



TI-30XS MultiView™ and TI-30XB MultiView™ Scientific Calculator Guidebook

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General Information41

Getting Started

Examples

Each section is followed by instructions for keystroke examples that demonstrate the TI-30XS MultiView™ and TI-30XB MultiView™ functions. All references in this manual will refer to the TI-30XS MultiView, but are also applicable for the TI-30XB MultiView™.

Examples assume all default settings, as shown in the Modes section.

For more activities and examples, see the TI-30XS MultiView™ Teacher Guide available at education.ti.com/guides.

Switching the Calculator On and Off

[on] turns on the TI-30XS MultiView™ calculator. **[2nd] [off]** turns it off. The display is cleared, but the history, settings, and memory are retained.

The APD™ (Automatic Power Down™) feature turns off the TI-30XS MultiView™ calculator automatically if no key is pressed for about 5 minutes. Press **[on]** after APD. The display, pending operations, settings, and memory are retained.

Display Contrast

The brightness and contrast of the display can depend on room lighting, battery freshness, and viewing angle.

To adjust the contrast:

1. Press and release the **[2nd]** key.
2. Press **[+]** (to darken the screen) or **[-]** (to lighten the screen).






Home Screen

On the Home screen, you can enter mathematical expressions and functions, along with other instructions. The answers are displayed on the Home screen. The TI-30XS MultiView™ screen can display a maximum of four lines with a maximum of 16 characters per line. For entries and expressions of more than 16 characters, you can scroll left and right (**[←]** and **[→]**) to view the entire entry or expression.

In the MathPrint™ mode, you can enter up to four levels of consecutive nested functions and expressions, which include fractions, square roots, exponents with $^$, $\sqrt[n]{}$, e^x , and 10^x .






When you calculate an entry on the Home screen, depending upon space, the answer is displayed either directly to the right of the entry or on the right side of the next line.

Special indicators may display on the screen to provide additional information concerning functions or results.

| Indicator | Definition |
|--|--|
| 2nd | 2nd function. |
| HYP | Hyperbolic function. |
| FIX | Fixed-decimal setting. (See Modes section.) |
| SCI, ENG | Scientific or engineering notation. (See Modes section.) |
| DEG, RAD, GRAD | Angle mode (degrees, radians, or gradians). (See Modes section.) |
| K | Constant feature is on. |
| L1, L2, L3 | Displays above the lists in data editor. |
|  | The TI-30XS MultiView™ calculator is performing an operation. |
| ↑↓ | An entry is stored in memory before and/or after the active screen. Press  and  to scroll. |
| ◀▶ | An entry or menu displays beyond 16 digits. Press  or  to scroll. |










2nd Functions



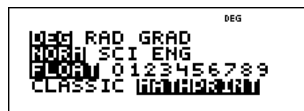
Most keys can perform two functions. The primary function is indicated on the key and the secondary function is displayed above it. Press  to activate the secondary function of a given key. Notice that **2nd** appears as an indicator on the screen. To cancel it before entering data, press  again. For example,   25  calculates the square root of 25 and returns the result, 5.

Modes



Use  to choose modes. Press     to choose a mode, and  to select it. Press  or   to return to the Home screen and perform your work using the chosen mode settings.

Default mode settings are shown highlighted.



DEG RAD GRAD Sets the angle mode to degrees, radians, or gradians.

NORM SCI ENG Sets the numeric notation mode. Numeric notation modes affect only the display of results, and not the accuracy of the values stored in the unit, which remain maximal.

NORM displays results with digits to the left and right of the decimal, as in 123456.78.

SCI expresses numbers with one digit to the left of the decimal and the appropriate power of 10, as in 1.2345678×10^5 (which is the same as 123456.78).

Note: In some restricted environments (for example function table, data editor, and the **2nd** **[recall]** menu), the TI-30XS MultiView™ calculator may display **E** instead of $\times 10^n$.

ENG displays results as a number from 1 to 999 times 10 to an integer power. The integer power is always a multiple of 3.

Note: **[x10^n]** is a shortcut key to enter a number in scientific notation format. The result displays in the numeric notation format set in mode.

FLOAT 0123456789 Sets the decimal notation mode.

FLOAT (floating decimal point) displays up to 10 digits, plus the sign and decimal.

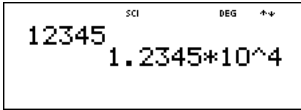
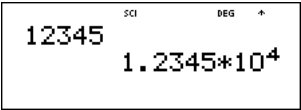
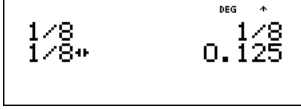
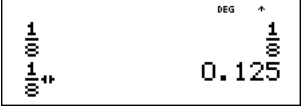
0123456789 (fixed decimal point) specifies the number of digits (0 through 9) to display to the right of the decimal.

CLASSIC MATHPRINT

CLASSIC mode displays inputs and outputs in a single line.

MATHPRINT mode displays most inputs and outputs in textbook format.

Examples of Classic and MathPrint modes

| Classic mode | MathPrint mode |
|---|--|
| Sci  | Sci  |
| Float mode and answer toggle key.  | Float mode and answer toggle key.  |
| Fix 2 | Fix 2 and answer toggle key. |

| Classic mode | MathPrint mode |
|---|---|
| <div><div>FIX</div><div>DEG \leftrightarrow</div><div>2π</div><div>6.28</div></div> | <div><div>FIX</div><div>DEG \leftrightarrow</div><div>2π</div><div>2π</div><div>6.28</div></div> |
| Un/d | Un/d |
| <div><div>DEG \leftrightarrow \leftrightarrow</div><div>$4\frac{5}{9}$</div><div>$41/9$</div></div> | <div><div>DEG \leftrightarrow \leftrightarrow</div><div>$4\frac{5}{9}$</div><div>$\frac{41}{9}$</div></div> |
| Exponent example | Exponent example |
| <div><div>DEG \leftrightarrow</div><div>2^5</div><div>32</div></div> | <div><div>DEG \leftrightarrow</div><div>2^5</div><div>32</div></div> |
| Square root example | Square root example |
| <div><div>DEG \leftrightarrow</div><div>$\sqrt{(2)}$</div><div>1.414213562</div></div> | <div><div>DEG \leftrightarrow</div><div>$\sqrt{2}$</div><div>$\sqrt{2}$</div><div>1.414213562</div></div> |
| Cube root example | Cube root example |
| <div><div>DEG \leftrightarrow \leftrightarrow</div><div>$3\sqrt[3]{64}$</div><div>4</div></div> | <div><div>DEG \leftrightarrow \leftrightarrow</div><div>$\sqrt[3]{64}$</div><div>4</div></div> |

Menus

Certain keys display menus: $\boxed{\text{prb}}$, $\boxed{2\text{nd}}$ $\boxed{[\text{angle}]}$, $\boxed{\text{data}}$, $\boxed{2\text{nd}}$ $\boxed{[\text{stat}]}$, $\boxed{2\text{nd}}$ $\boxed{[\text{reset}]}$, $\boxed{2\text{nd}}$ $\boxed{[\text{recall}]}$, and $\boxed{2\text{nd}}$ $\boxed{[\text{clear var}]}$. Some keys may display more than one menu.

Press \blacktriangleright and \blacktriangleleft to scroll and select a menu item, or press the corresponding number next to the menu item. To return to the previous screen without selecting the item, press $\boxed{\text{clear}}$. To exit a menu or application and return to the Home screen, press $\boxed{2\text{nd}}$ $\boxed{[\text{quit}]}$.

The menu chart shows the menu keys and the menus they display.

| [prb] | | [2nd] [angle] | |
|--------------|-------------|----------------------|----------------|
| PRB | RAND | DMS | R ◀ ▶ P |
| 1: nPr | 1: rand | 1: ° | 1: R ▶ Pr(|
| 2: nCr | 2: randint(| 2: ' | 2: R ▶ Pθ(|
| 3: ! | | 3: " | 3: P ▶ Rx(|
| | | 4: r | 4: P ▶ Ry(|
| | | 5: g | |
| | | 6: ▶ DMS | |

[data] [data]

Press once to display the Data editor screen. Press again to display the menu.

| CLEAR | FORMULA |
|--------------|-------------------|
| 1: Clear L1 | 1: Add/Edit Frmla |
| 2: Clear L2 | 2: Clear L1 Frmla |
| 3: Clear L3 | 3: Clear L2 Frmla |
| 4: Clear ALL | 4: Clear L3 Frmla |
| | 5: Clear ALL |

Press **[data]** while you are in the Add/Edit Formula option of the FORMULA menu to display this menu:

| Ls |
|-----------|
| 1: L1 |
| 2: L2 |
| 3: L3 |

[2nd] [stat]

| STATS |
|----------------|
| 1: 1-Var Stats |
| 2: 2-Var Stats |
| 3: StatVars* |

* This menu option displays after you calculate 1-var or 2-var stats:

| StatVars |
|--|
| 1: n |
| 2: \bar{x} |
| 3: Sx |
| Etc. See Statistics for a full list of values. |

| 2nd [reset] | 2nd [recall] | 2nd [clear var] |
|--------------------|--|------------------------|
| Reset | Recall Var | Clear Var |
| 1: No 2: Yes | 1: x = 2: y = 3: z = 4: t = 5: a = 6: b = 7: c = | 1: Yes 2: No |

Scrolling

⬅ ➡ ⬅ ➡

Press ⬅ or ➡ to place the cursor horizontally over the expression entered. Press **2nd** ⬅ or **2nd** ➡ to move the cursor directly to the beginning or end of the expression.

After an expression is evaluated, use ⬅ and ➡ to scroll through previous entries, which are stored in the TI-30XS MultiView™ calculator's memory. You can reuse a previous entry by pressing **enter** to paste it on the bottom line, and then evaluating a new expression.


Examples

| | | |
|--------|---------------------------|---|
| Scroll | 1 + 1 enter | <div> <div>1+1</div> <div>DEG +</div> <div>2</div> </div> |
| | 2 + 2 enter | <div> <div>1+1</div> <div>2+2</div> <div>DEG +</div> <div>2</div> <div>4</div> </div> |
| | 3 + 3 enter | <div> <div>1+1</div> <div>2+2</div> <div>3+3</div> <div>DEG +</div> <div>2</div> <div>4</div> <div>6</div> </div> |
| | 4 + 4 enter | <div> <div>1+1</div> <div>2+2</div> <div>3+3</div> <div>4+4</div> <div>DEG +</div> <div>2</div> <div>4</div> <div>6</div> <div>8</div> </div> |
| | ⬅ ⬅ ⬅ ⬅ enter | <div> <div>2+2</div> <div>3+3</div> <div>4+4</div> <div>3+3</div> <div>DEG ++</div> <div>4</div> <div>6</div> <div>8</div> </div> |


| | | |
|--|----------------------------|---|
| | $\boxed{+}$ 2 enter | <div> <div>2+2</div> <div>3+3</div> <div>4+4</div> <div>3+3+2</div> </div> <div> <div>4</div> <div>6</div> <div>8</div> <div>8</div> </div> <div>REG ++</div> |
|--|----------------------------|---|

Answer Toggle



Press the  key to toggle the display result between fraction and decimal answers, exact square root and decimal, and exact pi and decimal.

Example

| | | |
|---------------|---|--|
| Answer toggle | $\boxed{2nd}$ $\boxed{\sqrt{}}$ 8 enter | <div> <div>$\sqrt{8}$</div> <div>$2\sqrt{2}$</div> </div> <div>REG ++</div> |
| |  | <div> <div>$\sqrt{8}$</div> <div>$2\sqrt{2}$</div> <div>2.828427125</div> </div> <div>REG ++</div> |

Last Answer

$\boxed{2nd}$ \boxed{ans}

The most recently calculated result is stored to the variable **Ans**. **Ans** is retained in memory, even after the TI-30XS MultiView™ calculator is turned off. To recall the value of **Ans**:

- Press $\boxed{2nd}$ \boxed{ans} (**Ans** displays on the screen), or
- Press any operations key ($\boxed{+}$, $\boxed{-}$, and so forth) as the first part of an entry. **Ans** and the operator are both displayed.

Example

| | | |
|-----|-----------------------------------|---|
| Ans | 3 $\boxed{\times}$ 3 enter | <div> <div>3*3</div> <div>9</div> </div> <div>REG ++</div> |
| | $\boxed{\times}$ 3 enter | <div> <div>3*3</div> <div>ans*3</div> <div>9</div> <div>27</div> </div> <div>REG ++</div> |

| | |
|---|--|
| 3 [2nd] [\sqrt{x}] [2nd] [ans] [enter] | <div>DEG \leftrightarrow</div> $\begin{array}{r} 3 \times 3 \\ \text{ans} \times 3 \\ \sqrt[3]{\text{ans}} \end{array}$ <div>9 27 3</div> |
|---|--|

Order of Operations

The TI-30XS MultiView™ calculator uses Equation Operating System (EOS™) to evaluate expressions. Within a priority level, EOS evaluates functions from left to right and in the following order.

| | |
|-----|--|
| 1st | Expressions inside parentheses. |
| 2nd | Functions that need a) and precede the argument, such as sin , log , and all R ◀ ▶ P menu items. |
| 3rd | Fractions. |
| 4th | Functions that are entered after the argument, such as x² and angle unit modifiers. |
| 5th | <p>Exponentiation (^) and roots (\sqrt{x}).</p> <p>Note: In Classic mode, exponentiation using the \square key is evaluated from left to right. The expression $2^3 \wedge 2$ is evaluated as $(2^3)^2$, with a result of 64.</p> <div> <div>DEG \leftrightarrow</div> $2^3 \wedge 2 \quad 64$ </div> <p>In MathPrint™ mode, exponentiation using the \square key is evaluated from right to left. The expression $2^3 \wedge 2$ is evaluated as $2^{\wedge(3^2)}$, with a result of 512.</p> <div> <div>DEG \leftrightarrow</div> $2^3 \wedge 2 \quad 512$ </div> <p>The TI-30XS MultiView™ calculator evaluates expressions entered with \square and \square from left to right in both Classic and MathPrint modes. Pressing $3 \square \square$ is calculated as $(3^2)^2 = 81$.</p> |
| 6th | Negation (-). |
| 7th | Permutations (nPr) and combinations (nCr). |
| 8th | Multiplication, implied multiplication, division. |

| | |
|------|--|
| 9th | Addition and subtraction. |
| 10th | Conversions (n/d ◀ ▶ Un/d, F ◀ ▶ D, ▶DMS). |
| 11th | enter completes all operations and closes all open parentheses. |

Examples

| | | |
|--------------------|--|--|
| $+ \times \div -$ | 60 + 5 × (−) 12 enter | DEG $60+5*-12$ \leftrightarrow 0 |
| (−) | 1 + (−) 8 + 12 enter | DEG $1+-8+12$ \leftrightarrow 5 |
| | 2nd [√] 9 + 6 enter | DEG $\sqrt{9+16}$ \leftrightarrow 5 |
| () | 4 × (2 + 3) enter | DEG $4*(2+3)$ \leftrightarrow 20 |
| | 4 (2 + 3) enter | DEG $4(2+3)$ \leftrightarrow 20 |
| $^$ and \sqrt{x} | 2nd [√] 3 ^ 2 ↓ + 4 ^ 2 enter | DEG $\sqrt{3^2+4^2}$ \leftrightarrow 5 |

Clearing and Correcting

| | |
|------------------------|--|
| clear | Clears an error message. Clears characters on entry line. Moves the cursor to last entry in history once display is clear. Backs up one screen in applications. |
| delete | Deletes the character at the cursor. |
| 2nd [insert] | Inserts a character at the cursor. |
| 2nd [clear var] | Clears variables x , y , z , t , a , b , and c . |

| | |
|------------------------------------|---|
| 2nd [reset] 2 | Resets the TI-30XS MultiView™ calculator. Returns unit to default settings; clears memory variables, pending operations, all entries in history, and statistical data; clears the constant feature, K, and Ans . |
|------------------------------------|---|

Memory and Stored Variables

$x^{\frac{y+z}{abc}}$ **[sto]** **[2nd]** **[recall]** **[2nd]** **[clear var]**

The TI-30XS MultiView™ calculator has 7 memory variables—**x**, **y**, **z**, **t**, **a**, **b**, and **c**. You can store a real number or an expression that results in a real number to a memory variable.

[sto] lets you store values to variables. Press **[sto]** to store a variable, and press **$x^{\frac{y+z}{abc}}$** to select the variable to store. Press **[enter]** to store the value in the selected variable. If this variable already has a value, that value is replaced by the new one.

$x^{\frac{y+z}{abc}}$ accesses the menu of variables. Press this key multiple times to choose **x**, **y**, **z**, **t**, **a**, **b**, or **c**. You can also use **$x^{\frac{y+z}{abc}}$** to recall the stored values for these variables. The name of the variable is inserted into the current entry, but the value assigned to the variable is used to evaluate the expression.

[2nd] **[recall]** recalls the values of variables. Press **[2nd]** **[recall]** to display a menu of variables and their stored values. Select the variable you want to recall and press **[enter]**. The value assigned to the variable is inserted into the current entry and used to evaluate the expression.

[2nd] **[clear var]** clears variable values. Press **[2nd]** **[clear var]** and select **1: Yes** to clear all variable values.

Examples

| | | |
|-----------|--|--|
| Clear Var | [2nd] [clear var] 1 | |
| Store | 15 [sto] $x^{\frac{y+z}{abc}}$ | |
| | [enter] | |
| Recall | [2nd] [recall] | |

| | |
|--|---|
| enter x^2 enter | <div>DEG \leftrightarrow</div> <div>15\rightarrowx 15</div> <div>15² 225</div> |
| sto $x^{y\pm 1}_{abc}$ $x^{y\pm 1}_{abc}$ | <div>DEG \uparrow</div> <div>15\rightarrowx 15</div> <div>15² 225</div> <div>Ans\rightarrowy</div> |
| enter | <div>DEG \leftrightarrow</div> <div>15\rightarrowx 15</div> <div>15² 225</div> <div>Ans\rightarrowy 225</div> |
| $x^{y\pm 1}_{abc}$ $x^{y\pm 1}_{abc}$ | <div>DEG \uparrow</div> <div>15² 225</div> <div>Ans\rightarrowy 225</div> <div>y</div> |
| enter \div 4 enter | <div>DEG \leftrightarrow</div> <div>Ans\rightarrowy 225</div> <div>y 225</div> <div>Ans\div4 56.25</div> |

Problem

In a gravel quarry, two new excavations have been opened. The first one measures 350 meters by 560 meters, the second one measures 340 meters by 610 meters. What volume of gravel does the company need to extract from each excavation to reach a depth of 150 meters? To reach 210 meters? Display the results in engineering notation.

| | |
|---|---|
| mode \odot \triangleright enter clear 350 \times 560 sto $x^{y\pm 1}_{abc}$ enter | <div>ENG DEG \uparrow</div> <div>350*560\rightarrowx</div> <div>196*10³</div> |
| 340 \times 610 sto $x^{y\pm 1}_{abc}$ $x^{y\pm 1}_{abc}$ enter | <div>ENG DEG \leftrightarrow</div> <div>196*10³</div> <div>340*610\rightarrowy</div> <div>207.4*10³</div> |
| 150 \times 2nd [recall] | <div>ENG DEG</div> <div>Recall War</div> <div>1:x=196E3</div> <div>2:y=207.4E3</div> <div>3:z=0E0</div> |

| | |
|--|---|
| enter enter | <div>ENG DEG \leftrightarrow</div> <div>207.4*10³</div> <div>150*196000</div> <div>29.4*10⁶</div> |
| 210 x 2nd [recall] enter enter | <div>ENG DEG \leftrightarrow</div> <div>29.4*10⁶</div> <div>210*196000</div> <div>41.16*10⁶</div> |
| 150 x $x^{y\pm}$ $x^{y\pm}$ enter | <div>ENG DEG \leftrightarrow</div> <div>210*196000</div> <div>41.16*10⁶</div> <div>150*y 31.11*10⁶</div> |
| 210 x $x^{y\pm}$ $x^{y\pm}$ enter | <div>ENG DEG \leftrightarrow</div> <div>150*y 31.11*10⁶</div> <div>210*y</div> <div>43.554*10⁶</div> |

For the first excavation: The company needs to extract 29.4 million cubic meters to reach a depth of 150 meters, and to extract 41.16 million cubic meters to reach a depth of 210 meters.

For the second excavation: The company needs to extract 31.11 million cubic meters to reach a depth of 150 meters, and to extract 43.554 million cubic meters to reach a depth of 210 meters.

Math Functions

Fractions

$\frac{n}{d}$ 2nd $[U\frac{n}{d}]$ 2nd $[f\leftrightarrow d]$ 2nd $[\frac{n}{d}\leftrightarrow U\frac{n}{d}]$

In the MathPrint™ mode, fractions with $\frac{n}{d}$ can include operation keys ($+$, \times , etc.) and most function keys (x^2 , 2nd $[\%]$, etc.).

In Classic mode, fractions with $\frac{n}{d}$ do not allow operation keys, functions, or complex fractions in the numerator or denominator.

Note: In Classic mode, data editor, and table, use \div to perform complex division problems.

Calculations using fractions can display fraction or decimal results, depending on input.

The TI-30XS MultiView™ calculator defaults output to improper fractions. Results are automatically simplified.

- $\frac{n}{d}$ enters a simple fraction. Pressing $\frac{n}{d}$ before or after a number can result in different behavior. Entering a number before pressing $\frac{n}{d}$ makes that number the numerator.

To enter fractions with operators or radicals, press $\frac{n}{d}$ before you enter a number (in MathPrint™ mode only).

In MathPrint mode, press \odot between the entry of the numerator and the denominator.

In Classic mode, press $\frac{n}{d}$ between the entry of the numerator and the denominator.

- To paste a previous entry in the denominator, place the cursor in the denominator, press 2nd \odot to scroll to the desired entry, and then press **enter** to paste the entry to the denominator.
- To paste a previous entry in the numerator or unit, place the cursor in the numerator or unit, press \odot or 2nd \odot to scroll to the desired entry, and then press **enter** to paste the entry to the numerator or unit.
- 2nd $[U\frac{n}{d}]$ enters a mixed number. Press 2nd $[U\frac{n}{d}]$ between the entry of the unit and the numerator.
- 2nd $[\frac{n}{d}\leftrightarrow U\frac{n}{d}]$ converts between mixed numbers and simple fraction form.
- 2nd $[f\leftrightarrow d]$ converts results between fractions and decimals.

Examples Classic mode

| | | |
|-----------|--|--|
| n/d, Un/d | $3\frac{n}{d} 4 + 1\frac{n}{d} [U\frac{n}{d}]$ $7\frac{n}{d} 12$ enter | <div><div>5</div><div>BEG</div><div>+</div></div> <div>3/4+1 7/12</div> <div>7/3</div> |
|-----------|--|--|

| | | |
|-------------------------------|--|---|
| n/d \leftrightarrow Un/d | 9 $\frac{\square}{\square}$ 2 $\frac{\square}{\square}$ 2nd $\frac{\square}{\square}$ \leftrightarrow U $\frac{\square}{\square}$ enter | $\frac{9}{2} \div \frac{2}{2} = 4\frac{1}{2}$ |
| F \leftrightarrow D | 4 $\frac{\square}{\square}$ 2nd $\frac{\square}{\square}$ 1 $\frac{\square}{\square}$ 2 2nd $\frac{\square}{\square}$ $\frac{\square}{\square}$ \leftrightarrow d enter | $4\frac{1}{2} \div \frac{1}{2} = 4.5$ |

Examples MathPrint™ mode

| | | |
|---------------------------------------|---|---|
| n/d, Un/d | $\frac{\square}{\square}$ 3 \ominus 4 \oplus 1 2nd $\frac{\square}{\square}$ 7 \ominus 12 enter | $\frac{3}{4} + 1\frac{7}{12} = \frac{7}{3}$ |
| n/d \leftrightarrow Un/d | 9 $\frac{\square}{\square}$ 2 \oplus 2nd $\frac{\square}{\square}$ \leftrightarrow U $\frac{\square}{\square}$ enter | $\frac{9}{2} \div \frac{2}{2} = 4\frac{1}{2}$ |
| F \leftrightarrow D | 4 $\frac{\square}{\square}$ 2nd $\frac{\square}{\square}$ 1 \ominus 2 \oplus 2nd $\frac{\square}{\square}$ $\frac{\square}{\square}$ \leftrightarrow d enter | $4\frac{1}{2} \div \frac{1}{2} = 4.5$ |
| Examples (MathPrint™ mode only) | $\frac{\square}{\square}$ 1.2 \oplus 1.3 \ominus 4 enter | $\frac{1.2 + 1.3}{4} = 0.625$ |
| (MathPrint™ mode only) | $\frac{\square}{\square}$ (–) 5 \oplus 2nd [$\sqrt{}$] 5 $\frac{\square}{\square}$ 4 $\frac{\square}{\square}$ 1 $\frac{\square}{\square}$ $\frac{\square}{\square}$ 6 $\frac{\square}{\square}$ \ominus 2 $\frac{\square}{\square}$ 1 $\frac{\square}{\square}$ enter | $\frac{-5 + \sqrt{5^2 - 4(1)(6)}}{2(1)} = -2$ |

Percentages

$\frac{\square}{\square}$ [%] $\frac{\square}{\square}$ [%]

To perform a calculation involving a percentage, press $\frac{\square}{\square}$ [%] after entering the value of the percentage.

To express a value as a percentage, press $\frac{\square}{\square}$ [%] after the value.

Example

| | |
|---|---|
| 2 2nd [%] × 150 enter | DEG + 2%*150 3 |
| 1 1/x 5 ↓ 2nd [%] enter | DEG + $\frac{1}{5} \rightarrow \%$ 20% |

Problem

A mining company extracts 5000 tons of ore with a concentration of metal of 3% and 7300 tons with a concentration of 2.3%. On the basis of these two extraction figures, what is the total quantity of metal obtained?

If one ton of metal is worth 280 dollars, what is the total value of the metal extracted?

| | |
|--|--|
| 3 2nd [%] × 5000 enter | DEG + 3%*5000 150 |
| + 2.3 2nd [%] × 7300 enter | DEG + 3%*5000 150 Ans+2.3%*7300 317.9 |
| × 280 enter | DEG + 3%*5000 150 Ans+2.3%*7300 317.9 Ans*280 89012 |

The two extractions represent a total of 317.9 tons of metal for a total value of 89012 dollars.

x10ⁿ Key

x10ⁿ

Press **x10ⁿ** to enter a number in scientific notation format. Use parentheses to compute the correct order of operation.

| | |
|--|--|
| mode ↓ ↓ enter | SCI DEG MODE RAD GRAD NORMAL SCI ENG FLOA 0123456789 CLASSIC MATHPRN |
|--|--|

| | |
|---|--|
| $\frac{\square}{\square}$ 2 $\times 10^{12}$ 3 \div 4 $\times 10^{12}$ 5 \downarrow \uparrow \leftarrow enter | <div>SCI DEG \leftrightarrow</div> $\frac{2 \times 10^3}{4 \times 10^5} \div 5 \times 10^{-3}$ |
| clear () 2 $\times 10^{12}$ 3 \downarrow) \div () 4 $\times 10^{12}$ 5 \downarrow) enter | <div>SCI DEG \leftrightarrow</div> $(2 \times 10^3) \div (4 \times 10^5) \div 5 \times 10^{-3}$ |

Powers, Roots and Inverses

| | |
|----------------------------------|--|
| \square^x | Calculates the square of a value. The TI-30XS MultiView™ calculator evaluates expressions entered with \square^x and \square^{-1} from left to right in both Classic and MathPrint™ modes. |
| \wedge | Raises a value to the power indicated. If you insert an expression as the exponent, you must place it between parentheses. |
| 2^{nd} $\sqrt{}$ | Calculates the square root of a positive value. |
| 2^{nd} $\sqrt[x]{}$ | Calculates the n th root of any positive value and any odd integer root of a negative value. |
| \square^{-1} | Gives the inverse of a value: $1/x$. The TI-30XS MultiView™ calculator evaluates expressions entered with \square^x and \square^{-1} from left to right in both Classic and MathPrint™ modes. |

Examples

| | |
|---|---|
| 5 \wedge 2 \downarrow + 4 \wedge (2 + 1) enter | <div>DEG \leftrightarrow</div> $5^2 + 4^{(2+1)} \quad 89$ |
| 10 \wedge (-) 2 enter | $10^{-2} \quad \frac{1}{100}$ |
| 2^{nd} $\sqrt{}$ 49 enter | <div>DEG \leftrightarrow</div> $\sqrt{49} \quad 7$ |
| 2^{nd} $\sqrt[x]{}$ 3 \wedge 2 \downarrow + 2 \wedge 4 enter | <div>DEG \leftrightarrow</div> $\sqrt{3^2 + 2^4} \quad 5$ |

| | |
|--|---|
| 6 $\boxed{2^{nd}}$ $\boxed{[x\sqrt{}]}$ 64 $\boxed{\text{enter}}$ | $6\sqrt{64}$ <div>DEG + 2</div> |
| 2 $\boxed{x^{-1}}$ $\boxed{\text{enter}}$ | 2^{-1} <div>DEG ++ $\frac{1}{2}$</div> |

Pi



$\pi = 3.141592653590$ for calculations.

$\pi = 3.141592654$ for display.

Example

| | | |
|-------|---|--|
| π | 2 $\boxed{\times}$ $\boxed{\pi}$ $\boxed{\text{enter}}$ | $2*\pi$ <div>DEG + 2π</div> |
| | $\boxed{\leftarrow\rightarrow}$ | $\begin{array}{r} 2*\pi \\ 2\pi^{**} \end{array} \quad \begin{array}{r} \text{DEG} + \\ 6.283185307 \end{array}$ |

Problem

What is the area of a circle if the radius is 12 cm?

Reminder: $A = \pi r^2$.

| | |
|---|---|
| $\boxed{\pi}$ $\boxed{\times}$ 12 $\boxed{\wedge}$ 2 $\boxed{\text{enter}}$ | $\pi*12^2$ <div>DEG + 144π</div> |
| $\boxed{\leftarrow\rightarrow}$ | $\begin{array}{r} \pi*12^2 \\ 144\pi^{**} \end{array} \quad \begin{array}{r} \text{DEG} + \\ 452.3893421 \end{array}$ |

The area of the circle is 144π square cm. The area of the circle is approximately 452.4 square cm when rounded to one decimal place.

Angle Menu

[2nd] [angle]

[2nd] [angle] displays the choice of two submenus that enable you to specify the angle unit modifier as degrees (°), minutes (′), seconds (″); radian (r); gradian (g), or convert units using ►DMS. You can also convert between rectangular coordinate form (R) and polar coordinate form (P). (See Rectangular to Polar for more information.)

Choose an angle mode from the mode screen. You can choose from DEG (default), RAD, or GRAD. Entries are interpreted and results displayed according to the angle mode setting without needing to enter an angle unit modifier.

Examples

| | | |
|------|--|---|
| RAD | [mode] [▶] enter | <div>DEG RAD GRAD NORM SCI ENG FLOAR 0123456789 CLASSIC RATHPRINT</div> |
| | [clear] [sin] 30 [2nd] [angle] | <div>DMS R↔P 1° 2′ 3″</div> |
| | 4 [)] enter | <div>sin(30°) $\frac{1}{2}$</div> |
| DEG | [mode] enter | <div>DEG RAD GRAD NORM SCI ENG FLOAR 0123456789 CLASSIC RATHPRINT</div> |
| | [clear] 2 [π] [2nd] [angle] 4 enter | <div>sin(30°) $\frac{1}{2}$ 2π° 360</div> |
| ►DMS | 1.5 [2nd] [angle] 6 enter | <div>sin(30°) $\frac{1}{2}$ 2π° 360 1.5►DMS 1°30′0″</div> |

Problem

Two adjacent angles measure $12^{\circ} 31' 45''$ and $26^{\circ} 54' 38''$, respectively. Add the two angles and display the result in DMS format. Round the results to two decimal places.

| | |
|---|---|
| clear mode $\leftarrow \rightarrow \uparrow \downarrow$ enter mode | <div> <div>FIX DEG</div> <div> DEG RAD GRAD MORE SCI ENG FLOAT 0123456789 CLASSIC HPHP </div> </div> |
| clear 12 2nd [angle] | <div> <div></div> <div>RAD</div> <div> DMS R+P 12° 31' 23" 34" </div> </div> |
| 1 31 2nd [angle] 2 45 2nd [angle] 3 + 26 2nd [angle] 1 54 2nd [angle] 2 38 2nd [angle] 3 enter | <div> <div>FIX DEG \leftrightarrow</div> <div> 12°31'45"+26°54' 39.44 </div> </div> |
| 2nd [angle] 6 enter | <div> <div>FIX DEG \leftrightarrow</div> <div> 12°31'45"+26°54' 39.44 39.4397222221 39°26'23" </div> </div> |

The result is 39 degrees, 26 minutes and 23 seconds.

Problem

It is known that $30^\circ = \pi / 6$ radians. In the default mode, degrees, find the sine of 30° . Then set the calculator to radian mode and calculate the sine of $\pi / 6$ radians.

Note: Press **clear** to clear the screen between problems.

| | |
|--|---|
| clear sin 30 \square enter | <div> <div>FIX \uparrow</div> <div> sin(30) </div> <div> 1/2 </div> </div> |
| mode \uparrow enter clear sin π $\frac{\pi}{\square}$ 6 \downarrow \square enter | <div> <div>FIX RAD \uparrow</div> <div> sin(30) </div> <div> 1/2 </div> <div> sin($\frac{\pi}{6}$) </div> <div> 1/2 </div> </div> |

Retain radian mode on the calculator and calculate the sine of 30° . Change the calculator to degree mode and find the sine of $\pi / 6$ radians.

| | |
|--|--|
| sin 30 2nd [angle] enter \square enter | <div> <div>RAD \uparrow</div> <div> sin($\frac{\pi}{6}$) </div> <div> 1/2 </div> <div> sin(30°) </div> <div> 1/2 </div> </div> |
|--|--|

| | | | |
|---------------------------|-------|-----------------|-----------------------------|
| mode | enter | clear | |
| sin | π | $\frac{\pi}{d}$ | 6 \rightarrow 2nd [angle] |
| $\frac{\square}{\square}$ | enter | | |

$\sin(30^\circ)$
 $\sin\left(\frac{\pi}{6}\right)$

Rectangular to Polar

2nd [angle]

2nd [angle] displays a menu to convert rectangular coordinates (x,y) to polar coordinates (r,θ) or vice versa. Set Angle mode, as necessary, before starting calculations.

Example

Convert polar coordinates $(r,\theta)=(5,30)$ into rectangular coordinates. Then convert rectangular coordinates $(x,y) = (3,4)$ into polar coordinates. Round the results to one decimal place.

| | | |
|-----|---|--|
| R→P | clear mode \rightarrow \rightarrow \rightarrow enter | <div> FIX DEG DEG RAD GRAD MORE SCI ENG FLOAT 0123456789 CLASSIC HP-HPX-HPXII </div> |
| | clear 2nd [angle] \rightarrow 3 5 2nd [,] 30 \square enter 2nd [angle] \rightarrow 4 5 2nd [,] 30 \square enter | <div> FIX DEG + P→Rx(5,30) 4.3 P→Ry(5,30) 2.5 </div> |
| | 2nd [angle] \rightarrow 1 3 2nd [,] 4 \square enter 2nd [angle] \rightarrow 2 3 2nd [,] 4 \square enter | <div> FIX DEG + P→Rx(5,30) 4.3 P→Ry(5,30) 2.5 R→Pr(3,4) 5.0 R→Pθ(3,4) 53.1 </div> |

Converting $(r,\theta) = (5,30)$ gives $(x,y) = (4.3,2.5)$ and converting $(x,y) = (3,4)$ gives $(r,\theta) = (5.0,53.1)$.

Trigonometry

sin cos tan 2nd [sin⁻¹] [cos⁻¹] [tan⁻¹]

Enter trigonometric functions (sin, cos, tan, sin⁻¹, cos⁻¹, tan⁻¹), just as you would write them. Set the desired Angle mode before starting trigonometric calculations.

Example

| | | |
|-------------|---|---|
| tan | mode \downarrow \downarrow enter clear tan 45 \square enter | tan(45) DEG \uparrow 1 |
| \tan^{-1} | 2nd [tan $^{-1}$] 1 \square enter | $\tan^{-1}(1)$ DEG \uparrow 45 |
| cos | 5 \times cos 60 \square enter | 5*cos(60) DEG $\uparrow\downarrow$ 5 2 |

Degree Mode

Example Radian Mode

| | | |
|-------------|--|--|
| tan | mode \downarrow enter clear tan π $\frac{\pi}{4}$ 4 \downarrow \square enter | tan($\frac{\pi}{4}$) DEG \uparrow 1 |
| \tan^{-1} | 2nd [tan $^{-1}$] 1 \square enter | $\tan^{-1}(1)$ RAD $\uparrow\downarrow$ 0.785398163 |
| | \leftrightarrow | 0.785398163 0.7853981633975+ RAD $\uparrow\downarrow$ $\frac{\pi}{4}$ |
| cos | 5 \times cos π $\frac{\pi}{4}$ 4 \downarrow \square enter | $\frac{\pi}{4}$ RAD \uparrow 0.785398163 5*cos($\frac{\pi}{4}$) $\frac{5\sqrt{2}}{2}$ |
| | \leftrightarrow | $\frac{5\sqrt{2}}{2}$ RAD \uparrow 3.535533906 |

Problem

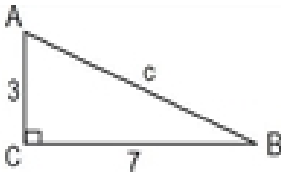
Find angle **A** of the right triangle below. Then calculate angle **B** and the length of the hypotenuse **c**. Lengths are in meters. Round results to one decimal place.

Reminder:

$\tan A = \frac{7}{3}$ therefore $m\angle A = \tan^{-1}\left(\frac{7}{3}\right)$

$m\angle A + m\angle B + 90^\circ = 180^\circ$
therefore $m\angle B = 90^\circ - m\angle A$

$c = \sqrt{3^2 + 7^2}$



| | |
|---|--|
| mode ▼ ▼ ▶ ▶ enter | <div> <div>FIX</div> <div>DEG</div> <div>MODE RAD GRAD</div> <div>MODE SCI ENG</div> <div>FORMAT 0 1 2 3 4 5 6 7 8 9</div> <div>CLASSIC 1/11/19 9:43 AM</div> </div> |
| clear 2nd [tan ⁻¹] 7 $\frac{\square}{\square}$ 3 ▶] enter | <div> <div>FIX</div> <div>DEG ↑</div> <div>tan⁻¹($\frac{7}{3}$)</div> <div>66.8</div> </div> |
| 90 □ 2nd [ans] enter | <div> <div>FIX</div> <div>DEG ↑</div> <div>tan⁻¹($\frac{7}{3}$)</div> <div>66.8</div> <div>90-Ans</div> <div>23.2</div> </div> |
| 2nd [$\sqrt{}$] 3 $\square x^2$ + 7 $\square x^2$ enter | <div> <div>FIX</div> <div>DEG ↕</div> <div>90-Ans</div> <div>23.2</div> <div>$\sqrt{3^2+7^2}$</div> <div>$\sqrt{58}$</div> </div> |
| ↔ | <div> <div>FIX</div> <div>DEG ↕</div> <div>90-Ans</div> <div>23.2</div> <div>$\sqrt{3^2+7^2}$</div> <div>$\sqrt{58}$ ↔</div> <div>7.6</div> </div> |

To one decimal place, the measure of angle **A** is 66.8°, the measure of angle **B** is 23.2°, and the length of the hypotenuse is 7.6 meters.

Hyperbolics

2nd [hyp]

2nd [hyp] displays the **HYP** indicator and accesses the hyperbolic function of the next trigonometry key that you press. Angle modes do not affect hyperbolic calculations.

Example

| | | |
|-----|---|---|
| HYP | $\boxed{2\text{nd}} \boxed{[\text{hyp}]} \boxed{\sin} \boxed{5} \boxed{)} \boxed{+} \boxed{2} \boxed{\text{enter}}$ | DEG \uparrow $\sinh(5)+2$ 76.20321058 |
| | $\boxed{\leftarrow} \boxed{\leftarrow} \boxed{\text{enter}} \boxed{\uparrow} \boxed{\uparrow} \boxed{\uparrow} \boxed{2\text{nd}} \boxed{[\text{hyp}]} \boxed{2\text{nd}} \boxed{[\sin^{-1}]} \boxed{\text{enter}}$ | DEG $\uparrow\uparrow$ $\sinh(5)+2$ 76.20321058 $\sinh^{-1}(5)+2$ 4.312438341 |

Logarithm and Exponential Functions

$\boxed{\log}$ $\boxed{\ln}$ $\boxed{2\text{nd}} \boxed{[10^x]}$ $\boxed{2\text{nd}} \boxed{[e^x]}$

$\boxed{\log}$ yields the common logarithm of a number.

$\boxed{\ln}$ yields the logarithm of a number to the base e ($e \approx 2.718281828459$).

$\boxed{2\text{nd}} \boxed{[10^x]}$ raises 10 to the power you specify.

$\boxed{2\text{nd}} \boxed{[e^x]}$ raises e to the power you specify.

Examples

| | | |
|--------|--|---|
| LOG | $\boxed{\log} \boxed{1} \boxed{)} \boxed{\text{enter}}$ | DEG \uparrow $\log(1)$ 0 |
| LN | $\boxed{\ln} \boxed{5} \boxed{)} \boxed{\times} \boxed{2} \boxed{\text{enter}}$ | DEG $\uparrow\uparrow$ $\log(1)$ 0 $\ln(5)*2$ 3.218875825 |
| 10^x | $\boxed{2\text{nd}} \boxed{[10^x]} \boxed{\log} \boxed{2} \boxed{)} \boxed{\text{enter}} \boxed{\log} \boxed{2\text{nd}} \boxed{[10^x]} \boxed{5} \boxed{\downarrow} \boxed{)} \boxed{\text{enter}}$ | DEG $\uparrow\uparrow$ 3.218875825 $10^{\log(2)}$ 2 $\log(10^5)$ 5 |
| e^x | $\boxed{2\text{nd}} \boxed{[e^x]} \boxed{.5} \boxed{\text{enter}}$ | DEG $\uparrow\uparrow$ $e^{.5}$ 1.648721271 |

Statistics

$\boxed{2\text{nd}} \boxed{[\text{stat}]} \boxed{\text{data}}$

$\boxed{2\text{nd}} \boxed{[\text{stat}]}$ displays a menu with the following options:

- **1-Var Stats** analyzes statistical data from 1 data set with 1 measured variable, x .

- **2-Var Stats** analyzes paired data from 2 data sets with 2 measured variables— x , the independent variable, and y , the dependent variable.
- **StatVars** displays a secondary menu of statistical variables. The StatVars menu only appears after you have calculated 1-Var or 2-Var stats. Use \odot and \ominus to locate the desired variable, and press **enter** to select it.

| Variables | Definition |
|------------------------------|--|
| n | Number of x or (x,y) data points. |
| \bar{x} or \bar{y} | Mean of all x or y values. |
| Sx or Sy | Sample standard deviation of x or y . |
| σx or σy | Population standard deviation of x or y . |
| Σx or Σy | Sum of all x or y values. |
| Σx^2 or Σy^2 | Sum of all x^2 or y^2 values. |
| Σxy | Sum of $(x...y)$ for all xy pairs. |
| a | Linear regression slope. |
| b | Linear regression y -intercept. |
| r | Correlation coefficient. |
| x' (2-Var) | Uses a and b to calculate predicted x value when you input a y value. |
| y' (2-Var) | Uses a and b to calculate predicted y value when you input an x value. |
| MinX | Minimum of x values. |
| Q1 (1-Var) | Median of the elements between MinX and Med (1st quartile). |
| Med | Median of all data points. |
| Q3 (1-Var) | Median of the elements between Med and MaxX (3rd quartile). |
| MaxX | Maximum of x values. |

To define statistical data points:

1. Enter data in L1, L2, or L3. (See Data editor.)

Note: Non-integer frequency elements are valid. This is useful when entering frequencies expressed as percentages or parts that add up to 1. However, the sample standard deviation, Sx , is undefined for non-integer frequencies, and $Sx = \text{Error}$ is displayed for that value. All other statistics are displayed.

2. Press **2nd** **[stat]**. Select **1-Var** or **2-Var** and press **enter**.
3. Select L1, L2, or L3, and the frequency.
4. Press **enter** to display the menu of variables.
5. To clear data, press **data** **data**, select a list to clear, and press **enter**.

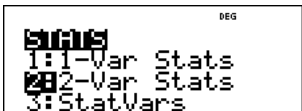
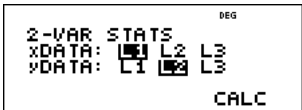

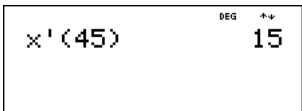
Examples

1-Var: Find the mean of {45, 55, 55, 55}

| | | |
|----------------|---------------------------------------|---|
| Clear all data | [data] [data] \odot \odot \odot | <div>DEG</div> 0= FORMULA 2:Clear L2 3:Clear L3 4:Clear ALL |
|----------------|---------------------------------------|---|

2-Var: Data: (45,30); (55,25). Find: $x'(45)$

| | | |
|----------------|--|---|
| Clear all data | [data] [data] \odot \odot \odot | <div>DEG</div> 0= FORMULA 2:Clear L2 3:Clear L3 4:Clear ALL |
|----------------|--|---|

| | | |
|------|--|---|
| Stat | 2nd [stat] 2 (Your screen may not show 3:StatVars if you did not previously perform a calculation.) |  |
| |  | |
| | enter 2nd [quit] 2nd [stat] 3 |  |
| | enter 45 enter |  |

Problem

For his last four tests, Anthony obtained the following scores. Tests 2 and 4 were given a weight of 0.5, and tests 1 and 3 were given a weight of 1.

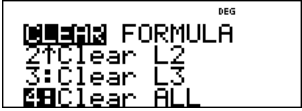
| Test No. | 1 | 2 | 3 | 4 |
|-------------|----|-----|----|-----|
| Score | 12 | 13 | 10 | 11 |
| Coefficient | 1 | 0.5 | 1 | 0.5 |

- Find Anthony's average grade (weighted average).
- What does the value of n given by the calculator represent? What does the value of Σx given by the calculator represent?

Reminder: The weighed average is

$$\frac{\Sigma x}{n} = \frac{(12)(1) + (13)(0.5) + (10)(1) + (11)(0.5)}{1+0.5+1+0.5}$$

- The teacher gave Anthony 4 more points on test 4 due to a grading error. Find Anthony's new average grade.

| | |
|--|---|
| data data 4 data 5 |  |
|--|---|

| | |
|---|--|
| | |
| 12 \odot 13 \odot 10 \odot 11 \odot \odot 1 \odot .5 \odot 1 \odot .5 \odot | |
| 2nd [stat] 1 (Your screen may not show 3:StatVars if you did not previously perform a calculation.) | |
| \odot \odot \odot enter | |
| enter | |

Anthony has an average (\bar{x}) of 11.33 (to the nearest hundredth).

On the calculator, n represents the total sum of the weights.

$$n = 1 + 0.5 + 1 + 0.5$$

Σx represents the weighted sum of his scores.

$$(12)(1) + (13)(0.5) + (10)(1) + (11)(0.5) = 34$$

Change Anthony's last score from 11 to 15.

| | |
|---|--|
| data \odot \odot \odot 15 \odot | |
| 2nd [stat] 1 \odot \odot enter | |

If the teacher adds 4 points to Test 4, Anthony's average grade is 12.

Problem

The table below gives the results of a braking test.


| | | | | |
|----------------------|------|-------|-------|-------|
| Test No. | 1 | 2 | 3 | 4 |
| Speed (kph) | 33 | 49 | 65 | 79 |
| Braking distance (m) | 5.30 | 14.45 | 20.21 | 38.45 |

Use the relationship between speed and braking distance to estimate the braking distance required for a vehicle traveling at 55 kph.

A hand-drawn scatter plot of these data points suggest a linear relationship. The TI-30XS MultiView™ calculator uses the least squares method to find the line of best fit, $y'=ax'+b$, for data entered in lists.

| | |
|---|--|
| [data] [data] 4 | |
| 33 [<] 49 [<] 65 [<] 79 [<] 5.3 [<] 14.45 [<] 20.21 [<] 38.45 [<] | |
| [2nd] [stat] 2 | |
| [<] [<] | |
| [enter] | |
| Press [<] to view a and b . | |
| Press [<] until y' is highlighted. | |

This line of best fit, $y'=0.67732519x'-18.66637321$ models the linear trend of the data.

| | |
|--|---|
| enter 55  enter | <div> $y'(55)$ 18.58651222 </div> |
|--|---|

The linear model gives an estimated braking distance of 18.59 meters for a vehicle traveling at 55 kph.

Probability



This key displays two menus: PRB and RAND.


PRB contains the following options:

| | |
|------------|--|
| nPr | Calculates the number of possible permutations of n items taken r at a time, given n and r . The order of objects is important, as in a race. |
| nCr | Calculates the number of possible combinations of n items taken r at a time, given n and r . The order of objects is not important, as in a hand of cards. |
| ! | A factorial is the product of the positive integers from 1 to n . n must be a positive whole number ≤ 69 . |

RAND contains the following options:

| | |
|-----------------|---|
| rand | Generates a random real number between 0 and 1. To control a sequence of random numbers, store an integer (seed value) ≥ 0 to rand. The seed value changes randomly every time a random number is generated. |
| randint(| Generates a random integer between 2 integers, A and B , where $A \leq \text{randint} \leq B$. Separate the 2 integers with a comma. |

Examples

| | | |
|------------|--|---|
| nPr | 8 | <div> 8 </div> |
| |  1 | <div> PRB RAND 1:nPr 2:nCr 3:1 </div> |

| | | |
|---------------|---|--|
| | 3 enter | 8 nPr 3 336 |
| nCr | 52 prb 2 5 enter | 52 nCr 5 2598960 |
| ! | 4 prb 3 enter | 4! 24 |
| STO ► rand | 5 sto► prb ► | PRB 3:20 1:rand 2:randint(|
| | 1 enter | 5→rand 5 |
| Rand | prb ► 1 enter | 5→rand 5 rand 0.000093165 |
| Randint(| prb ► 2 3 2nd [,] 5) enter | 5→rand 5 rand 0.000093165 randint(3,5) 5 |

Problem

An ice cream store advertises that it makes 25 flavors of home made ice cream. You like to order three different flavors in a dish. How many combinations of ice cream can you test over a very hot summer?

| | |
|--------------|------------|
| 25 | 25 3 |
| prb 2 | 25 nCr 3 |

3 enter

25 nCr 3 2300^{*}

You can choose from 2300 dishes with different combinations of flavors! If a long hot summer is about 90 days long, you will need to eat about 25 ice cream dishes each day!

Math Tools

Data Editor and List Formulas

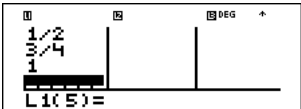
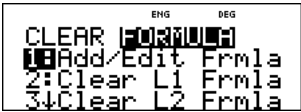
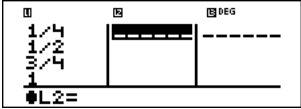
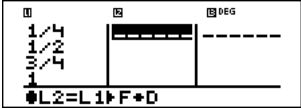
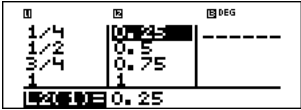
data

data lets you enter data in up to 3 lists. Each list can contain up to 42 items. Press **2nd** \uparrow to go to the top of a list, and **2nd** \downarrow to go to the bottom of a list.

List formulas accept all calculator functions.

Numeric notation, decimal notation, and angle modes affect the display of an element (except fractional elements).

Example

| | | |
|---------|---|--|
| L1 | data 1 $\frac{a}{b}$ 4 \downarrow 2 $\frac{a}{b}$ 4 \downarrow 3 $\frac{a}{b}$ 4 \downarrow 4 $\frac{a}{b}$ 4 enter |  |
| Formula | \downarrow data \downarrow |  |
| | enter |  |
| | data enter 2nd [f <=> d] |  |
| | enter |  |

Notice L2 is calculated per the formula you entered, and L2(1)= in the author line is highlighted to indicate the list is the result of a formula.

Problem

On a November day, a weather report on the Internet listed the following temperatures.

Paris, France 8°C

Moscow, Russia -1°C

Montreal, Canada 4°C

Convert these temperatures from degrees Celsius to degrees Fahrenheit.

Reminder: $F = \frac{9}{5}C + 32$

| | |
|-------------------------|--|
| data data 4 data → 5 | |
| | |
| 8 → (-) 1 → 4 → → | |
| data → 1 | |
| 9 ÷ 5 × data 1 + 32 | |
| enter | |

If Sydney, Australia is 21°C, find the temperature in degrees Fahrenheit.

| | |
|------------------|--|
| → → → → 21 enter | |
|------------------|--|

Function Table

table

The function table allows you to display a defined function in a tabular form. To set up a function table:

1. Press **table**.
2. Enter a function and press **enter**. Functions allow up to one level of fractions.
3. Select the table start, table step, auto, or ask- x options and press **enter**.

The table is displayed using the specified values.

| | |
|----------|---|
| Start | Specifies the starting value for the independent variable, x . |
| Step | Specifies the incremental value for the independent variable, x . The step can be positive or negative, but cannot be zero. |
| Auto | The TI-30XS MultiView™ calculator automatically generates a series of values based on table start and table step. |
| Ask- x | Lets you build a table manually by entering specific values for the independent variable, x . |

Problem

Find the vertex of the parabola, $y = x(36 - x)$ using a table of values.

Reminder: The vertex of the parabola is the point on the line of symmetry of the parabola.

| | | | | | | |
|-------|------------|---|----|---|------------|---|
| table | $x^{y\pm}$ | (| 36 | - | $x^{y\pm}$ |) |
| enter | | | | | | |

$y = x(36 - x)$

Start=0

Step=1

Auto Ask- x

OK

| | | | | | | | |
|-------|----|---|-------|---|---|---|-------|
| clear | 15 | → | clear | 3 | → | → | enter |
|-------|----|---|-------|---|---|---|-------|

$y = x(36 - x)$

Start=15

Step=3

Auto Ask- x

OK

| x | y |
|--------|-----|
| 15 | 315 |
| 18 | 324 |
| 21 | 315 |
| $x=15$ | |

After searching close to $x = 18$, the point (18, 324) appears to be the vertex of the parabola since it appears to be the turning point of the set of points of this function. To search closer to $x = 18$, change the Step value to see points closer to (18, 324).

Problem

A charity collected \$3,600 to help support a local food kitchen. \$450 will be given to the food kitchen every month until the funds run out. How many months will the charity support the kitchen?

Reminder: If x = months and y = money left, then $y = 3600 - 450x$.

| | | | | | | | | | |
|--|--|---|---|---|------|---|-----|---|---|
| table 3600 \square 450 \square $x^{y \pm /}$ | $y=3600-450x$ | | | | | | | | |
| enter 0 \downarrow 1 \downarrow \rightarrow enter \downarrow enter | Start=0 Step=1 Auto \square \square \square \square OK | | | | | | | | |
| Input guesses enter | <table> <tr> <td>x</td> <td>y</td> </tr> <tr> <td>2</td> <td>2700</td> </tr> <tr> <td>7</td> <td>450</td> </tr> <tr> <td>8</td> <td>0</td> </tr> </table> $x=8$ | x | y | 2 | 2700 | 7 | 450 | 8 | 0 |
| x | y | | | | | | | | |
| 2 | 2700 | | | | | | | | |
| 7 | 450 | | | | | | | | |
| 8 | 0 | | | | | | | | |

The support of \$450 per month will last for 8 months since $y(8) = 3600 - 450(8) = 0$ as shown in the table of values.

Constant

\square \square \square

\square \square \square turns Constant feature on and lets you define a constant.

To store an operation to **K** and recall it:

1. Press \square \square \square .
2. Enter any combination of numbers, operators, and/or values, up to 44 characters.
3. Press enter to save the operation. **K** displays in the indicator line.
4. Each subsequent time you press enter, the TI-30XS MultiView™ calculator recalls the stored operation and applies it to the last answer or the current entry.

Press \square \square \square again to turn Constant feature off.

Examples

| | | |
|---|-------------------------------|---------------------------|
| K | \square \square \square | \square = |
| | \square 2 \square 3 enter | \square = \square 2+3 |
| | 4 enter | \square 2+3 11 |

| | | |
|------------|---|---|
| | 6 enter | <div> <div>K</div> <div>DEG</div> <div>+</div> </div> $\begin{array}{r} 4*2+3 \\ 6*2+3 \end{array}$ $\begin{array}{r} 11 \\ 15 \end{array}$ |
| Reset K | 2nd [K] 2nd [K] clear [x²] enter | <div> <div>K</div> <div>DEG</div> </div> $K=^2$ |
| | 5 enter | <div> <div>K</div> <div>DEG</div> <div>++</div> </div> 5^2 25 |
| | 20 enter | <div> <div>K</div> <div>DEG</div> <div>++</div> </div> $\begin{array}{r} 5^2 \\ 20^2 \end{array}$ $\begin{array}{r} 25 \\ 400 \end{array}$ |
| Turn off K | 2nd [K] 1 + 1 enter | <div> <div>DEG</div> <div>++</div> </div> $\begin{array}{r} 5^2 \\ 20^2 \\ 1+1 \end{array}$ $\begin{array}{r} 25 \\ 400 \\ 2 \end{array}$ |

Problem

Given the linear function $y = 5x - 2$, calculate y for the following values of x : -5; -1.

| | |
|--|--|
| 2nd [K] [x] 5 [-] 2 enter | <div> <div>K</div> <div>DEG</div> </div> $K=*5-2$ |
| (-) 5 enter | <div> <div>K</div> <div>DEG</div> <div>+</div> </div> $-5*5-2$ -27 |
| (-) 1 enter | <div> <div>K</div> <div>DEG</div> <div>+</div> </div> $\begin{array}{r} -5*5-2 \\ -1*5-2 \end{array}$ $\begin{array}{r} -27 \\ -7 \end{array}$ |
| 2nd [K] | <div> <div>DEG</div> <div>+</div> </div> $\begin{array}{r} -5*5-2 \\ -1*5-2 \end{array}$ $\begin{array}{r} -27 \\ -7 \end{array}$ |

Reference Information

Errors

When the TI-30XS MultiView™ calculator detects an error, it returns an error message with the type of error.

To correct the error, note the error type and determine the cause of the error. If you cannot recognize the error, use the following list, which describes error messages in detail.

Press **[clear]** to clear the error message. The previous screen is displayed with the cursor at or near the error location. Correct the expression.

ARGUMENT — A function does not have the correct number of arguments.

DIVIDE BY 0 — You attempted to divide by 0. In statistics, $n = 1$.

DOMAIN — You specified an argument to a function outside the valid range. For example:

- For $x\sqrt{y}$: $x = 0$ or $y < 0$ and x is not an odd integer.
- For y^x : y and $x = 0$; $y < 0$ and x is not an integer.
- For \sqrt{x} : $x < 0$.
- For **LOG** or **LN**: $x \leq 0$.
- For **TAN**: $x = 90^\circ, -90^\circ, 270^\circ, -270^\circ, 450^\circ$, etc., and equivalent for radian mode.
- For **SIN⁻¹** or **COS⁻¹**: $|x| > 1$.
- For **nCr** or **nPr**: n or r are not integers ≥ 0 .
- For $x!$: x is not an integer between 0 and 69.

EQUATION LENGTH ERROR — An entry exceeds the digit limits (80 for stat entries or 47 for constant entries); for example, combining an entry with a constant that exceeds the limit.

FRQ DOMAIN — **FRQ** value (in **1-Var** stats) < 0 or > 99 .

OVERFLOW — You attempted to enter, or you have calculated, a number that is beyond the range of the calculator.

STAT — Attempting to calculate 1-var or 2-var stats with no defined data points, or attempting to calculate 2-var stats when the data lists are not of equal length.

DIM MISMATCH — Attempting to create a formula when the lists are not of equal length.

FORMULA — The formula does not contain a list name (L1, L2, or L3), or the formula for a list contains its own list name. For example, a formula for L1 contains L1.

SYNTAX — The command contains a syntax error: entering more than 23 pending operations or 8 pending values; or having misplaced functions, arguments, parentheses, or commas. If using $\frac{\Box}{\Box}$, try using $\frac{\Box}{\Box}$.

INVALID FUNCTION — Invalid function entered in the function table.

MEMORY LIMIT — The calculation contains too many pending operations (more than 23). If using the constant feature (K), you attempted to enter more than four levels of nested functions using fractions, square roots, exponents with $^$, $\sqrt[n]{\Box}$, e^x , and 10^x .

LOW BATTERY — Replace the battery.

Note: This message displays briefly and then disappears. Pressing clear does not clear this message.

Battery Information

Battery CAUTION:

- Do not ingest battery, Chemical Burn Hazard.
- This product contains a coin or button cell battery. If the coin or button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.
- Keep new and used batteries away from children.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.
- If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.
- Call a local poison control center for treatment information.
- Even used batteries may cause severe injury or death.
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above 140F (60C) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and -).
- Do not mix old and new batteries, different brands or types of batteries, such as alkaline, carbon-zinc or rechargeable batteries.
- Risk of fire or explosion if battery is replaced by an incorrect type.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations. Do NOT dispose of batteries in household trash or incinerate.

How to remove or replace the battery

The TI-30XS MultiView™ calculator uses one 3 volt CR2032 lithium battery.

Remove the protective cover and turn the TI-30XS MultiView™ calculator face downwards.

- With a small screwdriver, remove the screws from the back of the case.
- From the bottom, carefully separate the front from the back. **Be careful** not to damage any of the internal parts.
- With a small screwdriver (if required), remove the battery.
- To replace the battery, check the polarity (+ and -) and slide in a new battery. Press firmly to snap the new battery into place.

Important: When replacing the battery, avoid any contact with the other components of the TI-30XS MultiView™ calculator.

Dispose of the dead battery immediately and in accordance with local regulations.

Per CA Regulation 22 CCR 67384.4, the following applies to the button cell battery in this unit:

Perchlorate Material - Special handling may apply.

See www.dtsc.ca.gov/hazardouswaste/perchlorate

Australian Lithium Battery Warning



WARNING

KEEP BATTERIES OUT OF THE REACH
OF CHILDREN

Coin Battery
inside the product.

- Swallowing may lead to severe or fatal injuries in as little as 2 hours or less due to chemical burns and potential perforation of the esophagus.
- Never allow children to replace coin batteries of any device.
- If it is suspected your child has swallowed or inserted a coin battery immediately call the 24-hour Poisons Information Centre on 13 11 26 immediately for expert advice.
- Examine devices and make sure the battery compartment is correctly secured. E.g. that the screw or other mechanical fastener is tightened. Do not use if compartment is not secure.
- Dispose of used coin batteries immediately and safely. A battery can still be dangerous even when it can no longer operate the device.
- Tell others about the risk associated with the coin batteries and how to keep their children safe.

In Case of Difficulty

Review instructions to be certain calculations were performed properly.

Check the battery to ensure that it is fresh and properly installed.

Change the battery when:

- ☐ does not turn the unit on, or
- The screen goes blank, or
- You get unexpected results.

General Information

Online Help

education.ti.com/eguide

Select your country for more product information.

Contact TI Support

education.ti.com/ti-cares

Select your country for technical and other support resources.

Service and Warranty Information

education.ti.com/warranty

Select your country for information about the length and terms of the warranty or about product service.

Limited Warranty. This warranty does not affect your statutory rights.

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