

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

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## Important information

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## 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](http://education.ti.com/guides).

## Switching the TI-30XS MultiView 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  $^$ ,  $\sqrt[y]{x}$ ,  $e^x$ , 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 Mode section.)
SCI, ENG	Scientific or engineering notation. (See Mode section.)
DEG, RAD, GRAD	Angle mode (degrees, radians, or gradians). (See Mode 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 $\blacktriangleleft$ or $\blacktriangleright$ to scroll.
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## 2nd functions

**2nd**

Most keys can perform two functions. The primary function is indicated on the key and the secondary function is displayed above it. Press **2nd** 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 **2nd** again. For example, **2nd** [ $\sqrt{\phantom{x}}$ ] 25 **enter** calculates the square root of 25 and returns the result, 5.

## Modes

**mode**

Use **mode** to choose modes. Press  $\blacktriangledown$   $\blacktriangleup$   $\blacktriangleleft$   $\blacktriangleright$  to choose a mode, and **enter** to select it. Press **clear** or **2nd**[quit] to return to the Home screen and perform your work using the chosen mode settings.

Default mode settings are shown highlighted.

```

DEG RAD GRAD
NORM SCI ENG
FLOR 0 1 2 3 4 5 6 7 8 9
CLASSIC MATHPRINT
  
```

**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  $1.2345678 \times 10^5$  (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  $*10^n$ .

**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.

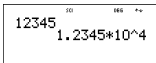
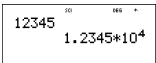
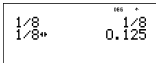
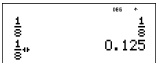
**0123456789** (fixed decimal point) specifies the number of digits (0 through 9) to display to the right of the decimal.

**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 	Float mode and answer toggle key. 

Fix 2 $2\pi \quad 6.28$	Fix 2 and answer toggle key. $\frac{2\pi}{2\pi} \quad 6.28$
U n/d $4\frac{5}{9} \quad 41/9$	U n/d $4\frac{5}{9} \quad \frac{41}{9}$
Exponent example $2^5 \quad 32$	Exponent example $2^5 \quad 32$
Square root example $\sqrt{2} \quad 1.414213562$	Square root example $\frac{\sqrt{2}}{\sqrt{2}} \quad 1.414213562$
Cube root example $3\sqrt[3]{64} \quad 4$	Cube root example $3\sqrt[3]{64} \quad 4$

## Menus

Certain keys display menus: **prb**, **2nd** **[angle]**, **data**, **2nd** **[stat]**, **2nd** **[reset]**, **2nd** **[recall]**, and **2nd** **[clear var]**. Some keys may display more than one menu.

Press **⬇** and **⬆** 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 **clear**. To exit a menu or application and return to the Home screen, press **2nd** **[quit]**.

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

---

<b>prb</b>		<b>2nd</b> [angle]	
PRB	RAND	DMS	R $\leftrightarrow$ P
1: nPr	1: rand	1: $^{\circ}$	1: R $\blacktriangleright$ Pr( 2: R $\blacktriangleright$ P $\theta$ (
2: nCr	2: randint( 3: !	2: ' " r	3: P $\blacktriangleright$ Rx( 4: P $\blacktriangleright$ Ry( 5: g
		6: $\blacktriangleright$ 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 menu:

1: n

2:  $\bar{x}$

3: Sx

Etc. See StatVar values for full list.

---

**2nd**[reset]

Reset

1: No

2: Yes

**2nd**[recall]

Recall Var

1: x =

2: y =

3: z =

4: t =

5: a =

6: b =

7: c =

**2nd**[clear var]

Clear Var

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 $\boxed{+}$ 1 <b>enter</b>	$1+1$ $2$
	2 $\boxed{+}$ 2 <b>enter</b>	$1+1$ $2+2$ $2$ $4$
	3 $\boxed{+}$ 3 <b>enter</b>	$1+1$ $2+2$ $3+3$ $2$ $4$ $6$
	4 $\boxed{+}$ 4 <b>enter</b>	$1+1$ $2+2$ $3+3$ $4+4$ $2$ $4$ $6$ $8$
	$\boxed{\uparrow}$ $\boxed{\uparrow}$ $\boxed{\uparrow}$ $\boxed{\uparrow}$ <b>enter</b>	$2+2$ $3+3$ $4+4$ $3+3$ $4$ $6$ $8$
	$\boxed{+}$ 2 <b>enter</b>	$2+2$ $3+3$ $4+4$ $3+3+2$ $4$ $6$ $8$ $8$

## 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	$\boxed{2nd}$ $\boxed{\sqrt{\phantom{x}}}$ 8 <b>enter</b>	$\sqrt{8}$ $2\sqrt{2}$
		$\sqrt{8}$ $2\sqrt{2}$ $2.828427125$

## Last answer

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

### Examples

Ans	3 <b>×</b> 3 <b>enter</b>	$3 \times 3 = 9$
	<b>×</b> 3 <b>enter</b>	$3 \times 3 = 9$ $\text{Ans} \times 3 = 27$
	3 <b>2nd</b> [ $\sqrt{x}$ ] <b>2nd</b> [ans] <b>enter</b>	$3 \times 3 = 9$ $\text{Ans} \times 3 = 27$ $\sqrt[3]{\text{Ans}} = 3$

## 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 <b>sin</b> , <b>log</b> , and all <b>R</b> $\leftrightarrow$ <b>P</b> menu items.
3rd	Fractions.
4th	Functions that are entered after the argument, such as $x^2$ and angle unit modifiers.

5th	<p>Exponentiation (^) and roots (<math>\sqrt{x}</math>).</p> <p><b>Note:</b> In Classic mode, exponentiation is evaluated from left to right. The expression <math>2^3^2</math> is evaluated as <math>(2^3)^2</math>, with a result of 64.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <math>2^3^2</math>      64         </div> <p>In MathPrint™ mode, exponentiation is evaluated from right to left. The expression <math>2^3^2</math> is evaluated as <math>2^{(3^2)}</math>, with a result of 512.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <math>2^{3^2}</math>      512         </div>
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	<b>enter</b> completes all operations and closes all open parentheses.

### Examples

+ × ÷ -	6 0 [ + ] 5 [ × ] [ (-) ] 1 2 <b>enter</b>	$60+5*-12$ 0
(-)	1 [ + ] [ (-) ] 8 [ + ] 1 2 <b>enter</b>	$1+-8+12$ 5
	<b>2nd</b> [ $\sqrt{\quad}$ ] 9 [ + ] 16 <b>enter</b>	$\sqrt{9+16}$ 5
( )	4 [ × ] [ ( ] 2 [ + ] 3 [ ) ] <b>enter</b>	$4*(2+3)$ 20

	4 ( ) 2 + 3 ( ) enter	4(2+3) <span style="float:right">M+ 20</span>
^ and $\sqrt{x}$	2nd [√] 3 ^ 2 ( ) + 4 ^ 2 enter	$\sqrt{3^2+4^2}$ <span style="float:right">M+ 5</span>

## 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 <b>x</b> , <b>y</b> , <b>z</b> , <b>t</b> , <b>a</b> , <b>b</b> , and <b>c</b> .
2nd [reset] 2 or on & clear	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, <b>K</b> , and <b>Ans</b> .

## Fractions

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

In the MathPrint™ mode, fractions with  $\frac{n}{d}$  can include operation keys (+, ×, etc.) and most function keys (x<sup>2</sup>, 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.

- $\left[\frac{n}{d}\right]$  enters a simple fraction. Pressing  $\left[\frac{n}{d}\right]$  before or after a number can result in different behavior. Entering a number before pressing  $\left[\frac{n}{d}\right]$  makes that number the numerator. To enter fractions with operators or radicals, press  $\left[\frac{n}{d}\right]$  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  $\left[\frac{n}{d}\right]$  between the entry of the numerator and the denominator.
- $[\text{2nd}][U\frac{n}{d}]$  enters a mixed number. Press  $[\text{2nd}][U\frac{n}{d}]$  between the entry of the unit and the numerator.
- $[\text{2nd}][\frac{n}{d} \leftrightarrow U\frac{n}{d}]$  converts between mixed numbers and simple fraction form.
- $[\text{2nd}][f \leftrightarrow d]$  converts results between fractions and decimals.

### Examples Classic mode

n/d, U n/d	3 $\left[\frac{n}{d}\right]$ 4 $+$ 1 $[\text{2nd}][U\frac{n}{d}]$ 7 $\left[\frac{n}{d}\right]$ 12 <b>enter</b>	$\frac{3}{4} + 1\frac{7}{12} = 2\frac{7}{3}$
n/d $\leftrightarrow$ U n/d	9 $\left[\frac{n}{d}\right]$ 2 $[\text{2nd}][\frac{n}{d} \leftrightarrow U\frac{n}{d}]$ <b>enter</b>	$9\frac{2}{3} \leftrightarrow 4\frac{1}{2}$
F $\leftrightarrow$ D	4 $[\text{2nd}][U\frac{n}{d}]$ 1 $\left[\frac{n}{d}\right]$ 2 $[\text{2nd}][f \leftrightarrow d]$ <b>enter</b>	$4\frac{1}{2} \leftrightarrow 4.5$

### Examples MathPrint™ mode

n/d, U n/d	$\left[\frac{n}{d}\right]$ 3 $\odot$ 4 $\odot$ $+$ 1 $[\text{2nd}][U\frac{n}{d}]$ 7 $\odot$ 12 <b>enter</b>	$\frac{3}{4} + 1\frac{7}{12} = 2\frac{7}{3}$
n/d $\leftrightarrow$ Un/d	9 $\left[\frac{n}{d}\right]$ 2 $\odot$ $[\text{2nd}][\frac{n}{d} \leftrightarrow U\frac{n}{d}]$ <b>enter</b>	$9\frac{2}{3} \leftrightarrow 4\frac{1}{2}$

F ↔ D	4 [2nd] [U <sub>d</sub> <sup>n</sup> ] 1 [↵] 2 [↵] [2nd] [f↔d] [enter]	$4\frac{1}{2} \rightarrow F \leftrightarrow D$ $4.5$
Examples (MathPrint™ mode only)	$\frac{n}{d}$ 1 [·] 2 [+] 1 [·] 3 [↵] 4 [enter]	$\frac{1.2+1.3}{4}$ $0.625$
(MathPrint mode only)	$\frac{n}{d}$ (-) 5 [+] [2nd] [√] 5 [x <sup>2</sup> ] [-] 4 [(] 1 [)] [(] 6 [)] [↵] 2 [(] 1 [)] [enter]	$\frac{-5 + \sqrt{5^2 - 4(1)(6)}}{2(1)}$ $-2$

## Percentages

[2nd] [%]

[2nd] [↵%]

To perform a calculation involving a percentage, press [2nd] [%] after entering the value of the percentage.

To express a value as a percentage, press [2nd] [↵%] after the value.

### Example

2 [2nd] [%] [×] 150 [enter]

$2\% * 150$   $3$

1 [ $\frac{n}{d}$ ] 5 [↵] [2nd] [↵%] [enter]

$\frac{1}{5} \rightarrow \%$   $20\%$

### 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]

$3\% * 5000$   $150$

$\boxed{+}$ 2 $\boxed{\cdot}$ 3 $\boxed{2nd}$ $\boxed{[\%]}$ $\boxed{\times}$ 7300 $\boxed{enter}$	$3\% * 5000$ $150$ $Ans + 2.3\% * 7300$ $317.9$
$\boxed{\times}$ 280 $\boxed{enter}$	$3\% * 5000$ $150$ $Ans + 2.3\% * 7300$ $317.9$ $Ans * 280$ $89012$

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

## $\times 10^n$ key

$\boxed{\times 10^n}$

$\boxed{\times 10^n}$  is a shortcut key to enter a number in scientific notation format.

### Example

2 $\boxed{\times 10^n}$ 5 $\boxed{enter}$	$2 * 10^5$ $200000$
$\boxed{mode}$ $\boxed{\leftarrow}$ $\boxed{\rightarrow}$ $\boxed{enter}$	$\boxed{MODE}$ $\boxed{RAD}$ $\boxed{GRAD}$ $\boxed{NORM}$ $\boxed{SCN}$ $\boxed{ENG}$ $\boxed{PLAY}$ 0123456789 $\boxed{CLASSIC}$ $\boxed{MATHPRINT}$
$\boxed{clear}$ $\boxed{enter}$	$2 * 10^5$ $200000$ $2 * 10^5$ $2 * 10^5$

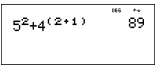
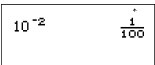

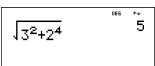


## Powers, roots and inverses

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



$\boxed{2\text{nd}}\boxed{[x\sqrt{\quad}]}$	Calculates the $n$ th root of any positive value and any odd integer root of a negative value.
$\boxed{[x^{-1}]}$	Gives the inverse of a value: $1/x$ . The TI-30XS MultiView™ calculator evaluates expressions entered with $\boxed{[x^2]}$ and $\boxed{[x^{-1}]}$ from left to right in both Classic and MathPrint™ modes.

### Examples

5 $\boxed{\wedge}$ 2 $\boxed{\blacktriangleright}$ + 4 $\boxed{\wedge}$ ( 2 + 1 ) $\boxed{\text{enter}}$	
10 $\boxed{\wedge}$ $\boxed{(-)}$ 2 $\boxed{\text{enter}}$	
$\boxed{2\text{nd}}\boxed{[\sqrt{\quad}]}$ 49 $\boxed{\text{enter}}$	
$\boxed{2\text{nd}}\boxed{[\sqrt{\quad}]}$ 3 $\boxed{\wedge}$ 2 $\boxed{\blacktriangleright}$ + 2 $\boxed{\wedge}$ 4 $\boxed{\text{enter}}$	
6 $\boxed{2\text{nd}}\boxed{[x\sqrt{\quad}]}$ 64 $\boxed{\text{enter}}$	
2 $\boxed{[x^{-1}]}$ $\boxed{\text{enter}}$	

### Pi

$\boxed{\pi}$

$\pi = 3.141592653590$  for calculations.

$\pi = 3.141592654$  for display.

## Example

$\pi$	2 $\times$ $\pi$ enter	$2*\pi$ $2\pi$
	$\leftarrow \rightarrow$	$2*\pi$ $2\pi$ $2\pi^*$ 6.283185307

## Problem

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

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

$\pi$ $\times$ 12 $\wedge$ 2 enter	$\pi*12^2$ $144\pi$
$\leftarrow \rightarrow$	$\pi*12^2$ $144\pi$ $144\pi^*$ 452.3893421

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

## Angle menu

$2^{nd}$ [angle]

$2^{nd}$ [angle] displays the choice of two submenus that enable you to specify the angle unit modifier as degrees ( $^\circ$ ), minutes ( $'$ ), seconds ( $''$ ); radian (r); gradian (g), or convert units using  $\blacktriangleright$  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	<b>mode</b> $\blacktriangleright$ <b>enter</b>	
	<b>clear</b> <b>sin</b> 3 0 <b>2nd</b> [angle]	
	1 <b>)</b> <b>enter</b>	
DEG	<b>mode</b> <b>enter</b>	
	<b>clear</b> 2 $\pi$ <b>2nd</b> [angle] 4 <b>enter</b>	
$\blacktriangleright$ DMS	1 $\cdot$ 5 <b>2nd</b> [angle] 6 <b>enter</b>	

### 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.

<b>clear</b> <b>mode</b> $\blacktriangledown$ $\blacktriangledown$ $\blacktriangleright$ $\blacktriangleright$ $\blacktriangleright$ <b>enter</b>	
<b>clear</b> 12 <b>2nd</b> [angle]	
1 31 <b>2nd</b> [angle] 2 45 <b>2nd</b> [angle] 3 <b>+</b> 26 <b>2nd</b> [angle] 1 54 <b>2nd</b> [angle] 2 38 <b>2nd</b> [angle] 3 <b>enter</b>	

<b>2nd</b> [angle] 6 <b>enter</b>	$12^{\circ}31'45'' + 26^{\circ}54'$ $39.44$ $39.43972222221$ $39^{\circ}26'23''$
-----------------------------------	--

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  $30^{\circ}$ . Then set the calculator to radian mode and calculate the sine of  $\pi / 6$  radians.

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

<b>clear</b> <b>sin</b> 30 <b>)</b> <b>enter</b>	$\sin(30)$ $\frac{1}{2}$
--	--------------------------

<b>mode</b> <b>▸</b> <b>enter</b> <b>clear</b> <b>sin</b> $\pi$ $\frac{n}{d}$ 6 <b>▸</b> <b>)</b> <b>enter</b>	$\sin(30)$ $\frac{1}{2}$ $\sin\left(\frac{\pi}{6}\right)$ $\frac{1}{2}$
---	---

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

<b>sin</b> 30 <b>2nd</b> [angle] <b>enter</b> <b>)</b> <b>enter</b>	$\sin\left(\frac{\pi}{6}\right)$ $\frac{1}{2}$ $\sin(30^{\circ})$ $\frac{1}{2}$
---	---

<b>mode</b> <b>enter</b> <b>clear</b> <b>sin</b> $\pi$ $\frac{n}{d}$ 6 <b>▸</b> <b>2nd</b> [angle] 4 <b>)</b> <b>enter</b>	$\sin(30^{\circ})$ $\frac{1}{2}$ $\sin\left(\frac{\pi}{6}\right)$ $\frac{1}{2}$
--	---

## Rectangular to polar

**2nd** [angle]

**2nd** [angle] displays a menu to convert rectangular coordinates  $(x, y)$  to polar coordinates  $(r, \theta)$  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 $\leftrightarrow$ P	<b>clear</b> <b>mode</b> $\leftarrow$ $\leftarrow$ $\rightarrow$ $\rightarrow$ <b>enter</b>	<div style="border: 1px solid black; padding: 2px; font-family: monospace; font-size: 0.8em;">           DEG RAD GRAD            NORM SCI ENG            FLOAT 0 1 2 3 4 5 6 7 8 9            CLASSIC <b>RTN/DRG/DM</b> </div>
	<b>clear</b> <b>2nd</b> <b>[angle]</b> $\rightarrow$ 3 5 <b>2nd</b> <b>[,]</b> 30 <b>)</b> <b>enter</b> <b>2nd</b> <b>[angle]</b> $\rightarrow$ 4 5 <b>2nd</b> <b>[,]</b> 30 <b>)</b> <b>enter</b>	<div style="border: 1px solid black; padding: 2px; font-family: monospace; font-size: 0.8em;">           DEG RAD GRAD            NORM SCI ENG            FLOAT 0 1 2 3 4 5 6 7 8 9            CLASSIC <b>RTN/DRG/DM</b>            P<math>\rightarrow</math>Rx(5,30) 4.3            P<math>\rightarrow</math>Ry(5,30) 2.5         </div>
	<b>2nd</b> <b>[angle]</b> $\rightarrow$ 1 3 <b>2nd</b> <b>[,]</b> 4 <b>)</b> <b>enter</b> <b>2nd</b> <b>[angle]</b> $\rightarrow$ 2 3 <b>2nd</b> <b>[,]</b> 4 <b>)</b> <b>enter</b>	<div style="border: 1px solid black; padding: 2px; font-family: monospace; font-size: 0.8em;">           DEG RAD GRAD            NORM SCI ENG            FLOAT 0 1 2 3 4 5 6 7 8 9            CLASSIC <b>RTN/DRG/DM</b>            P<math>\rightarrow</math>Rx(5,30) 4.3            P<math>\rightarrow</math>Ry(5,30) 2.5            R<math>\rightarrow</math>Pr(3,4) 5.0            R<math>\rightarrow</math>P<math>\theta</math>(3,4) 53.1         </div>

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

## Trigonometry

**sin** **cos** **tan**                      **2nd** **[sin<sup>-1</sup>]** **[cos<sup>-1</sup>]** **[tan<sup>-1</sup>]**

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

### Example Degree Mode

Tan	<b>mode</b> $\leftarrow$ $\leftarrow$ <b>enter</b> <b>clear</b> <b>tan</b> 45 <b>)</b> <b>enter</b>	<div style="border: 1px solid black; padding: 2px; font-family: monospace; font-size: 0.8em;">           tan(45)                      DEG °                      1         </div>
Tan <sup>-1</sup>	<b>2nd</b> <b>[tan<sup>-1</sup>]</b> 1 <b>)</b> <b>enter</b>	<div style="border: 1px solid black; padding: 2px; font-family: monospace; font-size: 0.8em;">           tan<sup>-1</sup>(1)                      DEG °                      45         </div>
Cos	5 <b>x</b> <b>cos</b> 60 <b>)</b> <b>enter</b>	<div style="border: 1px solid black; padding: 2px; font-family: monospace; font-size: 0.8em;">           5*cos(60)                      DEG °                      2.5            5*cos(60)                      NUM         </div>

## Example Radian Mode

Tan	<code>mode</code> $\rightarrow$ <code>enter</code> <code>clear</code> <code>tan</code> <code><math>\pi</math></code> <code><math>\frac{\pi}{d}</math></code> <code>4</code> $\rightarrow$ <code>)</code> <code>enter</code>	$\tan\left(\frac{\pi}{4}\right)$ 1
Tan <sup>-1</sup>	<code>2nd</code> [ <code>tan<sup>-1</sup></code> ] <code>1</code> <code>)</code> <code>enter</code>	$\tan^{-1}(1)$ 0.785398163
	<code><math>\leftarrow</math></code> <code><math>\rightarrow</math></code>	0.785398163 0.7853981633975 $\rightarrow$ $\frac{\pi}{4}$
Cos	<code>5</code> <code><math>\times</math></code> <code>cos</code> <code><math>\pi</math></code> <code><math>\frac{\pi}{d}</math></code> <code>4</code> $\rightarrow$ <code>)</code> <code>enter</code>	$\frac{\pi}{4}$ 0.785398163 $5 \cdot \cos\left(\frac{\pi}{4}\right)$ $\frac{5\sqrt{2}}{2}$
	<code><math>\leftarrow</math></code> <code><math>\rightarrow</math></code>	$\frac{5\sqrt{2}}{2}$ 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.

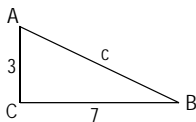
Reminder:

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

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

$$\text{therefore } m\angle B = 90^\circ - m\angle A$$

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



`mode`  $\leftarrow$   $\leftarrow$   $\rightarrow$   $\rightarrow$  `enter`

MODE  
MODE RAD GRAD  
MODE SCI ENG  
FLOAT 0 1 2 3 4 5 6 7 8 9  
CLASSIC NORMAL

<b>clear</b> <b>2nd</b> <b>[tan<sup>-1</sup>]</b> 7 <b>[<math>\frac{\square}{\square}</math>]</b> 3 <b>[<math>\rightarrow</math>]</b> <b>[<math>\rightarrow</math>]</b> <b>enter</b>	$\tan^{-1}\left(\frac{7}{3}\right)$ 66.8
90 <b>[<math>\square</math>]</b> <b>2nd</b> <b>[ans]</b> <b>enter</b>	$\tan^{-1}\left(\frac{7}{3}\right)$ 66.8 90-Ans 23.2
<b>2nd</b> <b>[<math>\sqrt{\square}</math>]</b> 3 <b>[<math>\times^2</math>]</b> <b>[+]</b> 7 <b>[<math>\times^2</math>]</b> <b>enter</b>	$\frac{90-\text{Ans}}{\sqrt{3^2+7^2}}$ 23.2 $\sqrt{58}$
<b>[<math>\leftarrow</math>]</b> <b>[<math>\rightarrow</math>]</b>	$\frac{90-\text{Ans}}{\sqrt{3^2+7^2}}$ 23.2 $\sqrt{58}$ 7.6

To one decimal place, the measure of angle A is  $66.8^\circ$ , the measure of angle B is  $23.2^\circ$ , 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	<b>2nd</b> <b>[hyp]</b> <b>[sin]</b> 5 <b>[<math>\square</math>]</b> <b>[+]</b> 2 <b>enter</b>	$\sinh(5)+2$ 76.20321058
	<b>[<math>\leftarrow</math>]</b> <b>[<math>\leftarrow</math>]</b> <b>enter</b> <b>[<math>\downarrow</math>]</b> <b>[<math>\downarrow</math>]</b> <b>[<math>\leftarrow</math>]</b> <b>[<math>\leftarrow</math>]</b> <b>[<math>\downarrow</math>]</b> <b>[<math>\downarrow</math>]</b> <b>2nd</b> <b>[hyp]</b> <b>2nd</b> <b>[sin<sup>-1</sup>]</b> <b>enter</b>	$\sinh(5)+2$ 76.20321058 $\sinh^{-1}(5)+2$ 4.312438341

## Logarithm and exponential functions

**log**

**ln**

**2nd** [ $10^x$ ]

**2nd** [ $e^x$ ]

**log** yields the common logarithm of a number.

**ln** yields the logarithm of a number to the base  $e$  ( $e \approx 2.819291929$ ).

**2nd** [ $10^x$ ] raises 10 to the power you specify.

**2nd** [ $e^x$ ] raises  $e$  to the power you specify.

### Examples

LOG	<b>log</b> 1 <b>)</b> <b>enter</b>	$\log(1)$ 0
LN	<b>ln</b> 1 5 <b>)</b> <b>x</b> 2 <b>enter</b>	$\log(1)$ 0 $\ln(15) \cdot 2$ 5.416100402
$10^x$	<b>2nd</b> [ $10^x$ ] <b>log</b> 2 <b>)</b> <b>enter</b> <b>log</b> <b>2nd</b> [ $10^x$ ] 5 <b>)</b> <b>enter</b>	$10^{\log(2)}$ 2 $\log(10^5)$ 5
$e^x$	<b>2nd</b> [ $e^x$ ] <b>.</b> 5 <b>enter</b>	$e \cdot 5$ 1.648721271

## Constant

**2nd** [**K**]

**2nd** [**K**] turns Constant feature on and lets you define a constant.

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

1. Press **2nd** [**K**].
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 **2nd** **[K]** again to turn Constant feature off.

### Examples

K	<b>2nd</b> <b>[K]</b>	K=
	<b>×</b> 2 <b>+</b> 3 <b>enter</b>	K= <sup>K</sup> *2+3
	4 <b>enter</b>	4*2+3 = 11
	6 <b>enter</b>	4*2+3 = 11 6*2+3 = 15
Reset K	<b>2nd</b> <b>[K]</b> <b>2nd</b> <b>[K]</b> <b>clear</b> <b>x<sup>2</sup></b> <b>enter</b>	K= <sup>K</sup> = <sup>2</sup>
	5 <b>enter</b>	5 <sup>2</sup> = 25
	20 <b>enter</b>	5 <sup>2</sup> = 25 20 <sup>2</sup> = 400
Turn off K	<b>2nd</b> <b>[K]</b> 1 <b>+</b> 1 <b>enter</b>	5 <sup>2</sup> = 25 20 <sup>2</sup> = 400 1+1 = 2

## Problem

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

$\boxed{2\text{nd}} \boxed{[K]} \boxed{\times} 5 \boxed{-} 2 \boxed{\text{enter}}$	$K = *5 - 2$
$\boxed{(-)} 5 \boxed{\text{enter}}$	$-5 * 5 - 2$ $-27$
$\boxed{(-)} 1 \boxed{\text{enter}}$	$-5 * 5 - 2$ $-27$ $-1 * 5 - 2$ $-7$
$\boxed{2\text{nd}} \boxed{[K]}$	$-5 * 5 - 2$ $-27$ $-1 * 5 - 2$ $-7$

## Memory and stored variables

 $\boxed{x^{yzt}}_{abc}$  $\boxed{\text{sto} \blacktriangleright}$  $\boxed{2\text{nd}} \boxed{[\text{recall}]}$  $\boxed{2\text{nd}} \boxed{[\text{clear var}]}$ 

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.

$\boxed{\text{sto} \blacktriangleright}$  lets you store values to variables. Press  $\boxed{\text{sto} \blacktriangleright}$  to store a variable, and press  $\boxed{x^{yzt}}_{abc}$  to select the variable to store. Press  $\boxed{\text{enter}}$  to store the value in the selected variable. If this variable already has a value, that value is replaced by the new one.

$\boxed{x^{yzt}}_{abc}$  accesses the menu of variables. Press this key multiple times to choose  $x$ ,  $y$ ,  $z$ ,  $t$ ,  $a$ ,  $b$ , or  $c$ . You can also use  $\boxed{x^{yzt}}_{abc}$  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	<b>2nd</b> [clear var] 1	<div style="border: 1px solid black; padding: 5px;">           Clear Var            1: Yes            2: No         </div>
Store	15 <b>sto</b> $x_{abc}$	<div style="border: 1px solid black; padding: 5px;">           15→x         </div>
	<b>enter</b>	<div style="border: 1px solid black; padding: 5px;">           15→x      15         </div>
Recall	<b>2nd</b> [recall]	<div style="border: 1px solid black; padding: 5px;">           Recall Var            1: x=15            2: y=0            3: z=0         </div>
	<b>enter</b> $x^2$ <b>enter</b>	<div style="border: 1px solid black; padding: 5px;">           15→x      15            15<sup>2</sup>      225         </div>
	<b>sto</b> $x_{abc}$ $x_{abc}$	<div style="border: 1px solid black; padding: 5px;">           15→x      15            15<sup>2</sup>      225            Ans→y         </div>
	<b>enter</b>	<div style="border: 1px solid black; padding: 5px;">           15→x      15            15<sup>2</sup>      225            Ans→y    225         </div>
	$x_{abc}$ $x_{abc}$	<div style="border: 1px solid black; padding: 5px;">           15<sup>2</sup>      225            Ans→y    225            y         </div>

<b>enter</b> $\frac{\square}{\square}$ 4 <b>enter</b>	<pre> Ans→y      225 y           225 Ans÷4      56.25 </pre>
---	--

### **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.

<b>mode</b> $\leftarrow$ $\rightarrow$ $\rightarrow$ <b>enter</b> <b>clear</b> 350 $\times$ 560 <b>sto</b> $\rightarrow$ $x^{yzt}_{abc}$ <b>enter</b>	<pre> 350*560→x 196*10<sup>3</sup> </pre>
340 $\times$ 610 <b>sto</b> $\rightarrow$ $x^{yzt}_{abc}$ $x^{yzt}_{abc}$ <b>enter</b>	<pre> 196*10<sup>3</sup> 340*610→y 207.4*10<sup>3</sup> </pre>
150 $\times$ <b>2nd</b> [ <b>recall</b> ]	<pre> Recall Var 1: x=196E3 2: y=207.4E3 3: z=0E0 </pre>
<b>enter</b> <b>enter</b>	<pre> 207.4*10<sup>3</sup> 150*196000 29.4*10<sup>6</sup> </pre>
210 $\times$ <b>2nd</b> [ <b>recall</b> ] <b>enter</b> <b>enter</b>	<pre> 29.4*10<sup>6</sup> 210*196000 41.16*10<sup>6</sup> </pre>
150 $\times$ $x^{yzt}_{abc}$ $x^{yzt}_{abc}$ <b>enter</b>	<pre> 210*196000 41.16*10<sup>6</sup> 150*y 31.11*10<sup>6</sup> </pre>
210 $\times$ $x^{yzt}_{abc}$ $x^{yzt}_{abc}$ <b>enter</b>	<pre> 150*y 31.11*10<sup>6</sup> 210*y 43.554*10<sup>6</sup> </pre>

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.

## Data editor and list formulas


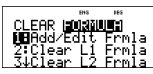
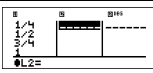

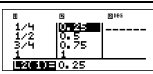
**data**

**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	<b>data</b> 1 $\frac{n}{d}$ 4 $\downarrow$ 2 $\frac{n}{d}$ 4 $\downarrow$ 3 $\frac{n}{d}$ 4 $\downarrow$ 4 $\frac{n}{d}$ 4 <b>enter</b>	
Formula	$\rightarrow$ <b>data</b> $\rightarrow$	
	<b>enter</b>	
	<b>data</b> <b>enter</b> <b>2nd</b> [f $\leftarrow$ $\rightarrow$ d]	
	<b>enter</b>	

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.

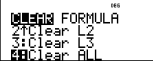
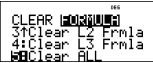
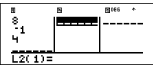

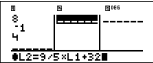
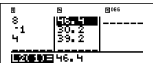
Paris, France                    8°C

Moscow, Russia                -1°C

Montreal, Canada              4°C

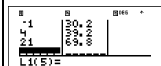
Convert these temperatures from degrees Celsius to degrees Fahrenheit.

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

<p>data data 4 data <math>\rightarrow</math> 5</p>	 
<p>8 <math>\downarrow</math> (-) 1 <math>\downarrow</math> 4 <math>\downarrow</math> <math>\rightarrow</math></p>	
<p>data <math>\rightarrow</math> 1</p>	
<p>9 <math>\div</math> 5 <math>\times</math> data 1 <math>+</math> 32</p>	
<p>enter</p>	

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

◀◀◀◀ 21 **enter**



## Statistics

**2nd** [stat] **data**

**2nd** [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  $\downarrow$  and  $\uparrow$  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.
$S_x$ or $S_y$	Sample standard deviation of $x$ or $y$ .
$\sigma_x$ or $\sigma_y$	Population standard deviation of $x$ or $y$ .
$\Sigma x$ or $\Sigma y$	Sum of all $x$ or $y$ values.
$\Sigma x^2$ or $\Sigma y^2$	Sum of all $x^2$ or $y^2$ values.
$\Sigma xy$	Sum of $(x \dots y)$ 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.

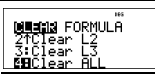
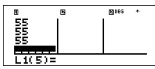
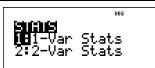
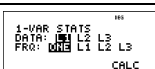
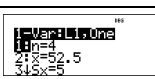
$y'$ (2-Var)	Uses $a$ and $b$ to calculate predicted $y$ value when you input an $x$ value.
MinX	Minimum of $x$ values.
Q1 (1-Var)	Median of the elements between MinX and Med (1st quartile).
Med	Median of all data points.
Q3 (1-Var)	Median of the elements between Med and MaxX (3rd quartile).
MaxX	Maximum of $x$ values.

To define statistical data points:

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

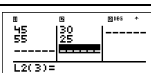
**1-Var:** Find the mean of {45, 55, 55, 55}

Clear all data	<b>data</b> <b>data</b> $\downarrow$ $\downarrow$ $\downarrow$	
Data	<b>enter</b> 45 $\downarrow$ 55 $\downarrow$ 55 $\downarrow$ 55 <b>enter</b>	
Stat	<b>2nd</b> [ <b>stat</b> ] 1	
	$\downarrow$ $\downarrow$	
	<b>enter</b>	



Stat Var	2 <b>enter</b>	$\bar{x}$ 52.5
	$\times$ 2 <b>enter</b>	$\bar{x}$ 52.5 Ans*2 105

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

Clear all data	<b>data</b> <b>data</b> $\downarrow$ $\downarrow$ $\downarrow$	<b>FORMULA</b> 2:Clear L2 3:Clear L3 4:Clear ALL
Data	<b>enter</b> 45 $\downarrow$ 55 $\downarrow$ 30 $\downarrow$ 25 $\downarrow$	 L2(3)=
Stat	<b>2nd</b> [stat] 2 (Your screen may not show 3:StatVars if you did not previously perform a calculation.)	<b>STATS</b> 1:1-Var Stats 2:2-Var Stats 3:StatVars
	$\downarrow$ $\downarrow$	2-VAR STATS xDATA: $\downarrow$ L2 L3 yDATA: L1 $\downarrow$ L3 CALC
	<b>enter</b> $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$ $\uparrow$	2-Var:L1,L1 G1x' H:y' I $\downarrow$ minX=45
	<b>enter</b> 45 <b>)</b> <b>enter</b>	$x'(45)$ 15

### 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.

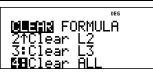
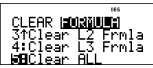
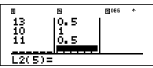



Test No.	1	2	3	4
Score	12	13	10	15
Coefficient	1	0.5	1	0.5

1. Find Anthony's average grade (weighted average).
2. What does the value of  $n$  given by the calculator represent? What does the value of  $\Sigma x$  given by the calculator represent?

Reminder: The weighed average is

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

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

<p>data data 4 data 5</p>	 
<p>12 13 10 11 1 1 5 1 5</p>	
<p>2nd [stat] 1 (Your screen may not show 3:StatVars if you did not previously perform a calculation.)</p>	
<p>down arrow right arrow right arrow enter down arrow</p>	
<p>enter</p>	

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

On the calculator,  $n$  represents the total sum of the weights  
 $n = 1 + 0.5 + 1 + 0.5$ .

$\Sigma x$  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**  $\downarrow$   $\downarrow$   $\downarrow$  15  $\downarrow$

**2nd** **[stat]** 1  $\downarrow$   $\downarrow$  **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  $\downarrow$  49  $\downarrow$  65  $\downarrow$  79  $\downarrow$   $\rightarrow$  5.3  $\downarrow$   
 14.45  $\downarrow$  20.21  $\downarrow$  38.45  $\downarrow$


**2nd** **[stat]** 2


 	<pre> 2-VAR STATS XDATA: [L1] L2 L3 YDATA: L1 [L2] L3 CALC </pre>
--	---

<b>enter</b>	<pre> 2-Var: [L1] [L2] 1: n=4 2: x=56.5 3: Sx=19.89137166 </pre>
--------------	--

Press  to view $a$ and $b$ .	<pre> 2-Var: [L1] [L2] C: TΣxy=5234.15 D: a=0.677325190 E: b=-18.6663732 </pre>
---	---

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

Press  until $y'$ is highlighted.	<pre> 2-Var: [L1] [L2] F: r=0.963411717 G: x' H: y' </pre>
--	--

<b>enter</b> 55  <b>enter</b>	<pre> y' (55) 18.58651222 </pre>
--	----------------------------------

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

## Probability

**prb**

This key displays two menus: PRB and RAND.

PRB contains the following options:

<b>nPr</b>	Calculates the number of possible <b>permutations</b> of $n$ items taken $r$ at a time, given $n$ and $r$ . The order of objects is important, as in a race.
<b>nCr</b>	Calculates the number of possible <b>combinations</b> 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 <b>factorial</b> is the product of the positive integers from 1 to $n$ . $n$ must be a positive whole number $\leq 69$ .
---	--

RAND contains the following options:

<b>rand</b>	Generates a random real number between 0 and 1. To control a sequence of random numbers, store an integer (seed value) $\geq 0$ to <b>rand</b> . The seed value changes randomly every time a random number is generated.
<b>randint(<math>A, B</math>)</b>	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	8
	<b>prb</b> 1	PRB RAND 1:nPr 2:nCr 3:!
	3 <b>enter</b>	8 nPr 3 336
nCr	52 <b>prb</b> 2 5 <b>enter</b>	52 nCr 5 2598960
!	4 <b>prb</b> 3 <b>enter</b>	4! 24
STO►rand	5 <b>STO►</b> <b>prb</b> <b>►</b>	PRB RAND 1:rand 2:randint( $A, B$ )
	1 <b>enter</b>	5►rand 5

Rand	<b>prb</b> <b>▶</b> 1 <b>enter</b>	5→rand * rand 0.000093165
Randint(	<b>prb</b> <b>▶</b> 2 3 <b>2nd</b> [,] 5 <b>)</b> <b>enter</b>	5→rand * 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 *
<b>prb</b> 2	25 nCr *
3 <b>enter</b>	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!

## 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	Specified the starting value for the independent variable, $x$ .
Step	Specified 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.

<p><b>table</b> <math>x^{yzt}</math> <math>abc</math> ( ) 36 - <math>x^{yzt}</math> <math>abc</math> ( ) <b>enter</b></p>	<p><math>y = x(36 - x)</math></p> <p>Start=0 Step=1 <b>Auto</b> Ask-<math>x</math> <b>OK</b></p>								
<p><b>clear</b> 15 <math>\odot</math> <b>clear</b> 3 <math>\odot</math> <math>\odot</math> <b>enter</b></p>	<p>Start=15 Step=3 <b>Auto</b> Ask-<math>x</math> <b>OK</b></p> <table border="1"> <thead> <tr> <th><math>x</math></th> <th><math>y</math></th> </tr> </thead> <tbody> <tr> <td>15</td> <td>315</td> </tr> <tr> <td>18</td> <td>324</td> </tr> <tr> <td>21</td> <td>315</td> </tr> </tbody> </table> <p><math>x=15</math></p>	$x$	$y$	15	315	18	324	21	315
$x$	$y$								
15	315								
18	324								
21	315								

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  
 $y = 3600 - 450x$ .

<b>table</b> 3600 $\square$ 450 $\left[ \begin{smallmatrix} x \cdot y = r \\ abc \end{smallmatrix} \right]$	$y=3600-450x$								
<b>enter</b> 0 $\downarrow$ 1 $\downarrow$ $\rightarrow$ <b>enter</b> $\downarrow$ <b>enter</b>	Start=0 Step=1 Auto <b>HSK-0</b> OK								
Input guesses <b>enter</b>	<table border="1"><thead><tr><th>x</th><th>y</th></tr></thead><tbody><tr><td>2</td><td>2700</td></tr><tr><td>7</td><td>450</td></tr><tr><td>8</td><td>0</td></tr></tbody></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.

## 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**<sup>-1</sup> or **COS**<sup>-1</sup>:  $|x| > 1$ .
- For **nCr** or **nPr**:  $n$  or  $r$  are not integers  $\geq 0$ .
- 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  $> 99$ , or not an integer.

**OVERFLOW** —  $|\theta| \geq 1\text{E}10$ , where  $\theta$  is an angle in a trig, hyperbolic, or **R►Pr**( function.

**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  $\left[\frac{\square}{\square}\right]$ , try using  $\left[\frac{\square}{\square}\right]$ .

**INVALID FUNCTION** — Invalid function entered in the function table.

**LOW BATTERY** — Replace the battery.

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

## Battery information

### Battery precautions

- Do not leave batteries within the reach of children.
- Do not mix new and used batteries. Do not mix brands (or types within brands) of batteries.
- Do not mix rechargeable and non-rechargeable batteries.
- Install batteries according to polarity (+ and -) diagrams.
- Do not place non-rechargeable batteries in a battery recharger.
- Properly dispose of used batteries immediately.
- Do not incinerate or dismantle batteries.
- Seek Medical Advice immediately if a cell or battery has been swallowed. (In the USA, contact the National Capital Poison Center at 1-800-222-1222.)

### Battery disposal

Do not mutilate, puncture, or dispose of batteries in fire. The batteries can burst or explode, releasing hazardous chemicals. Discard used batteries according to local regulations.

### 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.

- If necessary, press **on** and **CLEAR** simultaneously to reinitialize the calculator (erases the memory and all the settings and displays a MEM DELETED message).

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](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)

## In case of difficulty

Review instructions to be certain calculations were performed properly.

Press **on** and **clear** at the same time. This clears all settings and memory.

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

Change the battery when:

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

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## For product (hardware) service

**Customers in the U.S., Canada, Mexico, Puerto Rico and Virgin Islands:** Always contact Texas Instruments Customer Support before returning a product for service.

**All other customers:** Refer to the leaflet enclosed with this product (hardware) or contact your local Texas Instruments retailer/distributor.