



# TI-36X II

Scientific Calculator  
**USER'S GUIDE**

© 2000, 2003 Texas Instruments Incorporated  
education.ti.com  
ti-cares@ti.com

## Table of Contents

Turning the Calculator On and Off.....	1
Alternate Functions.....	1
Display.....	2
Scrolling.....	2
Menus.....	3
Fix.....	3
Clearing, Correcting, and Resetting.....	4
Display Indicators.....	5
Order of Operations.....	6
Basic Operations.....	7
Last Answer.....	7
Percent.....	9
Fractions.....	10
Exponents, Roots, and Reciprocals.....	11
Notation.....	12
Pi.....	13
Memory.....	14
Stored Operations.....	16
Logarithms.....	18
Trigonometric Functions.....	20
Angle Modes.....	22
Rectangular $\leftrightarrow$ Polar.....	24
Hyperbolic Functions.....	25
Metric Conversions.....	26
Physical Constants.....	28
Integrals.....	30
Probability.....	32
Statistics.....	34
Boolean Logic Operations.....	39
Number-System Modes.....	40
Complex Numbers.....	41
Error Conditions.....	43
In Case of Difficulty.....	45
Battery Replacement.....	45
Service Information.....	46

---

## Turning the Calculator On and Off

---

The TI-36X II is battery powered.

- To turn on the TI-36X II, press **[ON]**.
- To turn off the TI-36X II, press **[2nd][OFF]**. All data in memory is retained.

APD™ (Automatic Power Down™) turns off the TI-36X II automatically if no key is pressed for about five minutes. Press **[ON]** after APD to power up again; the display, pending operations, settings, and memory are retained.

---

## Alternate Functions

---

Most keys can perform two functions. The first function is marked on the key, and the second function is marked above the key, as illustrated below.

2nd function	$\sqrt{\quad}$
Primary function	<b>[x<sup>2</sup>]</b>

Press **[2nd]** to activate the second function of a key. To cancel the second function before making an entry, press **[2nd]** again. In this manual, second functions are shown in brackets ([ ]). For example, press **[x<sup>2</sup>]** to find the square of a number. Press **[2nd][√]** to find the square root of a number.

## Display

---

The TI-36X II has a two-line display. The first line (**Entry Line**) displays an entry of up to 88 digits or items (47 for **Stat** or Stored Operations). Entries begin on the left; those with more than 11 digits scroll to the left. You can have as many as 23 levels of parentheses and up to 8 mathematical operations pending.

The second line (**Result Line**) displays a result of up to 10 digits, plus a decimal point, a negative sign, a **x10** indicator, and a 2-digit positive or negative exponent. Results that exceed the digit limit are displayed in scientific notation.

**Note:** In the text, numbers containing decimal fractions are shown in decimal format consistent with the calculator display.

## Scrolling

---

Scroll with  $\leftarrow$ ,  $\rightarrow$ ,  $\uparrow$ , and  $\downarrow$ .

- Press  $\leftarrow$  and  $\rightarrow$  to scroll horizontally through the current or previous entries, or to move the underscore within a menu list. Press  $\left[2nd\right]\leftarrow$  or  $\left[2nd\right]\rightarrow$  to move the cursor to the beginning or end of the entry.
- After an expression is evaluated, press  $\uparrow$  and  $\downarrow$  to scroll through previous entries, which are stored in the TI-36X II history. If you edit a previous entry and press  $\left[ENTER\right]$ , the calculator will evaluate the new expression and return the new result.

## Menus

---

Some key presses access menus:  $\boxed{\text{STO}}$ ,  $\boxed{\text{MEMVAR}}$ ,  $\boxed{\text{TRIG}}$ ,  $\boxed{\text{LOGIC}}$ ,  $\boxed{\text{STATVAR}}$ ,  $\boxed{\text{DRG}}$ ,  $\boxed{\text{Co}}\overline{\text{nt}}\overline{\text{ver}}$ ,  $\boxed{2\text{nd}}\boxed{\text{RCL}}$ ,  $\boxed{2\text{nd}}\boxed{\text{CLRVAR}}$ ,  $\boxed{2\text{nd}}\boxed{\text{LOG}}$ ,  $\boxed{2\text{nd}}\boxed{\text{R}\leftrightarrow\text{P}}$ ,  $\boxed{2\text{nd}}\boxed{\text{HYP}}$ ,  $\boxed{2\text{nd}}\boxed{\text{CONST}}$ ,  $\boxed{2\text{nd}}\boxed{\text{PRB}}$ ,  $\boxed{2\text{nd}}\boxed{\text{STAT}}$ ,  $\boxed{2\text{nd}}\boxed{\text{EXIT STAT}}$ ,  $\boxed{2\text{nd}}\boxed{\text{SCI/ENG}}$ ,  $\boxed{2\text{nd}}\boxed{\text{FIX}}$ ,  $\boxed{2\text{nd}}\boxed{\text{COMPX}}$ , and  $\boxed{2\text{nd}}\boxed{\text{RESET}}$ .

The menu choices are displayed on the screen. Press  $\uparrow$  or  $\downarrow$  to scroll through the menu and underline an item. To select an underlined item:

- Press  $\boxed{\text{ENTER}}$  while the item is underlined. Or,
- For menu items followed by an argument value, enter the argument value while the item is underlined. The item and the argument value are transferred to the current entry. However, if the argument is another function, you need to press  $\boxed{\text{ENTER}}$  to select the first function before proceeding to the next.

To return to the previous screen without selecting the menu item, press  $\boxed{\text{CLEAR}}$ .

## Fix

---

$\boxed{2\text{nd}}\boxed{\text{FIX}}$  displays a menu: **F0123456789**. To round displayed results, scroll with  $\uparrow$  or  $\downarrow$  to select the desired number of decimal places, or enter the numeral corresponding to the desired number of decimal places. The displayed value is padded with zeroes if needed. To restore standard notation (floating decimal), select **F** (default) in the menu, or press  $\boxed{2\text{nd}}\boxed{\text{FIX}}\boxed{\text{F}}$ .

You can specify rounding places before you begin your calculations, before you complete an operation with  $\boxed{\text{ENTER}}$ , or after the results are displayed.

## Clearing, Correcting, and Resetting

---

Key	Action
<b>CLEAR</b>	Action depends on position of the cursor. <ul style="list-style-type: none"><li>• If cursor is in the middle of an entry, clears character under the cursor and all characters to the right of the cursor.</li><li>• If cursor is at the end of an entry, clears the entire entry.</li><li>• If an <b>Error</b> message is displayed, clears the error message and moves the cursor to last entry in history.</li><li>• If a menu is displayed, exits menu.</li></ul>
<b>DEL</b>	<ul style="list-style-type: none"><li>• If the cursor is on a character, deletes the character under the cursor.</li><li>• If the cursor is at the end of an entry, deletes the character to the left of the cursor.</li></ul>
<b>2nd</b> [INS]	Lets you insert one or more characters at the cursor.
<b>2nd</b> [RESET] <b>↵</b> [ENTER] or <b>ON</b> & <b>CLEAR</b> (simul- taneously)	Resets the TI-36X II. Returns unit to default settings; clears memory variables, pending operations, all entries in history, statistical data, <b>Ans</b> , and stored operations. <b>MEM CLEARED</b> is displayed.

You can overwrite entries. Move the cursor to the desired location and begin pressing keys. The new keypresses will overwrite the existing entry, character by character.

Before beginning a new set of examples or problems in this manual, reset the calculator to ensure that your displays will be the same as those shown.

## Display Indicators

Special indicators may appear in the display to provide additional information about functions or results.

Indicator	Meaning
<b>2nd</b>	2nd function is active.
<b>FIX</b>	Calculator is rounding results to specified number of places.
<b>SCI or ENG</b>	Scientific or engineering notation is active.
<b>STAT</b>	Calculator is in Statistics mode.
<b>DEG, RAD, or GRAD</b>	Specifies angle-unit setting (degrees, radians, or grads). The default is the degree setting.
<b>HEX or OCT</b>	Calculator is in hexadecimal or octal mode.
<b>x10</b>	Precedes the exponent in scientific or engineering notation.
↑ ↓	An entry is stored in memory before and/or after the active screen. Press $\odot$ and $\ominus$ to scroll.
→ ←	An entry or menu list extends beyond the capacity of the screen. Press $\odot$ and $\ominus$ to scroll.
<b>r or i</b>	Complex number, real part, or complex number, imaginary part.
$\text{⌚}$	Calculator is busy.

## Order of Operations

---

The TI-36X II uses EOS™ (Equation Operating System) to evaluate expressions.

Order	Evaluation
1st	Expressions inside parentheses.
2nd	Functions which need a ) and precede the argument, such as <b>sin</b> , <b>log</b> , and all <b>R↔P</b> menu items; Boolean Logic <b>NOT</b> and <b>2's</b> complement.
3rd	Fractions.
4th	Functions that are entered after the argument, such as $x^2$ and angle unit modifiers ( $^{\circ}$ , $^{\prime}$ , $^{\prime\prime}$ , $^{\circ}$ ); metric conversions.
5th	Exponentiation ( $^{\wedge}$ ) and roots ( $^{\sqrt{\quad}}$ ).
6th	Negation (-).
7th	Permutations ( <b>nPr</b> ) and combinations ( <b>nCr</b> ).
8th	Multiplication, implied multiplication, division.
9th	Addition and subtraction.
10th	Boolean logic <b>AND</b> .
11th	Boolean logic <b>XOR</b> and <b>OR</b> .
12th	Conversions ( <b>▶A<sup>b</sup>/c↔<sup>d</sup>/e</b> , <b>▶F↔D</b> , <b>▶DMS</b> ).
13th	<b>ENTER</b> completes all operations and closes all open parentheses.

You can change the order of operations by enclosing expressions in parentheses.



## Basic Operations

---

As you press keys, numerals, operators, and results appear on the display.

$\boxed{0}, \boxed{1}, \boxed{2}, \boxed{3}, \boxed{4},$ $\boxed{5}, \boxed{6}, \boxed{7}, \boxed{8}, \boxed{9}$	Enters numerals 0 through 9.
$\boxed{+}, \boxed{-}, \boxed{\times}, \boxed{\div}$	Adds, subtracts, multiplies, divides.
$\boxed{(}, \boxed{)}$	Opens, closes a parenthetical expression.
$\boxed{\cdot}$	Inserts the decimal point.
$\boxed{-}$	Enters a negative sign.
$\boxed{\text{ENTER}}$	Completes all operations.

## Last Answer

---

$\boxed{2\text{nd}}\boxed{\text{ANS}}$  recalls the value of the most recently calculated result and enters it into the current entry as **Ans**.

If you press an operator key immediately after completing an operation with  $\boxed{\text{ENTER}}$ , the most recently calculated result is recalled and entered as **Ans**.



Examples

5 [x] 9 [+] 6 [-] 2 [ENTER]

5\*9+6-2  
49.  
DEG

5 [x] [(] 9 [+] 6 [)] [-] 2 [ENTER]

5\*(9+6)-2  
73.  
DEG

[÷] 8 [·] 7 [ENTER]

Ans/8.7  
8.390804598  
DEG

[2nd] [FIX] [↓] [↓] [↓]

F0123456789  
DEG

[ENTER]

Ans/8.7  
8.391  
FIX DEG

5 [x] 2 [+] [2nd] [ANS] [2nd] [FIX] 6 [ENTER]

5\*2+Ans  
18.390805  
FIX DEG

[2nd] [FIX] [-]

5\*29  
2+Ans  
18.3908046  
DEG

[←] [←] [←]

5\*(9+6)-2  
DEG

[↓] [↓] [↓] [DEL] [2nd] [INS] 8 [ENTER]

5\*(8+6)-2  
68.  
DEG

[2nd] [RESET] [↓] [ENTER]

MEM CLEARED  
DEG

## Percent

To calculate a percent, press  $\boxed{2\text{nd}}\boxed{[\%]}$  after entering a value.



### Problem

A mining company mines 5000 tons of ore having a 3-percent concentration of metal, 7300 tons having a 2.3-percent concentration, and 8400 tons having a 3.1-percent concentration. How much metal does the company get in total from the three quantities of ore?

If the metal is worth \$280 per ton, what is the value of the total amount of metal present in the three quantities of ore?

5 0 0 0  $\boxed{\times}$  3  $\boxed{2\text{nd}}\boxed{[\%]}$   $\boxed{\text{ENTER}}$

5000\*3%  
150.  
DEG

$\boxed{+}$  7 3 0 0  $\boxed{\times}$  2  $\boxed{\cdot}$  3  $\boxed{2\text{nd}}\boxed{[\%]}$   
 $\boxed{\text{ENTER}}$

Ans+7300\*2.  
317.9  
DEG

$\boxed{+}$  8 4 0 0  $\boxed{\times}$  3  $\boxed{\cdot}$  1  $\boxed{2\text{nd}}\boxed{[\%]}$   
 $\boxed{\text{ENTER}}$

Ans+8400\*3.  
578.3  
DEG

$\boxed{\times}$  2 8 0  $\boxed{\text{ENTER}}$

Ans\*280  
161924.  
DEG

The three quantities of ore together contain 578.3 tons of metal. The value of the metal is \$161924.

## Fractions

Fractional calculations can display fractional or decimal results. Results are automatically simplified.

$\boxed{\text{Ab/c}}$	Enters a fraction. Press $\boxed{\text{Ab/c}}$ after entering whole number, and between numerator and denominator, both of which must be positive integers. To negate a fraction or a mixed number, press $\boxed{-}$ before entering the first argument.
$\boxed{2\text{nd}}\boxed{\text{Ab/c}\leftrightarrow\text{d/e}}$	Converts from mixed number to simple fraction, and vice versa.
$\boxed{2\text{nd}}\boxed{\text{F}\leftrightarrow\text{D}}$	Converts from fraction to decimal format and vice versa. <b>Note:</b> Due to display size, not all decimal numbers can be converted to fractions.

If a problem contains both fractions and decimals, the results will be displayed in decimal format.

	<i>Examples</i>
$4\boxed{\text{Ab/c}}3\boxed{\text{Ab/c}}5\boxed{+}2\boxed{\text{Ab/c}}1\boxed{\text{Ab/c}}$ $5\boxed{\text{ENTER}}$	$4\text{J}3\text{J}5+2\text{J}1\text{J}5$ $6\text{J}4/5$ DEG
$\boxed{2\text{nd}}\boxed{\text{Ab/c}\leftrightarrow\text{d/e}}\boxed{\text{ENTER}}$	$\text{Ans}\rightarrow\text{A}^b/\text{c}^d/\text{e}$ $34/5$ DEG
$\boxed{2\text{nd}}\boxed{\text{F}\leftrightarrow\text{D}}\boxed{\text{ENTER}}$	$\text{Ans}\rightarrow\text{F}\leftrightarrow\text{D}$ $6.8$ DEG
$\boxed{\times}\boxed{-}3\boxed{\text{Ab/c}}10\boxed{\text{ENTER}}$	$\text{Ans}\rightarrow-3\text{J}10$ $-2.04$ DEG

## Exponents, Roots, and Reciprocals

$x^2$	Calculates the square of a value.
$\wedge$	Raises a value to any power within the range of the calculator. If the number is negative, the power must be an integer. If you include an operation in the exponent, you must use parentheses.
$2^{nd}[\sqrt{\quad}]$	Calculates the square root of a positive value.
$2^{nd}[\sqrt[\quad]{\quad}]$	Calculates any root of any positive value (within the range of the calculator) and any odd-numbered integer root of a negative value.
$2^{nd}[\text{1/x}]$	Yields the reciprocal of a value.



### Examples

$5 [x^2] + 4 [\wedge] [ ( ] 2 [ + ] 1 [ ) ] [ENTER]$	$5^2 + 4 \wedge (2+1)$ 89. DEG
$2^{nd} [\sqrt{\quad}] 49 [ENTER]$	$\sqrt{49}$ 7. DEG
$6 [2^{nd} [\sqrt[\quad]{\quad}]] 64 [ENTER]$	$6^{\sqrt{64}}$ 2. DEG
$25 [2^{nd} [\text{1/x}]] [ENTER]$	$25^{-1}$ 0.04 DEG


## Notation

$\boxed{2\text{nd}}[\text{SCI/ENG}]$  displays the **Numeric Notation** mode menu.

- **FLO** (default): Displays results in floating notation, with digits to the left and right of the decimal point.
- **SCI**: Displays results in scientific notation. The format of scientific notation is  $n \times 10^p$ , where  $1 \leq n < 10$  and  $p$  is an integer.
- **ENG**: Engineering notation (exponent is a multiple of 3).

These modes affect *only* the display of results, and not the internally stored results.

$\boxed{\text{EE}}$  lets you enter a value in scientific notation, regardless of the numeric notation mode. Press  $\boxed{(-)}$  before entering a negative exponent.

	<i>Examples</i>
$1 \cdot 2 \boxed{\text{EE}} 5 + 4 \cdot 6 \boxed{\text{EE}} 7 \boxed{\text{ENTER}}$	$1.2\text{E}5+4.6\text{E}7$ $46120000.$ <small>DEG</small>
$\boxed{2\text{nd}}[\text{SCI/ENG}] \downarrow \boxed{\text{ENTER}}$	$1.2\text{E}5+4.6\text{E}7$ $4.612_{\times 10^07}$ <small>SCI DEG</small>
$\boxed{2\text{nd}}[\text{SCI/ENG}] \downarrow \boxed{\text{ENTER}}$	$1.2\text{E}5+4.6\text{E}7$ $46.12_{\times 10^06}$ <small>ENG DEG</small>

## Pi

$\pi$  enters the value of  $\pi$ . It is stored internally to 13 digits (3.141592653590) and displayed to 10 digits (3.141592654).

When multiplying  $\pi$  by a number, you do not need to press  $\times$ ; multiplication is implicit.



### Examples

Find the circumference and the area of a circle having a radius of 5 centimeters. Find the surface area of a sphere having a radius of 5 centimeters. (Remember: circumference= $2\pi r$ ; area= $\pi r^2$ ; surface area= $(4\pi)r^2$ .) Use the **Fix** function to display results rounded to the nearest whole number.

$\text{2nd} [\text{FIX}] \downarrow \text{ENTER} 2 \pi \times 5$ $\text{ENTER}$	$2\pi*5$ 31. FIX DEG
$\leftarrow \text{DEL} \downarrow \downarrow \downarrow \times^2 \text{ENTER}$	$\pi*5^2$ 79. FIX DEG
$\leftarrow \text{2nd} [\text{INS}] 4 \text{ENTER}$	$4\pi*5^2$ 314. FIX DEG

The circumference of the circle is 31 centimeters, and the area is 79 square centimeters. The surface area of the sphere is 314 square centimeters.

## Memory

---

The TI-36X II has five memory variables. You can store a real number or an expression that results in a real number to a memory variable. For storing complex numbers to memory, see page 31.

---

<b>STO►</b>	Lets you store values to variables.
<b>2nd[RCL]</b>	Recalls the values of variables.
<b>MEMVAR</b>	Recalls variables by letter designation.
<b>2nd[CLRVAR]</b>	Displays menu: <b>CLR VAR: Y N</b> . Select <b>Y</b> (yes) and press <b>ENTER</b> to clear all memory variables and re-initialize seed in <b>E</b> .

---

When you press **STO►**, a menu of variables displays: **A, B, C, D, and E**. Press **◀** or **▶** to select a variable. Press **ENTER**, and the value of your last answer is stored into the variable you have selected. If that variable already contains a value, the new one will replace it.

If you enter an expression and press **STO►** and then **ENTER**, the TI-36X II will simultaneously evaluate the expression and store the resulting value to the memory variable you select.

Press **2nd[RCL]** to display the menu of memory variables. Press **◀** or **▶** to select the variable you wish to recall and press **ENTER**. The value in this variable is inserted into your current entry at the cursor.

Pressing **MEMVAR** also displays the menu of memory variables, and you select the one you wish to recall. However, the variable name rather than the value itself is inserted into your current entry. Since the variable name contains the value, evaluation of the expression yields the same results.



In addition to serving as a memory variable, **E** stores a seed value to generate a random number when you are using the Probability function (see page 32).



*Problem*

*A gravel quarry is opening two new pits: one is 350 meters by 560 meters, and the other is 340 meters by 610 meters. What volume of gravel would the company remove from each if they excavated to a depth of 150 meters? To a depth of 210 meters? Display results in engineering notation.*

$350 \times 560$	$\rightarrow A$	$196 \times 10^3$
$340 \times 610$	$\rightarrow B$	$207.4 \times 10^3$
$150 \times 196000$		$29.4 \times 10^6$
$210 \times 196000$		$41.16 \times 10^6$
$150 \times B$		$31.11 \times 10^6$
$210 \times B$		$43.554 \times 10^6$

*From the first pit: 29.4 million cu.m. and 41.16 million cu.m., respectively. From the second pit: 31.11 million cu.m. and 43.554 million cu.m., respectively.*

## Stored Operations

---

The TI-36X II stores two operations, **Op1** and **Op2**. To store an operation to **Op1** or **Op2** and recall it:

1. Press  $\boxed{2\text{nd}}\boxed{>OP1}$  or  $\boxed{2\text{nd}}\boxed{>OP2}$ .
2. Enter the operation, beginning with an operator (such as +, -,  $\times$ ,  $\div$ , or  $\wedge$ ). You can store any combination of numbers, operators, and menu items and their arguments, to a limit of 47 characters or items.
3. Press  $\boxed{\text{ENTER}}$  to save the operation to memory.
4. Each subsequent time you press  $\boxed{OP1}$  or  $\boxed{OP2}$ , the TI-36X II recalls the stored operation and applies it to the last answer. The expression with the stored operation appears on the first line of the display, and the result appears on the second line. A counter on the left side of the result line displays the number of consecutive times you have pressed **Op1** or **Op2**.

You can set the TI-36X II to display only the counter and the result, and not the expression on the entry line. Press  $\boxed{2\text{nd}}\boxed{>OP1}$  or  $\boxed{2\text{nd}}\boxed{>OP2}$ , press  $\boxed{\text{=}}$  until the = is highlighted ( $\boxed{=}$ ) and press  $\boxed{\text{ENTER}}$ . Repeat to toggle this setting off.



Examples

**2nd** **[>OP1]** **[X]** **2** **[ENTER]**

**OP1=\*2**  
DEG

**3** **[OP1]**

**3\*2** ↑  
**1**      **6.**  
DEG

**[OP1]**

**6\*2** ↑  
**2**      **12.**  
DEG

**[OP1]**

**12\*2** ↑  
**3**      **24.**  
DEG

**2nd** **[>OP2]** **[+]** **5** **[ENTER]**

**OP2=+5**  
DEG

**10** **[OP2]**

**10+5** ↑  
**1**      **15.**  
DEG

**[OP2]**

**15+5** ↑  
**2**      **20.**  
DEG

**[OP2]**

**20+5** ↑  
**3**      **25.**  
DEG

**[OP1]**

**25\*2** ↑  
**1**      **50.**  
DEG

**[OP2]**

**50+5** ↑  
**1**      **55.**  
DEG

## Logarithms

$2^{\text{nd}}$ [LOG] displays a menu of log functions.

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

**10<sup>^</sup>** Raises 10 to the power you specify.

**ln** Yields the logarithm of a number to the base  $e$  ( $e=2.718281828495$ ).

**e<sup>^</sup>** Raises  $e$  to the power you specify.

Select the function on the menu, then enter the value and complete the expression with  $\text{[ ]}$ .



Examples

$2^{\text{nd}}$ [LOG]	<b>log 10<sup>^</sup></b> DEG
1 0 0 $\text{[ ]}$ $\text{[ENTER]}$	<b>log(100)</b> 2. DEG
$2^{\text{nd}}$ [LOG] $\text{[ ]}$ 3 $\text{[ ]}$ 2 $\text{[ ]}$ $\text{[ENTER]}$	<b>10<sup>^(3.2)</sup></b> 1584.893192 DEG
$2^{\text{nd}}$ [LOG] $\text{[ ]}$ 9 $\text{[ ]}$ 4 5 3 $\text{[ ]}$ $\text{[ENTER]}$	<b>ln(9.453)</b> 2.246332151 DEG
$2^{\text{nd}}$ [LOG] $\text{[ ]}$ 4 $\text{[ ]}$ 7 $\text{[ ]}$ $\text{[ENTER]}$	<b>e<sup>^(4.7)</sup></b> 109.9471725 DEG



Problem

A radioactive substance decays exponentially. If  $y_0$  grams of certain radioactive substance are initially present, the number of grams  $y(t)$  after  $t$  days is given by the formula:

$$y(t) = y_0 e^{-0.00015t}$$

After 340 days, how much of a 5-gram sample of this radioactive substance remains? After 475 days? Store the constant part of the exponent to memory so you need enter it only once. Round results to two decimal places.

<code>(-)</code> <code>0</code> <code>.</code> <code>0</code> <code>0</code> <code>0</code> <code>1</code> <code>5</code> <code>STO</code> <code>ENTER</code>	<b>-0.00015</b> → A -0.00015 DEG
<code>5</code> <code>×</code> <code>2nd</code> <code>[LOG]</code> <code>↓</code> <code>↓</code> <code>ENTER</code> <code>MEMVAR</code> <code>×</code> <code>3</code> <code>4</code> <code>0</code> <code>]</code> <code>ENTER</code>	<b>5*e^(A*340)</b> ↑ 4.751393353 DEG
<code>2nd</code> <code>[FIX]</code> <code>2</code>	<b>5* e^(A*340)</b> ↑ 4.75 FIX DEG
<code>5</code> <code>×</code> <code>2nd</code> <code>[LOG]</code> <code>↓</code> <code>↓</code> <code>ENTER</code> <code>MEMVAR</code> <code>×</code> <code>4</code> <code>7</code> <code>5</code> <code>]</code> <code>ENTER</code>	<b>5*e^(A*475)</b> ↑ 4.66 FIX DEG

About 4.75 grams of this radioactive substance remain after 340 days, and 4.66 grams remain after 475 days.

## Trigonometric Functions

**TRIG** displays a menu of the trigonometric functions (**sin**, **sin<sup>-1</sup>**, **cos**, **cos<sup>-1</sup>**, **tan**, **tan<sup>-1</sup>**). Press **→** or **←** to select the desired function, enter the value, and close the parentheses with **)**.

Set the desired angle mode before starting trigonometric calculations. The problems below assume the default, which is degree mode. See the section on **Angle Modes** (page 22) for other angle modes.



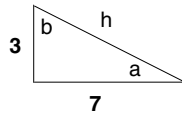
*Examples*

<b>TRIG</b> <b>→</b> <b>→</b>	<b>cos cos<sup>-1</sup></b> DEG
30 <b>)</b> <b>2nd</b> <b>[FIX]</b> 4 <b>ENTER</b>	<b>cos(30)</b> 0.8660 FIX DEG
<b>TRIG</b> <b>←</b>	<b>sin sin<sup>-1</sup></b> FIX DEG
0 <b>.</b> 7 3 9 1 <b>)</b> <b>ENTER</b>	<b>sin<sup>-1</sup>(0.7391)</b> 47.6548 FIX DEG
<b>TRIG</b> <b>→</b> <b>→</b> <b>ENTER</b> <b>TRIG</b> <b>←</b> 1 <b>)</b> <b>)</b> <b>ENTER</b>	<b>cos(tan<sup>-1</sup>(1))</b> 0.7071 FIX DEG



*Problem*

Find angle  $a$  in the right triangle below. Then find the length of the hypotenuse  $h$  and angle  $b$ . Measurements of length and height are in meters. Round off results to one decimal place.



Remember  $3/7 = \tan a$ , so  $a = \tan^{-1}(3/7)$ . Then  $3/h = \sin a$ , so  $h = 3/\sin a$ . Then  $7/h = \sin b$ , so  $b = \sin^{-1}(7/h)$ .

`[2nd] [FIX] 1 [TRIG] [◀] 3 [÷] 7 [ ]`  
`[ENTER]`

$\tan^{-1}(3/7)$
23.2
FIX DEG

`[TRIG] [2nd] [ANS] [ ] [ENTER]`

$\sin(\text{Ans})$
0.4
FIX DEG

`3 [÷] [2nd] [ANS] [ENTER]`

$3/\text{Ans}$
7.6
FIX DEG

`[TRIG] [▶] 7 [÷] [2nd] [ANS] [ ] [ENTER]`


$\sin^{-1}(7/\text{Ans})$
66.8
FIX DEG

Angle  $a$  is about 23.2 degrees. The hypotenuse  $h$  is about 7.6 meters. Angle  $b$  is about 66.8 degrees.

## Angle Modes

$\square^{\circ}'''$  displays a menu to specify the angle unit modifier for an entry: degrees ( $^{\circ}$ ), radians ( $^{\circ}$ ), grads ( $^{\circ}$ ), or DMS ( $^{\circ}'''$ ). It also lets you convert an angle to DMS Notation ( $\blacktriangleright$ DMS).


You can use a DMS value in calculations, but then the results will no longer be in DMS format; the calculator will automatically convert to decimal format.

 *Problem*  
 Two adjacent angles measure  $12^{\circ}31'45''$  and  $26^{\circ}54'38''$ , respectively. Sum the two angles and display the results in DMS format.

$12 \square^{\circ}'''$	$\square^{\circ}'''$ $\square^{\circ}'''$ $\square^{\circ}'''$ $\square^{\circ}'''$ $\square^{\circ}'''$ $\square^{\circ}'''$
	DEG
31	12°31
	DEG
$\square^{\circ}''' \blacktriangleright 46 \square^{\circ}''' \blacktriangleright \blacktriangleright +$	12°31'46" +
	DEG
$26 \square^{\circ}''' 54 \square^{\circ}''' \blacktriangleright 38 \square^{\circ}''' \blacktriangleright \blacktriangleright$	12°31'46" + 26°54'38"
$\square^{\circ}''' \blacktriangleright \blacktriangleright \square^{\circ}''' \blacktriangleright \blacktriangleright$	39.44
	DEG
$\square^{\circ}''' \blacktriangleright \blacktriangleright \square^{\circ}''' \blacktriangleright \blacktriangleright$	Ans $\blacktriangleright$ DMS
	39°26'24"
	DEG



**DRG** displays a menu (**DEG RAD GRD**) to express angle measurements in degrees (default), radians, or grads, respectively.

 *Problem*  
 You probably know that  $30^\circ = \pi/6$  radians. In the default Degree Mode, find the sine of  $30^\circ$ . Then set the calculator to Radian Mode and find the sine of  $\pi/6$  radians.

<b>TRIG</b> 3 0 <b>]</b> <b>ENTER</b>	<b>sin(30)</b> 0.5 DEG
<b>DRG</b> <b>↵</b> <b>ENTER</b> <b>↵</b> <b>(</b> <b>π</b> <b>÷</b> 6 <b>]</b> <b>ENTER</b>	<b>sin(<math>\pi/6</math>)</b> 0.5 RAD

You can override the Angle Mode with the **◻<sup>◻</sup>** key.

Keep the calculator in Radian Mode and find the sine of  $30^\circ$ . Then return the calculator to Degree Mode and find the sine of  $\pi/6$  radians.

<b>TRIG</b> 3 0 <b>◻<sup>◻</sup></b> <b>]</b> <b>ENTER</b>	<b>sin(30°)</b> 0.5 RAD
<b>DRG</b> <b>↵</b> <b>ENTER</b> <b>↵</b> <b>(</b> <b>π</b> <b>÷</b> 6 <b>]</b> <b>◻<sup>◻</sup></b> <b>↵</b> <b>↵</b> <b>]</b> <b>ENTER</b>	<b>sin(<math>(\pi/6)r</math>)</b> 0.5 DEG

## Rectangular↔Polar

$\boxed{2\text{nd}}\boxed{R\leftrightarrow P}$  displays a menu to convert rectangular coordinates  $(x, y)$  to polar coordinates  $(r, \theta)$  or vice versa. For each coordinate to which you are converting, enter both values expressed in the format *from* which you are converting, separated by a comma, then close the parentheses with  $\boxed{)}$  before you complete the operation with  $\boxed{\text{ENTER}}$ . Set angle mode, as necessary, before starting calculations.



### Examples

Convert polar coordinates  $(r, \theta)=(5, 30)$  into rectangular coordinates. Then convert rectangular coordinates  $(x, y)=(3, 4)$  into polar coordinates. Round all results to 1 decimal place.

$\boxed{2\text{nd}}\boxed{R\leftrightarrow P}\boxed{\rightarrow}\boxed{\rightarrow}\boxed{5}\boxed{2\text{nd}}\boxed{,}\boxed{30}\boxed{)}$	<b>P→Rx(5,30)</b>	4.3
$\boxed{2\text{nd}}\boxed{\text{FIX}}\boxed{\rightarrow}\boxed{\rightarrow}\boxed{\text{ENTER}}\boxed{\text{ENTER}}$	<b>FIX</b>	<b>DEG</b>
$\boxed{2\text{nd}}\boxed{R\leftrightarrow P}\boxed{\rightarrow}\boxed{\rightarrow}\boxed{5}\boxed{2\text{nd}}\boxed{,}\boxed{30}\boxed{)}$	<b>P→Ry(5,30)</b>	2.5
$\boxed{\text{Y}}\boxed{\text{ENTER}}$	<b>FIX</b>	<b>DEG</b>
$\boxed{2\text{nd}}\boxed{R\leftrightarrow P}\boxed{3}\boxed{2\text{nd}}\boxed{,}\boxed{4}\boxed{)}$	<b>R→Pr(3,4)</b>	5.0
$\boxed{\text{ENTER}}$	<b>FIX</b>	<b>DEG</b>
$\boxed{2\text{nd}}\boxed{R\leftrightarrow P}\boxed{\rightarrow}\boxed{3}\boxed{2\text{nd}}\boxed{,}\boxed{4}\boxed{)}$	<b>R→Pθ(3,4)</b>	53.1
$\boxed{\text{ENTER}}$	<b>FIX</b>	<b>DEG</b>

$(r, \theta)=(5, 30)$  converts to  $(x, y)=(4.3, 2.5)$ .  $(x, y) = (3, 4)$  converts to  $(r, \theta)=(5.0, 53.1)$ .

## Hyperbolic Functions

$2^{nd}$ [HYP] displays a menu of hyperbolic functions (**sinh**, **sinh<sup>-1</sup>**, **cosh**, **cosh<sup>-1</sup>**, **tanh**, **tanh<sup>-1</sup>**). Angle modes do not affect hyperbolic calculations.



*Problem*

Given the hyperbolic function

$$y=3\cosh(x-1)$$

Find the value of  $y$  when  $x=2$  and  $x=5$ . Round off results to one decimal place. Use the Stored Operations function for the repetitive computations.

$2^{nd}$ [STO] [1] [ENTER]	<b>OP1=-1</b> DEG
$2^{nd}$ [STO] [3] [ENTER]	<b>OP2=*3</b> DEG
$2^{nd}$ [FIX] 2 $2^{nd}$ [HYP] [2] [OP1]	<b>cosh(2-1)</b> 1      1.54 FIX    DEG
[OP2]	<b>1.543080634</b> $\rightarrow$ 1      4.63 FIX    DEG
$2^{nd}$ [HYP] [5] [OP1] [OP2]	<b>27.30823283</b> $\rightarrow$ 1      81.92 FIX    DEG

When  $x=2$ ,  $y=4.63$ ; when  $x=5$ ,  $y=81.92$ .

## Metric Conversions

Press **[Conv]** to access a menu of 20 conversions from the metric system into the English system and vice versa. Scroll through the choices with **[▶]** and **[◀]** and select with **[ENTER]**. To reverse the direction of the conversion, press **[2nd]** while the desired item is underlined. If you enter a negative value, enclose it in parentheses.

<b>cm↔in</b>	centimeters to inches inches to centimeters	<b>cm</b> ÷ 2.54 <b>in</b> × 2.54
<b>m↔ft</b>	meters to feet feet to meters	<b>m</b> ÷ 0.3048 <b>ft</b> × 0.3048
<b>m↔yd</b>	meters to yards yards to meters	<b>m</b> ÷ 0.9144 <b>yd</b> × 0.9144
<b>km↔ mile</b>	kilometers to miles miles to kilometers	<b>km</b> ÷ 1.609344 <b>mile</b> × 1.609344
<b>l↔gal (US)</b>	liters to U.S. liquid gallons U.S. liquid gallons to liters	<b>l</b> ÷ 3.785411784 <b>gal</b> × 3.785411784
<b>l↔gal (UK)</b>	liters to U.K. gallons U.K. gallons to liters	<b>l</b> ÷ 4.54609 <b>gal</b> × 4.54609
<b>km/h↔ m/s</b>	kilometers per hour to meters per second meters per second to kilometers per hour	<b>km/h</b> ÷ 3.6 <b>m/s</b> × 3.6
<b>g↔oz</b>	grams to ounces avoirdupois ounces avoirdupois to grams	<b>g</b> ÷ 28.349523125 <b>oz</b> × 28.349523125
<b>kg↔lb</b>	kilograms to pounds pounds to kilograms	<b>kg</b> ÷ .45359237 <b>lb</b> × .45359237
<b>°C↔°F</b>	Celsius to Fahrenheit Fahrenheit to Celsius	<b>°C</b> × 9/5 + 32 <b>(°F - 32)</b> × 5/9



*Problem*

Convert 10 kilometers into miles. Then convert 50 miles into kilometers. Round results to two decimal places.

10 [Convert] [Down] [Down]

km↔mile  
DEG

[ENTER] [ENTER] [2nd] [FIX] 2

10 km→mile  
6.21  
FIX DEG

50 [Convert] [Down] [Down] [2nd] [ENTER]  
[ENTER]

50 mile→km  
80.47  
FIX DEG



*Problem*

Under a pressure of one atmosphere, ethyl alcohol freezes at  $-117^{\circ}\text{C}$  and boils at  $78.5^{\circ}\text{C}$ . Convert these temperatures to the Fahrenheit scale.

[C] [-] 1 1 7 [Convert] [Down]

°C↔°F  
FIX DEG

[ENTER] [ENTER]

(-117) °C→°  
-178.60  
FIX DEG

↶ 7 8 . 5 [DEL] [DEL] [ENTER]

78.5 °C→°F  
173.30  
FIX DEG

Ethyl alcohol freezes at  $-178.6^{\circ}\text{F}$  and boils at  $173.3^{\circ}\text{F}$  at one atmosphere of pressure.

## Physical Constants

Press 2nd[CONST] to access a menu of 16 physical constants. Scroll through the choices with  $\uparrow$  and  $\downarrow$ .

Constant	Value
<u>c</u>	speed of light 299792458 meters per second
<u>g</u>	gravitational acceleration 9.80665 meters per second <sup>2</sup>
<u>h</u>	Planck's constant $6.62606876 \times 10^{-34}$ Joule seconds
<u>N<sub>A</sub></u>	Avogadro's number $6.02214199 \times 10^{23}$ molecules per mole
<u>R</u>	ideal gas constant 8.314472 Joules per mole °Kelvin
<u>m<sub>e</sub></u>	electron mass $9.10938188 \times 10^{-31}$ kilograms
<u>m<sub>p</sub></u>	proton mass $1.67262158 \times 10^{-27}$ kilograms
<u>m<sub>n</sub></u>	neutron mass $1.67492716 \times 10^{-27}$ kilograms
<u>m<sub>μ</sub></u>	muon mass $1.88353109 \times 10^{-28}$ kilograms
<u>G</u>	universal gravitation $6.673 \times 10^{-11}$ Newton meters <sup>2</sup> per kilogram <sup>2</sup>
<u>F</u>	Faraday constant 96485.3415 coulombs per mole
<u>a<sub>0</sub></u>	Bohr radius $5.291772083 \times 10^{-11}$ meters
<u>r<sub>0</sub></u>	classical electron radius $2.817940285 \times 10^{-15}$ meters
<u>k</u>	Boltzmann constant $1.3806503 \times 10^{-23}$ Joules per °K
<u>e</u>	electron charge $1.602176462 \times 10^{-19}$ coulombs
<u>u</u>	atomic mass unit $1.66053873 \times 10^{-27}$ kilograms

As you scroll through the menu, the value of the underlined constant appears in the result line. When you press ENTER, the name of the underlined constant is transferred to the entry line at the cursor.



*Problem*

A brick falls off the roof of a building and hits the sidewalk 3.5 seconds later. Find the height of the building in meters and then in feet, rounded off to the nearest whole number.

The formula for distance fallen is

$$y = -\frac{1}{2}gt^2$$

where  $t$  = time in seconds, and  $g$  = gravitational acceleration (9.80665 meters per second-squared). We measure the  $y$  coordinate from the position where the brick began its fall, and we specify that  $y$  is positive upwards.

$(\leftarrow)$ 1 $(\text{Ab}\text{C})$ 2 $(\times)$	-1 $\downarrow$ 2* DEG
$(2^{\text{nd}})$ [CONST] $(\odot)$	c g h N <sub>a</sub> R <sup>-</sup> 9.80665 DEG
[ENTER] [ENTER]	-1 $\downarrow$ 2 * g -4.903325 DEG
$(\times)$ 3 $(\cdot)$ 5 $(x^2)$ [ENTER]	Ans * 3.5 <sup>2</sup> -60.06573125 DEG
$(2^{\text{nd}})$ [FIX] 0	Ans * 3.5 <sup>2</sup> -60. FIX DEG
[Conv] $(\downarrow)$ [ENTER] [ENTER]	Ans m $\rightarrow$ ft -197 FIX DEG

The height of the building is 60 meters or 197 feet.

## Integrals

---

The TI-36X II performs numerical integration using Simpson's Rule. To prepare for an integral, store the lower limit in memory variable **A**, the upper limit in memory **B**, and the number of intervals (from 1 to 99) in memory **C**. Press  $\int dx$  and enter the expression, using memory variable **A** as the independent variable. Then press  $\text{ENTER}$ . While the calculator is processing the data,  $\text{CALC}$  displays. When the calculation is successfully completed, the TI-36X II will return the numerical value to the result line. In addition, the calculator will clear memory variable **C**; **A** and **B** will be equal to the upper limit. If  $A > B$ , or if **C** is not an integer 1-99, or if **A**, **B**, or **C** is undefined, **Integrate Error** will display, and **A**, **B**, and **C** will be cleared.

If you want to solve a given problem again using a different number of intervals or different limits, enter values to store in memory variables **A**, **B**, and **C**. Then scroll to the integration problem in history and press  $\text{ENTER}$ ; the calculator will solve the same problem with the new data.

The time the calculator takes to solve the problem depends on the complexity of the problem and the number of intervals. You can abort the calculation by pressing and holding  $\text{ON}$  until **Integrate Error** is displayed.

With polynomials up to the third degree, Simpson's rule yields the exact answer, so increasing the number of intervals will not change the results. However, with polynomials of higher degree and equations containing more complicated functions (such as trigonometry), increasing the number of intervals will improve the precision of the results.

**Note:** When you perform integration with trigonometric functions, the calculator must be in **radian** mode.





Problem

Find  $\int_0^{\pi/2} \sin a + \cos a \, da$ , using 10 intervals.  
 Solve the problem again, using 20 intervals.

DRG  $\rightarrow$  ENTER 0 STO  $\rightarrow$  ENTER

0  $\rightarrow$  A  
0.  
RAD

$\pi$   $\div$  2 STO  $\rightarrow$  ENTER

$\pi/2 \rightarrow$  B  
1.570796327  
RAD

1 0 STO  $\rightarrow$   $\rightarrow$  ENTER

10  $\rightarrow$  C  
10.  
RAD

$\int dx$  TRIG ENTER MEMVAR  $\rightarrow$  +  
TRIG  $\rightarrow$   $\rightarrow$  ENTER MEMVAR  $\rightarrow$   
ENTER

CALC  
RAD

$\int \sin(A) + \cos$   
2.000000423  
RAD

0 STO  $\rightarrow$  ENTER  $\pi$   $\div$  2 STO  $\rightarrow$   $\rightarrow$   
ENTER 2 0 STO  $\rightarrow$   $\rightarrow$  ENTER

20  $\rightarrow$  C  
20.  
RAD

$\int dx$  TRIG ENTER MEMVAR  $\rightarrow$  +  
TRIG  $\rightarrow$   $\rightarrow$  ENTER MEMVAR  $\rightarrow$   
ENTER

CALC  
RAD

$\int \sin(A) + \cos$   
2.000000026  
RAD

## Probability

---

Press  $\boxed{2\text{nd}}\boxed{\text{PRB}}$  to access a menu of functions.

---

<b>nPr</b>	Calculates the number of possible <b>permutations</b> of $n$ items taken $r$ at a time. 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. The order of objects is not important, as in a hand of cards.
<b>!</b>	The <b>factorial</b> of $n$ is the product of the positive integers from 1 to $n$ . $n$ must be a positive whole number $\leq 69$ .
<b>RAND</b>	Generates a random real number between 0 and 1. To control a sequence of random numbers, store an integer ( <i>seed value</i> ) $\geq 0$ to $\boxed{\text{STO}}\boxed{\text{E}}$ . The <i>seed value</i> changes randomly every time a random number is generated.
<b>RANDI</b>	Generates a random integer between two integers, $A$ and $B$ , where $A \leq \text{RANDI} \leq B$ . Separate the two integers with a comma.

---

For **nPr** and **nCr**, enter the first argument, press  $\boxed{2\text{nd}}\boxed{\text{PRB}}$ , select **nPr** or **nCr**, press  $\boxed{\text{ENTER}}$ , and enter the second argument.



Problem

Compute  $\frac{n!}{r!(n-r)!}$  where  $n=52$  and  $r=5$ .

5 2 [2nd] [PRB] [down arrow] [down arrow]

nPr nCr !  
DEG

[ENTER]

52!  
DEG

[left arrow] [5] [2nd] [PRB] [down arrow] [down arrow] [ENTER] [X]

52!/(5!\*(52-5)!)  
2598960.  
DEG

[left arrow] 5 2 [left arrow] 5 [right arrow] [2nd] [PRB] [down arrow] [down arrow] [right arrow]

[ENTER]

You no doubt recognize the above formula to find the number of possible combinations of  $n$  objects taken  $r$  at a time without replacement. You can obtain this result more directly by using **nCr** on the **Probability** menu.



Problem

How many ways can you deal 5 cards from a deck of 52 cards?

5 2 [2nd] [PRB] [down arrow]

nPr nCr !  
DEG

5 [ENTER]

52 nCr 5  
2598960.  
DEG

There are 2598960 ways to deal 5 cards from a deck of 52 cards.

## Statistics

---

$\boxed{2nd}$ [STAT] displays a menu.

<b>1-VAR</b>	Analyzes data from 1 set of data with 1 measured variable: $x$ .
<b>LIN</b>	Analyzes paired data with 2 measured variables: $x$ , the independent variable, and $y$ , the dependent variable. Yields regression equation in the form $y=a+bx$ .
<b>LN</b>	Analyzes paired data with 2 measured variables. Yields regression equation in the form $y=a+b \ln x$ .
<b>EXP</b>	Analyzes paired data with 2 measured variables. Yields regression equation in the form $y=ab^x$ .
<b>PWR</b>	Analyzes paired data with 2 measured variables. Yields regression equation in the form $y=ax^b$ .
<b>CLRDATA</b>	Clears data values without exiting <b>STAT</b> mode.

You can enter up to 42 points or data pairs.

When using the LN regression, you do not need to find the natural logarithms of the numbers. Enter the data directly, and the TI-36X II makes the transformation. Similarly, when you want to make a prediction with the LN regression equation, you enter the value of  $x$  directly (and not  $\ln x$ ), and the calculator returns the predicted value of  $y$  (and not  $\ln y$ ).

To set up the problem and perform the analysis:

1. Press  $\boxed{2\text{nd}}\boxed{\text{STAT}}$ . Select the desired type of analysis from the menu and press  $\boxed{\text{ENTER}}$ . The **STAT** indicator displays.
2. Press  $\boxed{\text{DATA}}$ .
3. Enter a value for  $X_1$  and press  $\odot$ .
4. Then:
  - In **1-VAR** stat mode, enter the frequency of occurrence (**FRQ**) of the data point and press  $\odot$ . **FRQ** default=1. If **FRQ**=0, the data point is ignored. Or,
  - In **LIN, LN, EXP, OR PWR**, enter the value of **Y** and press  $\odot$ .
5. Repeat steps 3 and 4 until all data points are entered. You can change or delete data points by scrolling to the desired point and editing or pressing  $\boxed{\text{DEL}}$ . If you are in **2-VAR** mode, you must delete both the data point and the frequency. You can add new points by scrolling to the last point and pressing  $\odot$ ; the calculator will prompt you for the new data. If you add or delete data points, the TI-36X II automatically reorders the list.
6. When all points and frequencies are entered:
  - Press  $\boxed{\text{STATVAR}}$  to display the menu of variables (see table for definitions) and their current values. Or,
  - Press  $\boxed{\text{DATA}}$  to return to the blank **STAT** screen.

You can perform calculations with data variables ( $\bar{x}$ ,  $\bar{y}$ , etc.). After such calculations, you can return to the display of variables by pressing  $\boxed{\text{STATVAR}}$  again. You can return to the data entries again by pressing  $\boxed{\text{DATA}}$ .

7. When finished:

- Press  $\boxed{2\text{nd}}\boxed{\text{STAT}}$  and select **CLRDATA** to clear all data points *without* exiting **STAT** mode, or
- Press  $\boxed{2\text{nd}}\boxed{\text{EXIT STAT}}$  to access the following menu.

**EXIT ST: Y N**

Press  $\boxed{\text{ENTER}}$  when **Y** (yes) is underlined to clear all data values and exit **STAT** mode. **STAT** indicator turns off.

Press  $\boxed{\text{ENTER}}$  when **N** (no) is underlined to return to the previous screen without exiting **STAT** mode.

Variables	Definition
<b>n</b>	Number of <b>X</b> or ( <b>X</b> , <b>Y</b> ) data points.
$\bar{x}$ or $\bar{y}$	Mean of all <b>X</b> or <b>Y</b> values.
<b>Sx</b> or <b>Sy</b>	Sample standard deviation of <b>X</b> or <b>Y</b> .
$\sigma_x$ or $\sigma_y$	Population standard deviation of <b>X</b> or <b>Y</b> .
$\Sigma x$ or $\Sigma y$	Sum of all <b>X</b> or <b>Y</b> values.
$\Sigma x^2$ or $\Sigma y^2$	Sum of all <b>X</b> <sup>2</sup> or <b>Y</b> <sup>2</sup> values.
$\Sigma xy$	Sum of <b>X</b> * <b>Y</b> for all <b>XY</b> pairs.
<b>a</b>	Linear regression <b>Y</b> -intercept.
<b>b</b>	Linear regression slope.
<b>r</b>	Correlation coefficient.
<b>X' (2-VAR)</b>	Calculates predicted <b>X</b> value when you input a <b>Y</b> -value.
<b>Y' (2-VAR)</b>	Calculates predicted <b>Y</b> value when you input an <b>X</b> value.



**Problem**

The table below gives the Gross Domestic Product per capita and the telephone density (main lines per 100 population) for several countries in a recent year.

Country	GDP/Cap.	Tel. Den.
Austria	\$25032	46.55
Israel	\$13596	41.77
Argentina	\$ 8182	15.99
Brazil	\$ 3496	7.48
China	\$ 424	3.35

Using the LIN regression, find the equation representing the best fit, in the form  $y=a+bx$ , where  $x$ =GDP/capita and  $y$ =telephone density. Find the coefficient of correlation. Use this equation to predict the telephone density of a country with a GDP per capita of \$10,695. If a country has a telephone density of 5.68, what GDP per capital would you expect this country to have?

2nd [FIX] 4 2nd [STAT] [ENTER]  
[DATA] 2 5 0 3 2

X1=25032  
FIX STAT DEG

46 . 55

Y1=46.55  
FIX STAT DEG

13596 41 . 77  
8182 15 . 99

Y3=15.99  
FIX STAT DEG

3496 7 . 48 424  
3 . 35

Y5=3.35  
FIX STAT DEG

[STATVAR] ⏴ ⏴ ⏴ ⏴

$\Sigma xy$  a b r  
3.5143  
FIX STAT DEG

⏴

$\Sigma xy$  a b r  
0.0019  
FIX STAT DEG

⏴

$\Sigma xy$  a b r  
0.9374  
FIX STAT DEG

⏴ ⏴

$x'$   $y'$   
FIX STAT DEG

10695 [ENTER] [2nd] [FIX] 2

$y'(10695)$   
24.08  
FIX STAT DEG

[STATVAR] ⏴ ⏴ 5 . 68 [ENTER]  
[2nd] [FIX] 0

$x'(5.68)$   
1126.  
FIX STAT DEG

The equation is  $y=3.5143+0.0019x$ . The coefficient of correlation is .9374. A country with a GDP per capita of \$10695 is predicted to have a telephone density of 24.08. If a country has a telephone density of 5.68, you would expect that country to have a GDP per capita of about \$1126.




## Boolean Logic Operations

Press **[LOGIC]** to access a menu of Boolean Logic operations.

Function	Effect on Each Bit of the Result		
<b>AND</b>	0 AND 0 = 0	0 AND 1 = 0	1 AND 1 = 1
<b>OR</b>	0 OR 0 = 0	0 OR 1 = 1	1 OR 1 = 1
<b>XOR</b>	0 XOR 0 = 0	0 XOR 1 = 1	1 XOR 1 = 0
<b>NOT</b>	NOT 0 = 1	NOT 1 = 0	
<b>2's</b>	2's complement		

Except for **NOT** and **2's** complement, these functions compare the corresponding bits of two values. The result is displayed in the current number base.

You can perform logical operations in the decimal, octal, and hexadecimal modes.

 *Examples*  
Perform the operations 9 AND 2, 9 OR 2, and 9 XOR 2.

9 <b>[LOGIC]</b>	<b>and or xor</b> DEG
2 <b>[ENTER]</b>	<b>9 and 2</b> 0. DEG
9 <b>[LOGIC]</b> <b>[OR]</b> 2 <b>[ENTER]</b>	<b>9 or 2</b> 11. DEG
9 <b>[LOGIC]</b> <b>[XOR]</b> 2 <b>[ENTER]</b>	<b>9 xor 2</b> 11. DEG

## Number-System Modes

---

Number system modes are second functions of keys.

---

$\boxed{2^{\text{nd}}}$  $\boxed{\text{DEC}}$  Selects decimal mode (default). When the calculator is in another number mode, press  $\boxed{2^{\text{nd}}}$  $\boxed{\text{DEC}}$  to return the calculator to decimal mode. **Note:** Normally you should keep the calculator in the decimal mode, because some of the calculator's operating features are limited or nonexistent in the other modes.

---

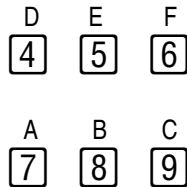
$\boxed{2^{\text{nd}}}$  $\boxed{\text{OCT}}$  Selects octal mode. You can enter positive octal numbers as large as 377777777. Numbers beyond this are interpreted as negative.

---

$\boxed{2^{\text{nd}}}$  $\boxed{\text{HEX}}$  Selects hexadecimal mode. You can enter positive hexadecimal numbers as large as 7FFFFFFFF. Numbers beyond this are interpreted as negative.

---

To enter the hexadecimal digits A through F, press  $\boxed{2^{\text{nd}}}$  and then the appropriate key shown below.





*Problem*

Add  $456+125$  in base 8 and in hexadecimal. Then return the calculator to decimal mode and do the same addition.

<code>[2nd] [OCT] 4 5 6 [+ ] 1 2 5 [ENTER]</code>	<table border="1"> <tr><td><b>456+125</b></td></tr> <tr><td><b>603</b></td></tr> <tr><td>OCT DEG</td></tr> </table>	<b>456+125</b>	<b>603</b>	OCT DEG
<b>456+125</b>				
<b>603</b>				
OCT DEG				
<code>[2nd] [HEX] [↔] [ENTER]</code>	<table border="1"> <tr><td><b>456+125</b></td></tr> <tr><td><b>57b</b></td></tr> <tr><td>HEX DEG</td></tr> </table>	<b>456+125</b>	<b>57b</b>	HEX DEG
<b>456+125</b>				
<b>57b</b>				
HEX DEG				
<code>[2nd] [DEC] [↔] [ENTER]</code>	<table border="1"> <tr><td><b>456+125</b></td></tr> <tr><td><b>581.</b></td></tr> <tr><td>DEG</td></tr> </table>	<b>456+125</b>	<b>581.</b>	DEG
<b>456+125</b>				
<b>581.</b>				
DEG				

### Complex Numbers

Enter a complex number as an ordered pair in parentheses, with the real part first. Operations with complex numbers are limited to  $+$ ,  $-$ ,  $\times$ ,  $\div$ ,  $\square$ , and the functions in the menu below. When you perform computations with complex numbers, the result line displays the real part of the answer, and *r* shows on the indicator line; press  $\odot$  to see the imaginary part, and *i* shows on the indicator line.

If a computation with complex numbers yields a real number, the *r* and *i* will no longer be displayed.

When you store a complex number in memory, it takes up two memory locations. Store to memory variable **A**, and it occupies **A** (for the real part) and **B** (for the imaginary part); or store to **C**, and it occupies **C** and **D**.

Press  $\boxed{2\text{nd}}\boxed{[\text{COMPX}]}$  to access a menu.

**conj** Returns the conjugate of a complex number.

**real** Returns the real part of a complex number.

**imag** Returns the imaginary part of a complex number.

**abs** Returns the absolute value of a number.



*Problem*

Find the product of  $(4-2i)$  and  $(3+5i)$ ; display the imaginary part as well as the real part of the result. Then find the conjugate of the result, and display the imaginary part as well as the real part.

$\boxed{4}\boxed{2\text{nd}}\boxed{[,]}\boxed{(-)}\boxed{2}\boxed{)}\boxed{\times}\boxed{3}\boxed{2\text{nd}}\boxed{[,]}\boxed{5}\boxed{)}\boxed{\text{ENTER}}$   $(4,-2)*(3,5)$   $\rightarrow$   
 $22. r$   
DEG

$\text{\textcircled{D}}$   $(4,-2)*(3,5)$   $\rightarrow$   
 $14. i$   
DEG

$\boxed{2\text{nd}}\boxed{[\text{COMPX}]}$  **conj real**  $\rightarrow$   
DEG

$22\boxed{2\text{nd}}\boxed{[,]}\boxed{14}\boxed{)}\boxed{\text{ENTER}}$  **conj(22,14)**  $\rightarrow$   
 $22. r$   
DEG

$\text{\textcircled{D}}$  **conj(22,14)**  $\rightarrow$   
 $-14. i$   
DEG

## Error Conditions

---

When **Error** appears in the display, the calculator will not accept a keyboard entry until you press **CLEAR** or **2nd**[OFF]. Press **CLEAR** once to clear the error message and return to the entry that caused the error; then you can edit the entry or clear the display.

**ARGUMENT** - a function does not have the correct number of arguments.

### **DIVIDE BY 0** -

- You attempted to divide by 0.
- In statistics,  $n=1$ .

**SYNTAX** - The command contains a syntax error: entering more than 23 pending operations, 8 pending values, or having misplaced functions, arguments, parentheses, or commas.

**EQU LENGTH** - An entry exceeds the limit (88 characters or items for Entry Line and 47 for **Stat** or Stored Operation lines).

**OP** - Pressing **OP1** or **OP2** when constants not defined or while in **STAT** mode.

**OVERFLOW** - The result is outside the range of the calculator:

- In decimal, range  $\geq -1 \times 10^{100}$  or  $\leq 1 \times 10^{100}$ .
- In Hex, range 0-7FFFFFFFFF, 8000000001-FFFFFFFF.
- In Oct, range 0-3777777777, 4000000001-7777777777.

**FRQ DOMAIN** - **FRQ** value (in **1-VAR** stats)  $< 0$  or  $> 99$ , or not an integer.

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

- For  $\sqrt[x]{y}$ :  $x=0$ ;  $y<0$  and  $x$  not an odd integer.
- For  $y^x$ :  $y$  and  $x=0$ ;  $y<0$  and  $x$  not an integer.
- For  $\sqrt{x}$ ,  $x<0$ .
- For  $x!$ :  $x$  is not an integer between 0 and 69.
- For Boolean **and**, **or**, **xor**:  $x$  or  $y$  in Hex out of range ( $>2^{39}$ ).
- For **log** or **ln**:  $x\leq 0$ .
- For **tan**:  $x=90^\circ$ ,  $-90^\circ$ ,  $270^\circ$ ,  $-270^\circ$ ,  $450^\circ$ , etc.
- For **sin<sup>-1</sup>** or **cos<sup>-1</sup>**:  $|x| > 1$ .
- For **tanh<sup>-1</sup>(x)**:  $|x| > 1$ .
- For **cosh<sup>-1</sup>(0)**.
- For **cosh<sup>-1</sup>(x)**:  $x < 0$ .
- For **nCr** or **nPr**: either  $n$  or  $r$  is not an integer  $\geq 0$ .
- $|\theta| \geq 1E10$ , where  $\theta$  is an angle in a trig or **P>Rx()**, **P>Ry()** function.

**STAT** –

- Pressing **[STATVAR]** with no defined data points.
- When not in **STAT** mode, pressing **[DATA]**, **[STATVAR]**, or **[2nd][EXIT STAT]**.

**COMPLEX** – Using a complex number incorrectly in an operation or in memory.

**BASE** – Using a base incorrectly or in the wrong mode.

**INTEGRATE** – Error in setting up integration problem:

- **A>B**, or
- **C** not integer 1-99, or
- **A**, **B**, or **C** undefined.

## **In Case of Difficulty**

---

Review instructions to be certain calculations were performed properly.

Press **[ON]** and **[CLEAR]** simultaneously to reset. When released, memory and settings are cleared, and **MEM CLEARED** is displayed.

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.

## **Battery Replacement**

---

Replace protective cover. Place the TI-36X II face down.

1. Remove screw case, using a small Phillips screwdriver.
2. Carefully separate front from back, starting from the bottom. **Caution:** Be careful not to damage any internal parts.
3. Remove battery, using a small Phillips screwdriver, if necessary; replace with new battery. Install batteries according to polarity (+ and -) diagrams.  
**Caution:** Avoid contact with other TI-36X II components while changing the battery.
4. If necessary, press **[ON]** and **[CLEAR]** simultaneously to reset. When released, memory and settings are cleared, and **MEM CLEARED** is displayed.
5. Properly dispose of used batteries immediately. Do not leave them within the reach of children.

## **Service Information**

---

### **TI Product and Services Information**

For more information about TI products and services, contact TI by e-mail or visit the TI calculator home page on the world-wide web.

e-mail address: **ti-cares@ti.com**

Internet address: **education.ti.com**

### **Service and Warranty Information**

For information about the length and terms of the warranty or about product service, refer to the warranty statement enclosed with this product or contact your local Texas Instruments retailer/distributor.