

# Calculator Review

## Ti-30xs Multiview Calculator



Name: \_\_\_\_\_

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**Topics**

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***What type of Calculator do I use?***

Texas Instruments TI-30XS on-screen calculator will automatically be available when you sit for the GED® test on computer after January 2nd, 2014. The calculator-prohibited items are limited to only 5 items on each form of the Mathematical Reasoning test. All of the other items in that module allow the use of the calculator.

Keep in mind that the calculator is also provided on certain items in the Science and Social Studies tests where it would be useful to test-takers in answering those items. The calculator used in testing in 2014 must be the on-screen calculator.



Effective October 6, students can bring in and use a handheld TI-30XS Multiview Scientific Calculator for any of the three test subjects that allow the use of a calculator: Mathematical Reasoning, Science, and Social Studies. Students who want to use a handheld calculator are responsible for bringing their own TI-30XS Multiview Scientific Calculator

The new Math test will include two distinct parts - Part 1 and Part 2 with a brief, three-minute break in between. Part 1 includes the initial test items that do not allow the use of any calculator. Part 2 still includes the embedded on-screen calculator, but now students have the option to use a handheld calculator.

Students who bring in a handheld calculator must place it in their secure lockers at the start of the test. Once students complete Part 1, they can go to their lockers during the three-minute break to get their handheld calculator to use on Part 2

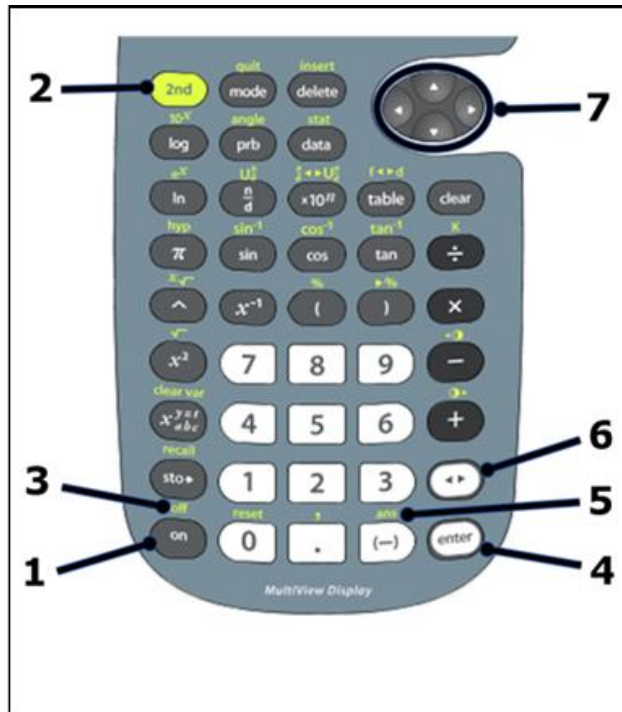
***What is with the non-calculator questions?***

The non-calculator questions are the first five questions on the test. These five test questions test foundational arithmetic skills including the four basic operations (addition, subtractions, multiplication, and division), exponents, roots, and basic number sense.

You can move back and forth between the first five questions, **but** you have to submit your answers to those five questions before moving on to the rest of the test. This prevents you from using the calculator on a later test question to calculate the answer to one of the calculator-prohibited questions.

Please note that the non-calculator test items are not timed separately from the rest of the test. It is up to you to manage your time and to complete both the non-calculator and calculator parts of the test within the allotted 115 minutes.

**Basic Operations of the Calculator**



The diagram shows a calculator with the following callouts:

- 1** points to the **on** button.
- 2** points to the **2nd** button.
- 3** points to the **off** button.
- 4** points to the **enter** button.
- 5** points to the **2nd** and **ans** buttons.
- 6** points to the **↔** button.
- 7** points to the directional arrow buttons.

1 **on** turns on the calculator.

2 **2nd** turns on the 2nd indicator and accesses the function shown above the next key you press.

3 **2nd** **off** turns off the calculator and clears the display.

4 **enter** completes the operation or executes the command.

5 **2nd** **ans** (**(-)**) recalls the most recently calculated result and displays it as Ans.

6 **↔** toggles the answer between fraction and decimal, exact square root and decimal, and exact pi and decimals formats.

7 **↔** allows you to move the cursor on the screen and in operations as necessary.

**Clearing and Correcting**

- **clear** - clears characters and error messages. Press **clear** once to clear an uncompleted entry; press it again to clear the display. You can scroll up and use **clear** to clear entries in history.
- **2nd** **[insert]** lets you insert a character at the cursor.
- **delete** deletes the character at the cursor. Then, each time you press **delete**, it deletes 1 character to the left of the cursor.

**Examples**

a) Enter 4569 + 285, and then change it to 459 + 865. Complete the problem.

Press	Display
4569 <b>+</b> 285	4569+285
⬅ ⬅ ⬅ ⬅ ⬅ ⬅ <b>delete</b>	459+285
➡ ➡ ➡ ➡ <b>2nd</b> <b>[insert]</b> 6	459+2865
<b>enter</b>	459+2865 3324

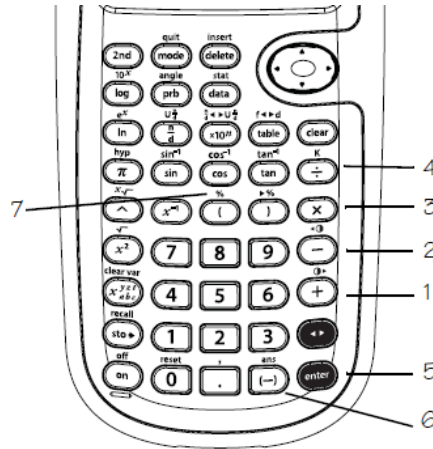
b) Enter 21595. Clear the 95. Clear the entry.

Press	Display
21595	21595
⬅ ⬅ <b>clear</b> (Clear to right)	215
<b>clear</b> (Clear entry)	█

**Basic Operations with Integers**

**Keys**

1.  $+$  adds.
2.  $-$  subtracts.
3.  $\times$  multiplies.
4.  $\div$  divides.
5. **enter** completes the operation or executes the command.
6.  $(-)$  lets you enter a negative number.
7. **2nd** [%] appends the % sign to a number.



**Notes:**

- The TI-30XS MultiView™ allows implied multiplication.
  - **Example:**  $3(4+3) = 21$
- Do not confuse  $(-)$  with  $-$ .  $-$  allows subtraction.
- Use parentheses to group the negation sign with the number if needed.
  - **Example:**  $-2^2 = -4$ , and  $(-2)^2 = 4$ .
- Press  $\leftarrow \rightarrow$  to toggle the display result between fraction and decimal answers, exact square root and decimal, and exact pi and decimal.

**Examples:**

a)  $2 + 54 - 6$

Press	_____
$2$ $+$ $54$ $-$	$2+54-6$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>
$6$ <b>enter</b>	$50$

b)  $-3 + 12$

Press	_____
$(-)$ $3$ $+$	$-3+12$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>
$12$ <b>enter</b>	$9$

c) Mike makes \$80 per week. He saves 15% of his earnings. How much does Mike save per week?

Press	_____
$15$	$15$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>
<b>2nd</b> [%] $\times$	$15\% \times 80$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>
$80$ <b>enter</b>	$12$

d)  $1 + 2 \times 3$

Press	_____
$1$ $+$ $2$ $\times$	$1+2 \times 3$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>
$3$ <b>enter</b>	$7$

e)  $1 + (2 \times 3)$

Press	_____
$1$ $+$ $($ $2$ $\times$ $3$	$1+2 \times 3$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>
$)$ <b>enter</b>	$7$
	$1+(2 \times 3)$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>

f)  $(1 + 2) \times 3$

Press	_____
$($ $1$ $+$ $2$ $)$	$1+2 \times 3$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>
$\times$ $3$ <b>enter</b>	$9$
	$1+(2 \times 3)$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>
	$(1+2) \times 3$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>

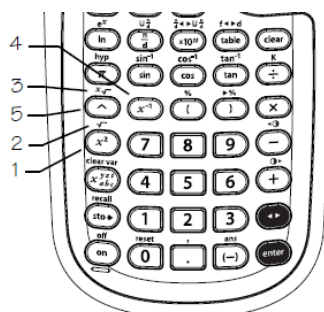
g) Give decimal approximation of  $\sqrt{8}$

Press	_____
<b>2nd</b> [ $\sqrt{\quad}$ ]	$\sqrt{8}$ <span style="float: right;">DEG <math>\frac{\pi}{180}</math></span>
$8$ <b>enter</b>	$2\sqrt{2}$
$\leftarrow \rightarrow$	$2.828427125$

**Powers, Roots, and Reciprocals**

**Keys**

1.  $x^2$  squares the value.
2.  $2^{nd}$   $\sqrt{\phantom{x}}$  calculates the square root.
3.  $2^{nd}$   $x^{\sqrt{\phantom{x}}}$  calculates the specified root (x) of the value.
4.  $x^{-1}$  calculates the reciprocal.
5.  $\wedge$  raises a value to a specified power.



**Notes:**

- To use  $\wedge$ , enter the base, press  $\wedge$ , and then enter the exponent.
- In Classic mode, exponentiation using the  $\wedge$  key is evaluated from left to right.
  - The expression  $2^3^2$  is evaluated as  $(2^3)^2$ , with the result of 64.
- In MathPrint™ mode, exponentiation using the  $\wedge$  key is evaluated from right to left.
  - Pressing  $2 \wedge 3 \wedge 2$  displays as  $2^{3^2}$ , with the result of 512.
- The result of calculations with  $\wedge$  must be within the range of the TI-30XS MultiView™ calculator.
- The TI-30 MultiView calculator evaluates expressions entered with  $x^2$  and  $x^{-1}$  from left to right in both Classic and MathPrint modes. Pressing  $3 x^2 x^2$  displays as  $3^{2^2}$ . This is calculated as  $(3^2)^2 = 81$ .
- The base and the exponent may be either positive or negative.
- Use parentheses where needed to obtain the desired results.
  - **Example:**  $-2^2 = -4$ , and  $(-2)^2 = 4$ .

**Examples:**

h)  $27.4^2$

Press	Display
27 $\square$ 4	
$x^2$ enter	27.4 <sup>2</sup> 750.76
or	
27 $\square$ 4 $\wedge$	
2 enter	27.4 <sup>2</sup> 750.76

i)  $\sqrt[3]{3}$

Press	Display
$2^{nd}$ $\sqrt{\phantom{x}}$ 3 enter	$\sqrt[3]{3}$
$\blacktriangleleft$	$\sqrt[3]{3}$ 1.732050808
mode $\downarrow$ $\downarrow$	
$\blacktriangleright$ enter	$\sqrt[3]{3}$ 1.732050808
clear enter	$\sqrt[3]{3}$ 2

j)  $2.3^3$

Press	Display
2 $\square$ 3 $\wedge$	
3 enter	2.3 <sup>3</sup> 12.167
$\blacktriangleleft$	2.3 <sup>3</sup> 12.167
	12.167
	1000

k)  $\sqrt[3]{125}$

Press	Display
3 $2^{nd}$ $x^{\sqrt{\phantom{x}}}$	
125 enter	$\sqrt[3]{125}$ 5

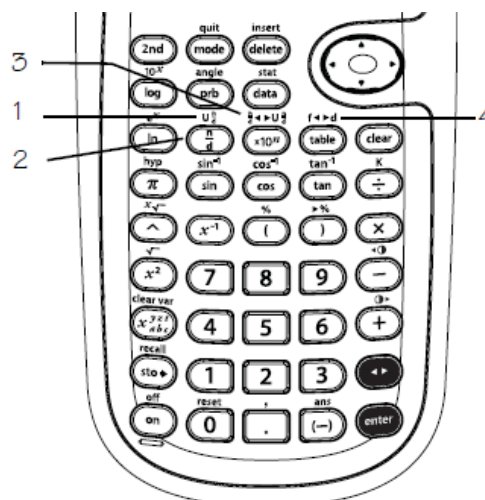
l)  $\sqrt{5^2 - 4(1)(3)}$

Press	Display
mode $\downarrow$ $\downarrow$ $\downarrow$	
$\blacktriangleright$ enter clear	$\sqrt{5^2-4(1)(3)}$ $\sqrt{13}$
$2^{nd}$ $\sqrt{\phantom{x}}$ 5 $x^2$	
$\square$ 4 $\square$ 1 $\square$	
$\square$ 3 $\square$ enter	
$\blacktriangleleft$	$\sqrt{5^2-4(1)(3)}$ $\sqrt{13}$
	3.605551275

**Basic Operations with Fractions and Mixed Numbers**

**Keys**

1.  $[\text{2nd}][\text{U}_a^b]$  lets you enter mixed numbers and fractions. The unit must be an Integer. The numerator and denominator can contain decimals.
2.  $[\frac{\square}{\square}]$  lets you enter a simple fraction. Pressing  $[\frac{\square}{\square}]$  before or after a number can result in differing behavior. In MathPrint™ mode, entering a number before pressing  $[\frac{\square}{\square}]$  usually makes that number the numerator.
3.  $[\text{2nd}][\frac{\square}{\square} \leftrightarrow \text{U}_a^b]$  converts a simple fraction to a mixed number or a mixed number to a simple fraction.
4.  $[\text{2nd}][\text{f} \leftrightarrow \text{d}]$  converts a fraction to its decimal equivalent or changes a decimal to its fractional equivalent, if possible.



**Notes:**

- Fractional results and entries are automatically simplified to their lowest terms.
- Calculations using fractions can display fraction or decimal results, depending on input.

**Examples:**

a)  $\frac{5}{6} + \frac{1}{10}$

Press	Display
$5 [\frac{\square}{\square}] 6 [\text{+}] 1 [\frac{\square}{\square}] 10 [\text{enter}]$	$\frac{5}{6} + \frac{1}{10}$ $\frac{14}{15}$

b)  $4\frac{3}{8} + 2\frac{3}{4}$

Press	Display
$4 [\text{2nd}][\text{U}_a^b] 3 [\text{+}] 2 [\text{2nd}][\text{U}_a^b] 3 [\text{+}] 4 [\text{enter}]$	$4\frac{3}{8} + 2\frac{3}{4}$ $\frac{57}{8}$
$[\text{2nd}][\frac{\square}{\square} \leftrightarrow \text{U}_a^b] [\text{enter}]$	$\frac{57}{8} \rightarrow 7\frac{1}{8}$

c) Convert  $5\frac{3}{4}$  to be a decimal.

Press	Display
$5 [\text{2nd}][\text{U}_a^b] 3 [\text{+}] 4 [\text{2nd}][\text{f} \leftrightarrow \text{d}] [\text{enter}]$	$5\frac{3}{4} \rightarrow \text{F+D}$ $5.75$

d) Change 2.25 to its fractional equivalent.

Press	Display
$2 [\text{.}] 25 [\text{2nd}] [\text{f} \leftrightarrow \text{d}] [\text{enter}]$	$2.25 \rightarrow \text{F+D}$ $\frac{9}{4}$
or	
$2 [\text{.}] 25 [\text{enter}] [\text{2nd}] [\text{f} \leftrightarrow \text{d}] [\text{enter}]$	$2.25$ $\frac{9}{4}$



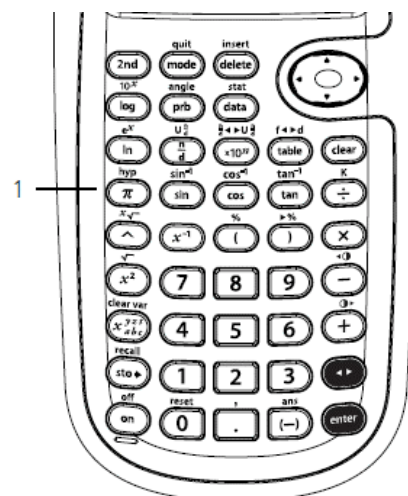
Pi

Keys

1.  $\pi$  displays the value of pi rounded to 10 digits (3.141592654).

Notes:

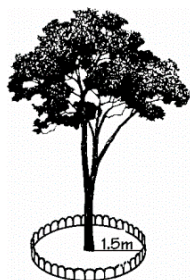
- In MathPrint™ mode, include a decimal number inside the expression with pi to receive a decimal output. For example, if you enter  $2\pi$ , the TI-30XS MultiView™ calculator displays  $2\pi$ . If you enter  $2.0\pi$ , the calculator displays the decimal version, 6.28319.
- You can use n to toggle the answer between decimal and pi formats.
- Internally, pi is stored to 13 digits (3.141592653590).
- You can select the number of decimal places from the mode menu.



Examples:

- a) Use this formula to find the amount of border you need if you want to put a circular border all the way around the tree.

$$c = 2\pi r = 2 * \pi * 1.5m$$

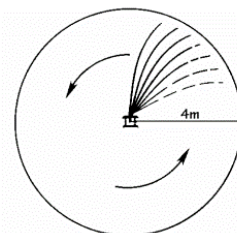


Press	Display
$2 \times \pi \times$	$2 * \pi * 1.5$
$1.5 \text{ enter}$	$9.424777961$
$\leftarrow \rightarrow$	$2 * \pi * 1.5$ $9.424777961$ $9.42477796077$ $3\pi$

The border length is  $3\pi$  m. You will need approximately 9.4 m for the border.

- b) Use this formula to find how much of a lawn would be covered by the sprinkler. Round your answer to the nearest whole number.

$$A = \pi r^2 = \pi * 4^2 \text{ square meters}$$



Press	Display
$\pi \times 4$	$\pi * 4^2$ $16\pi$
$x^2 \text{ enter}$	
$\leftarrow \rightarrow$	$\pi * 4^2$ $16\pi$ $16\pi$ $50.26548246$

The area will be covered by the sprinkler is approximately 50 square meters.

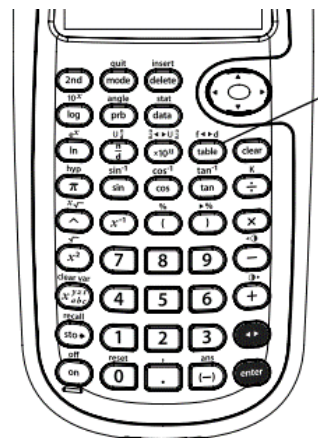


### Creating a Table of Values

#### Keys

1. **table** allows you to display a defined function in a tabular form. To set up a function table:
  - a. Press **table**.
  - b. Enter a function in terms of  $x$  and press **enter**.
  - c. Select the start and step values, and auto or ask- $x$  options, and press **enter**.

The table is displayed using the specified values.



#### Notes:

- Enter the function (expression) at the  $y=$  prompt. Functions can contain stacked fractions and most built-in functions such as sine, cosine,  $e^x$ , and so forth. Functions cannot contain  $\frac{\square}{\square}$  or the functions rand and randint.
- To change a value on the table setup screen, press **clear** and then enter a new value.
- Depending on the function and the step values, you may be able to affect the format (decimal or fraction) of the  $y$  values. When a decimal number (like 2.0) is used in the function or the step values, answers can be forced to decimal.
- To clear the table in ask- $x$ , press **delete** on each entry.
- In ask- $x$ , if you input a decimal, the  $x$ -value displays as a decimal. For example, if you enter  $2\pi$ , the  $x$ -value displays  $2\pi$ . If you enter  $2.0\pi$ , the  $x$ -value displays 6.28319.
- If you enter a fraction using  $\frac{\square}{\square}$ , the  $x$ -value displays as a fraction.
- Press **clear** to back up screens within the function table.
- The TI-30XS MultiView™ calculator retains the last entered function in memory when you quit the function table application (**2nd** [quit]).

#### Examples:

a) Create a table of values for  $y = x(36 - x)$









b) Create a table of values for  $y = 3600 - 450x$



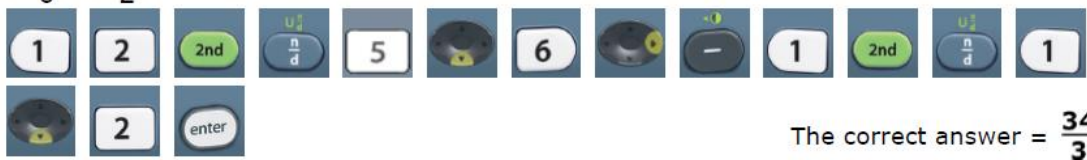






Press	Display										
<b>table</b> $x^{\frac{\square}{\square}}$ $\frac{\square}{\square}$ $\frac{\square}{\square}$	$y=x(36-x)$										
36 $\frac{\square}{\square}$ $x^{\frac{\square}{\square}}$											
<b>enter</b>											
0 $\frac{\square}{\square}$ 4 $\frac{\square}{\square}$	Start=0										
<b>enter</b> $\frac{\square}{\square}$	Step=4										
<b>enter</b> $\frac{\square}{\square}$	Auto Ask-x OK										
<b>enter</b> $\frac{\square}{\square}$ $\frac{\square}{\square}$ $\frac{\square}{\square}$											
$\frac{\square}{\square}$ $\frac{\square}{\square}$											
	<table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>288</td> </tr> <tr> <td>16</td> <td>320</td> </tr> <tr> <td>20</td> <td>320</td> </tr> <tr> <td>x=20</td> <td></td> </tr> </tbody> </table>	x	y	12	288	16	320	20	320	x=20	
x	y										
12	288										
16	320										
20	320										
x=20											

Press	Display										
<b>table</b>	$y=3600-450x$										
Press <b>clear</b> if necessary to clear a previous function.											
3600 $\frac{\square}{\square}$ 450											
$x^{\frac{\square}{\square}}$ $\frac{\square}{\square}$ <b>enter</b>											
<b>clear</b> 0 $\frac{\square}{\square}$	Start=0										
<b>clear</b> 1 $\frac{\square}{\square}$	Step=1										
<b>enter</b> $\frac{\square}{\square}$ <b>enter</b>	Auto Ask-x OK										
Input good guesses for the number of months, $x$ .											
<b>enter</b>	<table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>300</td> </tr> <tr> <td>7</td> <td>450</td> </tr> <tr> <td>8</td> <td>0</td> </tr> <tr> <td>x=8</td> <td></td> </tr> </tbody> </table>	x	y	6	300	7	450	8	0	x=8	
x	y										
6	300										
7	450										
8	0										
x=8											

**TI-30XS Calculator Reference Sheet**

The calculator reference sheet is provided on most items on the 2014 GED® Mathematical Reasoning Mathematical Reasoning test, as well as certain items on the Scientific Reasoning and Social Studies tests. The calculator reference sheet is provided to test-takers in order to demonstrate the functionality of the onscreen calculator, specifically in terms of what order to click the buttons in complex problems, such as order of operations or calculating with fractions.

<b>BASIC ARITHMETIC</b>	<p>To perform basic arithmetic, enter numbers and operation symbols using the standard order of operations.</p> <p><b>EXAMPLE</b></p> <p><math>8 \times -4 + 7 =</math></p>  <p>The correct answer = <b>-25</b></p>
<b>PERCENTAGES</b>	<p>To calculate with percentages, enter the number, then  .</p> <p><b>EXAMPLE</b></p> <p><math>40\% \times 560 =</math></p>  <p>The correct answer = <b>224</b></p>
<b>SCIENTIFIC NOTATION</b>	<p>To perform calculations with scientific notation, use the  key.</p> <p><b>EXAMPLE</b></p> <p><math>7.8 \times 10^8 - 1.5 \times 10^8 =</math></p>  <p>The correct answer = <b>630000000</b></p>
<b>FRACTIONS</b>	<p>To perform calculations with fractions, use the  key. The answer will automatically be formatted in reduced form.</p> <p><b>EXAMPLE</b></p> <p><math>\frac{2}{9} \times \frac{3}{7} =</math></p>  <p>The correct answer = <b><math>\frac{2}{21}</math></b></p>

MIXED NUMBERS	<p>To perform calculations with mixed numbers, use  . As with fractions, the answer will automatically be formatted in reduced form.</p> <p><b>EXAMPLE</b></p> <p><math>12\frac{5}{6} - 1\frac{1}{2} =</math></p>  <p>The correct answer = <math>\frac{34}{3}</math></p>
POWERS AND ROOTS	<p>To perform calculations with powers and roots, you will use the following keys:</p> <p>To perform calculations with powers and roots, you will use the following keys:</p>  <p><b>EXAMPLE</b></p> <p><math>1.2^2 =</math></p>  <p>The correct answer = <b>1.44</b></p> <p><b>EXAMPLE</b></p> <p><math>7^4 =</math></p>  <p>The correct answer = <b>2401</b></p> <p><b>EXAMPLE</b></p> <p><math>\sqrt{529} =</math></p>  <p>The correct answer = <b>23</b></p> <p><b>EXAMPLE</b></p> <p><math>\sqrt[3]{1728} =</math></p>  <p>The correct answer = <b>12</b></p>
TOGGLE KEY	<p>The answer toggle key can be used to toggle the display result between fraction and decimal answers, exact square root and decimal, and exact pi and decimal.</p> <p><b>EXAMPLE</b></p> <p><math>\frac{9}{10} =</math></p>  <p>The correct answer = <b>0.9</b></p>

**Frequently Asked Questions**

- **What percentage of problems are test takers able to use a calculator to solve?**
  - The calculator-prohibited items are limited to only 5 items on each form of the Mathematical Reasoning test. All of the other items in that module allow the use of the calculator. Keep in mind that the calculator is also provided on certain items in the Science and Social Studies tests where it would be useful to test-takers in answering those items.
- **Are handheld calculators allowed on the Mathematical Reasoning, Science, and Social Studies tests?**
  - Yes, test-takers can bring a TI-30XS Multiview Scientific Calculator to use on the GED® test. An embedded, on-screen calculator is also available for all test-takers.
- **Will GED Testing Service provide the handheld calculators or will testing centers provide them?**
  - Test-takers who want to use a handheld calculator must bring it with them to the testing center. Pearson VUE Testing Centers will NOT provide handheld calculators. However, if a jurisdiction has GED®-only testing centers, the jurisdiction may elect to provide handheld calculators at the expense of the jurisdiction. In all cases, test-takers will be informed that GED Testing Service will continue to provide the on-screen calculator embedded in the test for each test item for which it is appropriate for use, and that they should bring in their own handheld calculator if they wish to use it.
- **What handheld calculator can test-takers use?**
  - Test-takers can only bring a TI-30XS Multiview Scientific Calculator to use on the Mathematical Reasoning, Science, and Social Studies tests.
- **Will the calculator be available for all math portions? Or will it be similar to the current test where part of the math section you can use the calculator, and the other you cannot?**
  - The on-screen calculator will be available for all but the first few items on the Mathematical Reasoning test — though there will be a handful of items that are calculator-prohibited, testing basic computational skills that are incorporated into the career- and college-readiness standards and (by extension) the GED® test Assessment Targets. In addition, the calculator will also be available for certain items in the Science and Social Studies tests.
- **Is using the electronic calculator quicker/slower than using a hand-held calculator? Has someone timed and compared answer response using both methods?**
  - The onscreen calculator is just as responsive as a hand-held calculator and has been used by tens of thousands of test-takers in our 2012 field-testing program with no performance issues.