

Backspace – Clears the last numeral entered

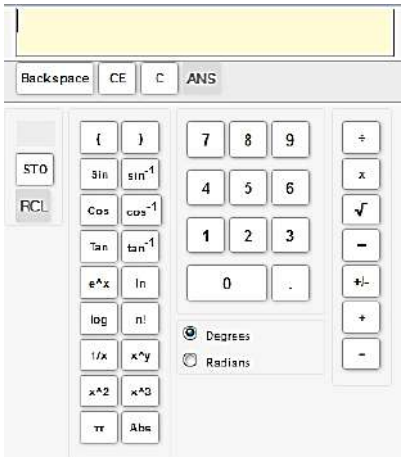
CE – Clears the last numeric entry made; the previous operation is still current

C – Clears all numbers and operations

ANS – Recalls the last answer

At ***grades 7 and 8***, the Smarter Balanced summative mathematics assessment allows an embedded online scientific calculator during the Calculator Available section. No graphing calculator is allowed. If the students need such a device, the tools for answering the item or task will be provided with the item or task.

The online calculator for grades 7 and 8 will look like this:



Scientific Calculator

In addition to the functions available on the basic calculator, the scientific calculator includes exponential, logarithmic, and trigonometric functions.

Function keys include:

STO – Stores displayed value in memory;
M – Indicates memory full
RCL – Recalls stored value from memory
C – Clears stored value in memory
ANS – Recalls the last answer
Sin – Displays **"sin("** *followed by expression*—used to find sine values
Cos – Displays **"cos("** *followed by expression*—used to find cosine values
Tan – Displays **"tan("** *followed by expression*—used to find tangent values
$\sin^{-1}$ – Displays **"sin^–1("** *followed by expression*—used to find the inverse of sine values
$\cos^{-1}$ – Displays **"cos^–1("** *followed by expression*—used to find the inverse of cosine values
$\tan^{-1}$ – Displays **"tan^–1("** *followed by expression*—used to find the inverse of tangent values
e^x – Displays **"exp("** *followed by expression*—used to find exponentials
ln – Displays **"ln("** *followed by expression*—used to find natural logarithms
log – Displays **"log("** *followed by expression*—used to find logarithms **(** – Left parentheses
) – Right parentheses
n! – Finds factorial of displayed value
1/x – Finds multiplicative inverse of displayed value
x^y – Displays carrot symbol to represent power notation
x^2 – Finds the square of the displayed value
x^3 – Finds the cube of the displayed value
π – Displays the value of pi as 3.141593
Abs – Displays **"Abs("** followed by expression – used to find absolute value
Degrees – Sets calculator in degrees mode
Radians – Sets calculator in radians mode

The format of the items, in some instances, will take care of the computation part. For example, some of the Technology Enhanced items will have the necessary tools embedded to correctly answer the item/task. So if students need to demonstrate graphing capabilities to communicate their understanding, the tool will be available online through the testing platform. Students should have no major difficulties using it if they have used the practice and training tests. Using Mozilla Firefox, Smarter calculators are available at http://sbac.portal.airast.org/practice-test/calculators/

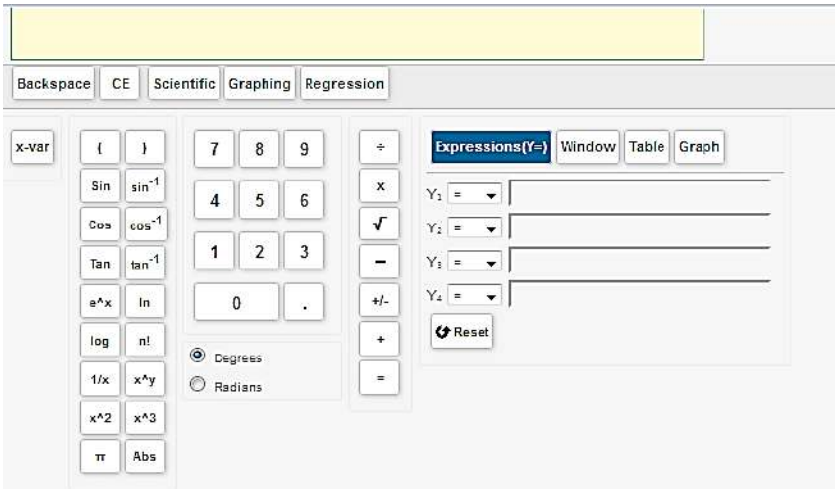
Technology changes often and it is important for the students to be flexible. There are many universal tools and some calculators are visually different but have some of the same functions as others. Relationships among multiple representations will be important in middle school but key in high school.

High School

The Smarter Balanced summative mathematics assessments at high school are also divided into two sections: Calculator Available and Calculator Not Available.

At ***high school***, the Smarter Balanced summative mathematics assessment allows an embedded online calculator with scientific, regression, and graphing capabilities during the Calculator Available section.

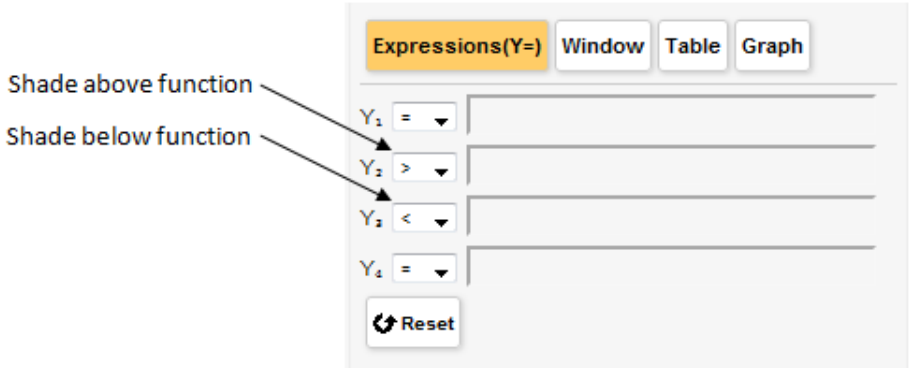
The scientific calculator view will appear as the default view. If students want to enable the graphing or regression mode, they will have to click on the appropriate button at any time to switch between modes. The graphing calculator can plot graphs for up to four equations.



Function keys include:

Expressions (Y=) – Allows student to enter 4 different expressions
Window – Allows student to set maximum and minimum axes values for graphing window
Table – Allows student to create a table of values for each entered expression
Graph – Shows graph for each entered expression using the window
Reset – Clears all expressions and resets window to default values
***x*-var –** Inputs *x*-variable

Drop Down Equality/Inequality Options:



Window View

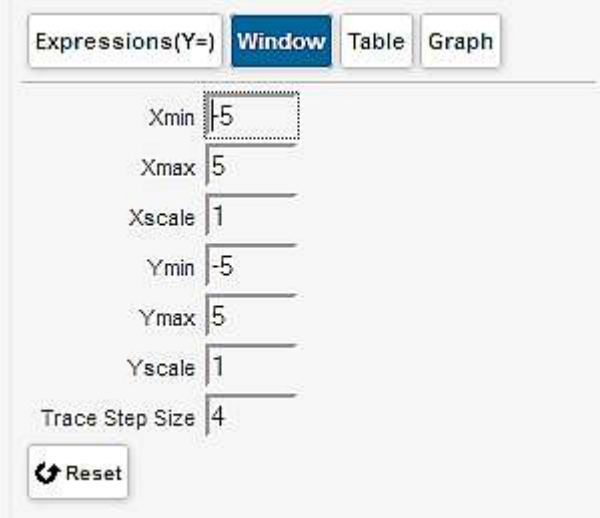
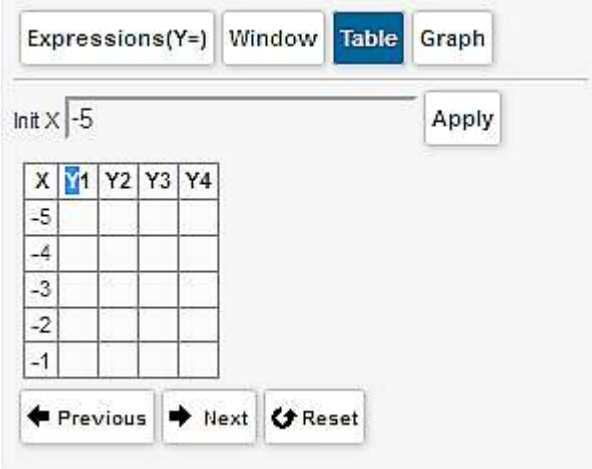


Table View

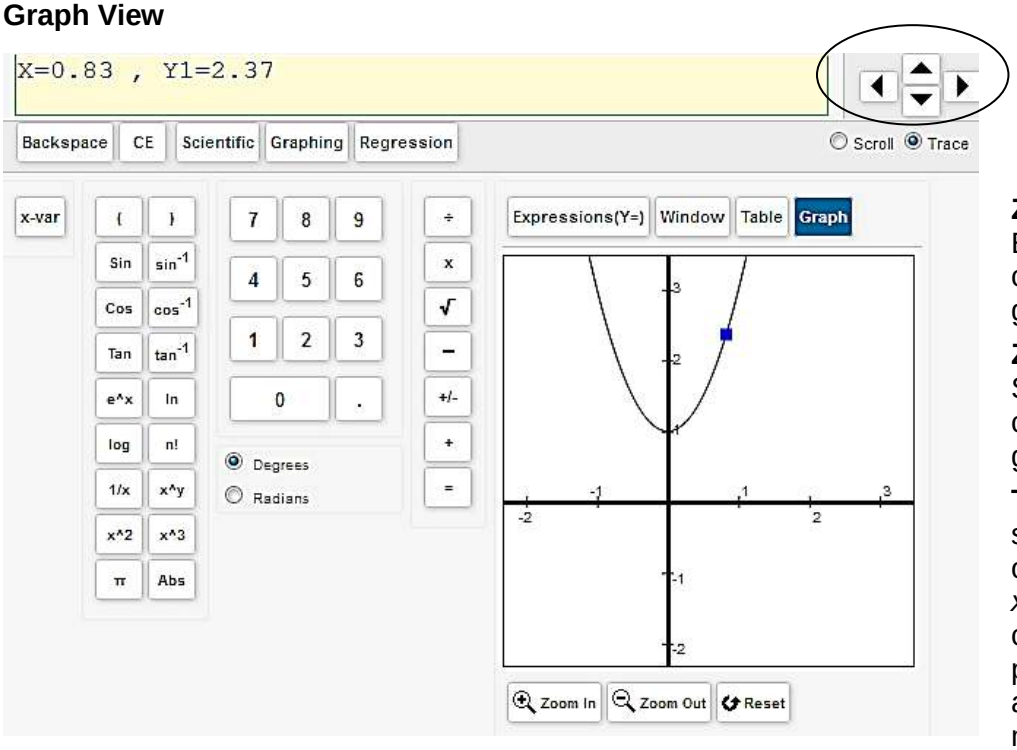


Apply – Shows *y*-values for the inputted x-value

Previous – Shows *y*-values for the preceding 5 values of *x*

Next – Shows *y*-values for the next 5 values of *x*

Graph View



Allows student to move or trace on the graph

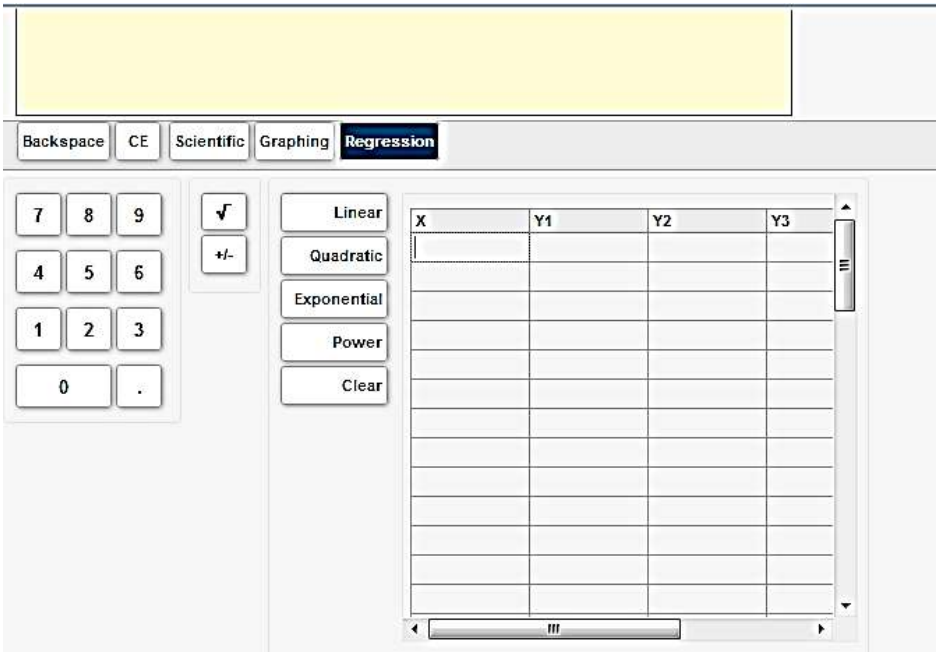
Zoom In – Enlarges graph by changing graphing window

Zoom Out – Shrinks graph by changing graphing window

Trace – Allows student to observe both the *x* and *y* coordinates of a point on the graph as the cursor moves along the graph of the function.

Regression Calculator

In addition to the functions available on the basic calculator, the regression calculator can derive a linear, quadratic, and exponential equation.



http://www.smarterbalanced.org/wordpress/wp-content/uploads/2014/03/Calculator-Availability-by-Grade-Level.pdf