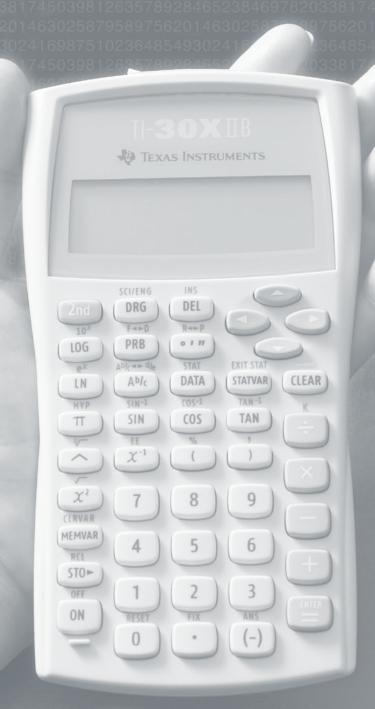
Mastering the CALCULATOR



USQ AUSTRALIA

UNIVERSITY OF SOUTHERN QUEENSLAND

The Learning Centre | Learning and Teaching Support Unit

TI-30XIIB (battery powered) and TI-30XIIS (solar battery powered)

Learning and Teaching Support Unit (LTSU) The Learning Centre

Guide book

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Introduction

This is one in a series of booklets prepared to assist students who are learning to use a calculator. They have been prepared by staff in The Learning Centre from the Learning and Teaching Support Unit (LTSU) at USQ. The series comprises:

Mastering the Calculator

- Using the Casio fx-100s (also suitable for Casio fx-570)
- Using the Casio fx-100AU
- Using the Casio fx-82LB
- Using the Casio fx-82MS
- Using the Casio fx-82TL
- Using the Casio fx-82AU
- Using the Sharp EL-531LH
- Using the Sharp EL-556L
- Using the Sharp EL-531RH

The instructions in this booklet only explain **some** of the keys available on your calculator necessary for basic work in data manipulation. If you require more assistance please contact The Learning Centre. If you would like information about other support services available from **The Learning Centre**, please contact

The Learning Centre (TLC) Learning and Teaching Support Unit (LTSU), S-Block The University of Southern Queensland Telephone: 07 4631 2751 Email: tlc@usq.edu.au

Fax: 07 4631 1801

Home page: http://www.usq.edu.au/ltsu

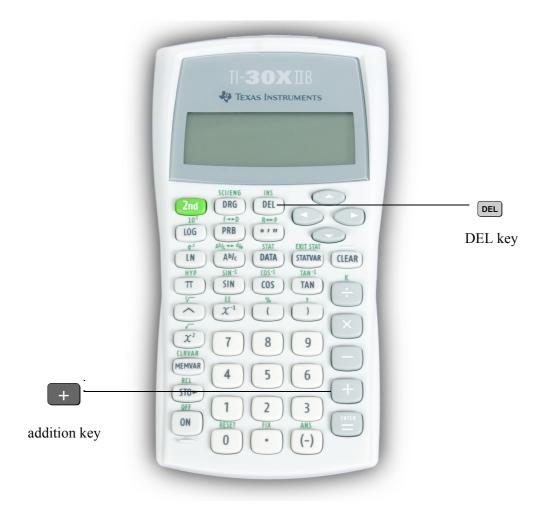
Note the booklets are also available online at the above address (follow the prompts).

A word about starting out

- Make sure you are in the correct mode selection and that all previous data is cleared.
- To clear all values press CLEAR
- To clear memory press 2nd MEMVAR
- If your calculator has RAD or GRAD on the display press press then move to degree mode using the keys and press keys and press.

1. Addition and subtraction

1.1 To add numbers



Find the + key

(it is shown on the photograph of the calculator here).

Example

To add 7 and 3, type



The display should read 10

To add 7 and 3.1, type



4 Mastering the calculator using the Texas TI-30XIIB and TI-30XIIS
Example
I want to find the total amount I earned in the past four weeks. If I earned \$471, \$575, \$471 and \$528, the key strokes would be
4 7 1 + 5 7 5 + 4 7 1 + 5 2 8 = The display should read 2045.
1.2 Sometimes you make an error when typing in a number
If this happens use the DEL key to cancel the last number and then type in the correct number and continue.
Example
If you want to enter 3 + 4 but accidentally type 3 + 5
press DEL to cancel the 5.
Now type 4
Example
If I want to add 471 and 575 but I typed
4 7 1 + 5 7 6
I can cancel 6 by typing DEL and then typing 5
The display should read 1 046.
Try practising cancelling with the DEL key until you are comfortable with its use.
1.3 The keys are used when you need to delete other data
Example
If you typed:
471 + 546
but you wanted 471 + 576 press the key twice. When the cursor is over the 4 press 7.
The 7 now replaces the 4, there is no need to press DEL .



The display should read 1 047.

You can also use insert to enter anything you omitted.

Example

If you typed 471 + 56

but you wanted 471 + 576, press until the cursor is in the position where the ommitted value should be. Then press 2nd DEL 7

the display should read 1047.

Hitting 2nd DEL again turns off insert mode, as does moving the cursor (using the keys) or hitting ENTER.

1.4 To subtract numbers

Find the key (it is shown on the photograph of the calculator following).

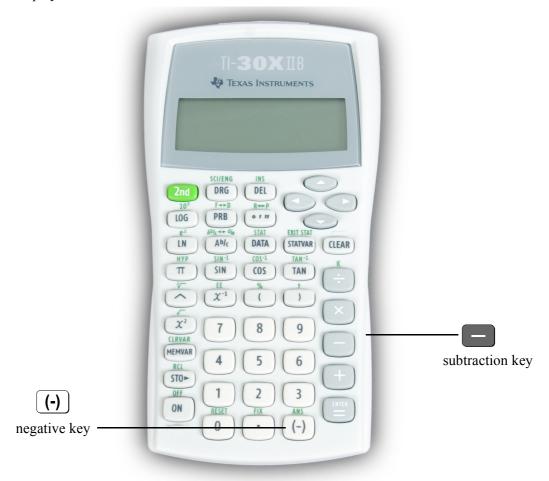
Note: the (-) key is only used for entering negative numbers.

Example

To subtract 35 from 257, type



The display should read 222



Example

$$348 - 24 - 19$$

The keystrokes are



The display should read 305.

Sometimes you may have a sum like this:

-7 + 4

You use the (-) key.

The key strokes are



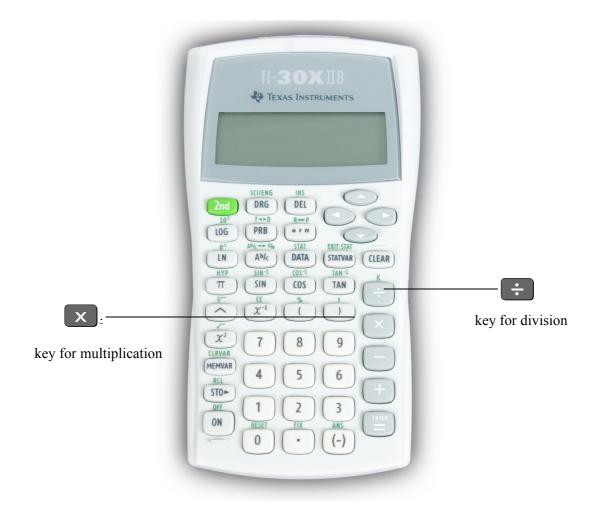
The display should read -3.

Note: Avoid using the key to enter negative numbers

2. Multiplication and division

2.1 To multiply numbers

Find the key (it is shown on the photograph of your calculator here).



Example

To multiply 7 and 3, type



The display should read 21

To find 753×492 , type



The display should read 370 476

2.2 To divide numbers

Find the key (it is shown here on the photograph of the calculator)

Example

To divide 35 by 7, type



The display should read 5

To divide 7 905 by 85, type



The display should read 93

To divide 56 by 23947 type

The display should read 0.002338498

If it reads $2.3385^{\times 10^{-03}}$ or something similar, then your calculator is in SCI (Scientific mode). See page 2 to change to FLO (floating point mode)

2.3 Combining multiplication and division

Example

If the question is

$$\frac{27}{7 \times 4}$$
 then

it is really $27 \div (7 \times 4)$ or $27 \div 7 \div 4$

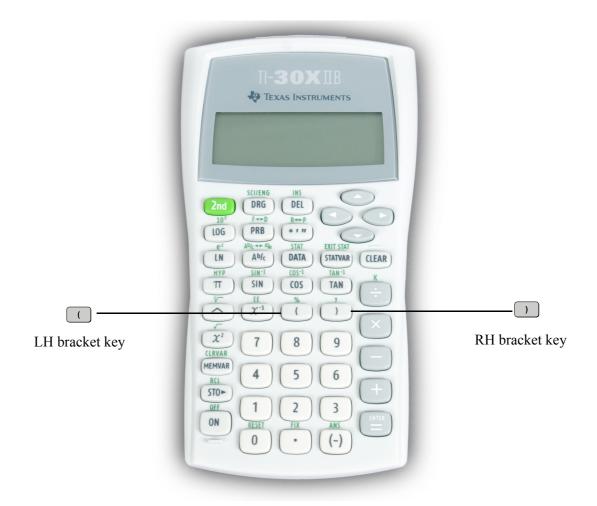


The display should read 0.964285714

3. Brackets

Find the set of bracket keys on your calculator.

The TI-30XIIB allows you to use many sets of brackets.



Example

Do the calculation 471 - (93 + 11 + 2) on the calculator. The keystrokes required are



The display should read 365.

Sometimes in calculations you will see other grouping symbols, for example, { } (called braces), [] (called square brackets). On the calculator only one type of bracket is used, but these symbols are equivalent.

Try these examples:

Exercise 1

- (a) 25 + (7 + 2 4)
- (b) 18 (3 + 7) [a multiplication sign is understood $18 \times (3 + 7)$] but you don't need to press the \times key
- (c) 4 + 5[2(3 + 7)] [to use two sets of brackets just press the same button]

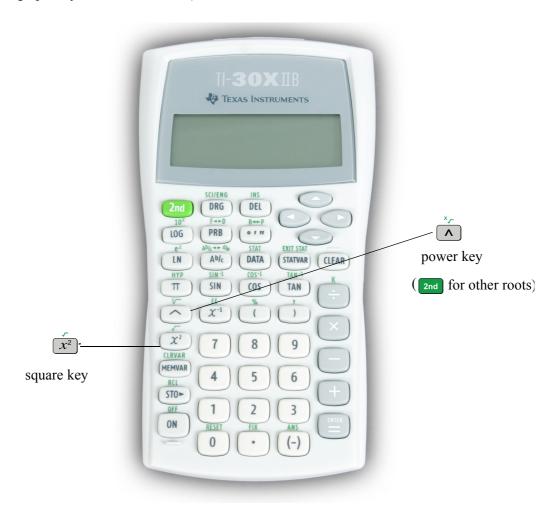
(d)
$$\frac{5}{(3+2)}$$

Answers: 30; 180; 104; 1

4. Powers

4.1 Squaring and higher powers

 6^2 means 6×6 . You can use the square key to do this calculation. (It is shown on the photograph of your calculator here.)





the display should read 36.

Or you can use the power key on your calculator.

Find the \(\backsquare{\lambda} \) key on your calculator (similar to the key on your computer keyboard).

Example

To square 6,

that is, find 6^2 , type



The display should read 36.

To find 27³ the required key strokes are



and the display should read 19683.

If you have learnt your multiplication tables you will already know the squares of the whole numbers from 1 to 12 and thus be able to complete much of the following table.

Exercise 2

Use your calculator to find the squares of the whole numbers from 13 to 25 and any other squares you are unsure of.

$1^2 = 1$	$11^2 =$	$21^2 =$
$2^2 = 4$	$12^2 =$	$22^2 =$
$3^2 = 9$	$13^2 =$	$23^2 = 529$
$4^2 =$	$14^2 =$	$24^2 = 576$
$5^2 =$	$15^2 =$	$25^2 = 625$
$6^2 =$	$16^2 =$	
$7^2 =$	$17^2 =$	
8 ² =	$18^2 =$	
$9^2 =$	$19^2 =$	
10^{2}	20^{2}	

Exercise 3

You can use this key for other powers as well. Try these examples

- (a) 7^4
- (b) 8^{10}
- (c) $(0.4)^6$ (you **do not** have to type the brackets in)
- (d) $(-7)^6$ (you need to type the brackets in)
- (e) $5^{0.4}$
- (f) 5^{-4}

Answers:

- (a) 2401
- (b) 1073741824
- (c) 4.096×10^{-3} or 0.004096 (you move the decimal 3 places to the left)
- (d) ((-) 7) \land 6 $\stackrel{\text{ENTER}}{=}$ 117649
- (e) 1.903653939
- (f) 0.0016 [Just press $\boxed{5}$ $\boxed{(-)}$ $\boxed{4}$ $\stackrel{\text{ENTER}}{=}$; 5^{-4} is the same as
- $\frac{1}{5^4}$ so you could press **5 A 4 ENTER** to get the same answer]

4.2 Square root

Finding the **square root** of a number 'undoes' or 'neutralises' the squaring of the number and vice versa. The symbol for square root is

 $\sqrt{}$ (This is called the radical sign) and is found above the square key.

The square root of 36 is written as $\sqrt{36}$

Now because $6^2 = 36$, $\sqrt{36} = 6$.

Find the square root key on your calculator and type



The display will read 6.

What do you think $\sqrt{81}$ is? $\sqrt{81}$ =

You should have said 9 because $9^2 = 81$

(Check your calculator)

What do you think $\sqrt{-49}$ will be? You should have said 'you can't find the square root of a negative' since you can't find a number that squares to give a positive. Your calculator will say Domain ERROR.

Exercise 4

Try these by looking at the table of squares you completed on the previous page and then check your answers on your calculator

(a)
$$\sqrt{16}$$

(e)
$$\sqrt{49}$$

(b)
$$\sqrt{144}$$
 =

(f)
$$\sqrt{169}$$

(c)
$$\sqrt{100}$$
 =

(g)
$$\sqrt{121}$$
 =

(d)
$$\sqrt{441}$$

(h)
$$\sqrt{361}$$
 =

The answers are 4, 12, 10, 21, 7, 13, 11, 19.

Let's now check that taking the square root neutralises squaring.

Try this on your calculator.

Find the square root of 3 squared that is, $\sqrt{3^2}$

The key strokes required are







The display should read 3

Because **squaring** and taking **square roots** are **inverse operations**, the **order** of the operatons **can be reversed** and the number is unaffected.

So the square, of the square root of 3, should also equal 3

Try it on your calculator. The key strokes required are



Exercise 5

1. Complete the following without using the calculator

(a)
$$\sqrt{7}^2$$

(b)
$$\sqrt{10^2}$$

$$(c)\sqrt{\Box}^2 = 10$$

$$(d)\sqrt{\Box^2} = 625$$

$$(e)\sqrt{\square}^2 = 144$$

(f)
$$\sqrt{64}$$
 = $\boxed{}$, because 8^2 =

Check your answers on the calculator.

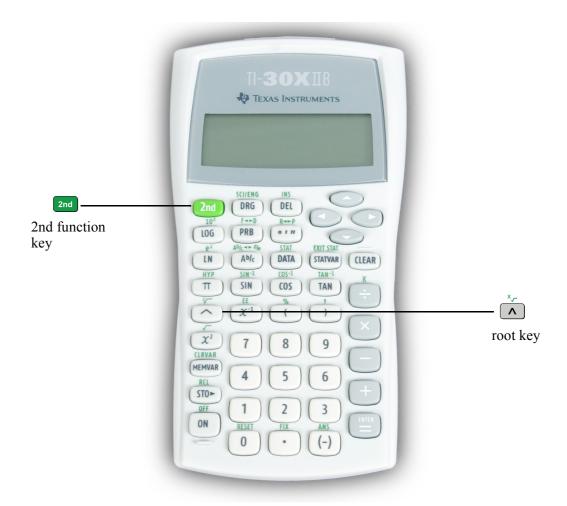
Example:

To do the following
$$\frac{8 + \sqrt{112}}{8}$$
 first rewrite it: $(8 + \sqrt{112}) \div 8$

Your answer will be ≈ 2.32288 .

4.3 Other roots

You can also use the root key on the calculator. Find the on your calculator. To get to this key you must press **shift** first.



Look at the examples below.

Examples

(a) $9^{\frac{1}{2}}$



and the display should read 3.

or



and the display should read 3.

(b) $8^{\frac{1}{3}}$



and the display should read 2.

(c) $16^{\frac{1}{4}}$



and the display should read 2.

Note:

- Root key is a function at the back of the power key, so you will need to activate it with the
 2nd key
- From the examples above you may have seen that $8^{\frac{1}{3}} = \sqrt[3]{8}$.

 $8^{\frac{1}{3}}$ is called a fractional index.

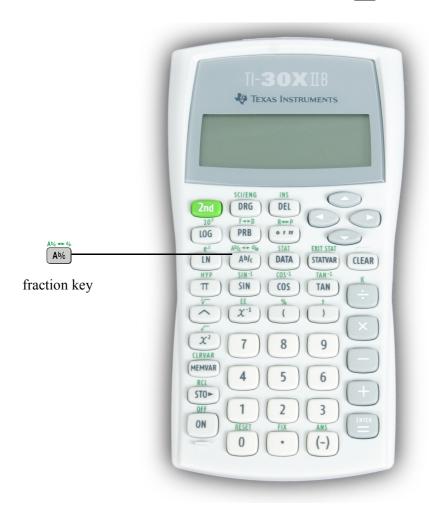
5. Fractions

How do you add $\frac{1}{12}$ and $\frac{4}{63}$? Normally you would have to find a common denominator of 252.

So:

$$\frac{1}{12} + \frac{4}{63} = \frac{21}{252} + \frac{16}{252} = \frac{37}{252}$$

Or you can use your calculator to add fractions. Find the ${\tiny f A^{b_k}}$ key



On the Abe key the 'A' represents the whole part of a mixed

number and the ' $\frac{b}{c}$ ' represents the fraction part of a mixed number.

When the number you are typing is a proper or improper fraction the 'A' is zero and there is no need to type a value for it.

The key strokes required for the calculation $\frac{1}{12} + \frac{4}{63}$ are:



and the display will show 37/252.

Example

Find
$$8\frac{1}{9} + \frac{63}{72}$$

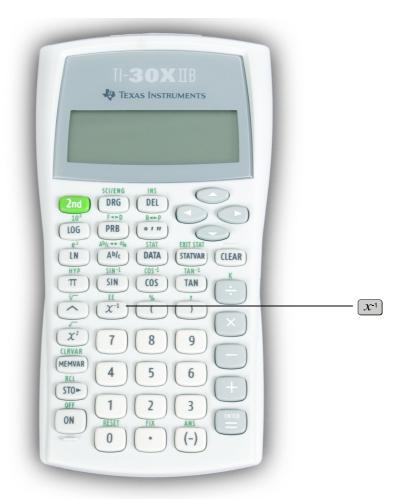
Using the calculator the key strokes are:

The display will show $8 \cup 71/72$ (i.e. the mixed fraction $8\frac{71}{72}$).

To turn this into an improprer fraction hit 2nd Abb ENTER which gives 647/72.

To convert a fraction to a decimal (or vice-versa) hit 2nd PRB . In this case 8.986111111.

6. Using the x^{-1} key



This is a very useful key in more complex calculations. Find the x^{-1} key on your calculator.

Example

Look at this simple example

$$\frac{4}{7}$$
 is the same as $4 \times \frac{1}{7}$

You can input this in your calculator by pressing

7
$$x^{-1}$$
 \times 4 $\stackrel{\text{ENTER}}{=}$

The answer should be 0.571428571. Converting this to a fraction will give $\frac{4}{7}$.

Take another example

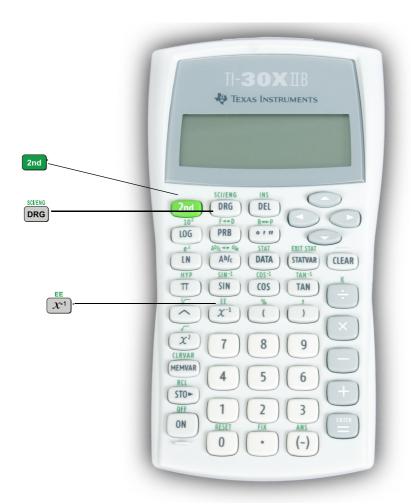
$$\frac{4}{(8+3)\times7}$$

Type:

The answer should be 0.051948051.

7. Scientific notation

Sometimes you may have numbers expressed in scientific notation, i.e., 7.24×10^3 instead of 7240. When a number is multiplied by 10^3 , you move the decimal point three places to the right. You can do this on the calculator by using the second function of the x^{-1} key.



Press **7** • **2 4** 2nd x^{-1} **3** • the display should read 7240.

If you want to multiply two numbers e.g. $8.34 \times 10^{-2} \times 4.28 \times 10^{5}$. Press

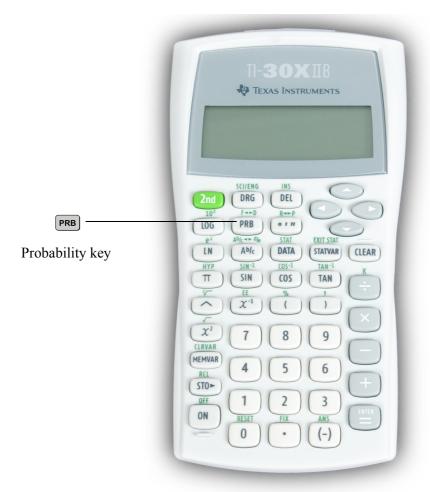
and the display will read 35695.2.

If you press and select SCI using the bred keys and press enter, you will go into Scientific notation and your answer will read 3.56952×10^4 .

To change back to floating point mode from scientific notation press and select FLO and press.

8. Factorial x!

The factorial x! (or n!) is found by hitting the Probability key (PRB) and selecting the factorial, denoted as !.



Use this to find the 3! and 5!. In the first case press 3 PRB, then select! using the

keys and press keys

3! means $3 \times 2 \times 1$ and $5! = 5 \times 4 \times 3 \times 2 \times 1$

3! = 6 5! = 120

How many ways would you guess that we could arrange ten people? That is, how large would you estimate 10! to be? Use your calculator to find 10! You should get 3 628 800.

$$10! = 10 \times 9 \times 8 \times ... \times 3 \times 2 \times 1$$

(Thank goodness this can be done on the calculator.)

Factorial rule

The number of ways of arranging n items in order is known as 'factorial n' which is symbolised as n! where:

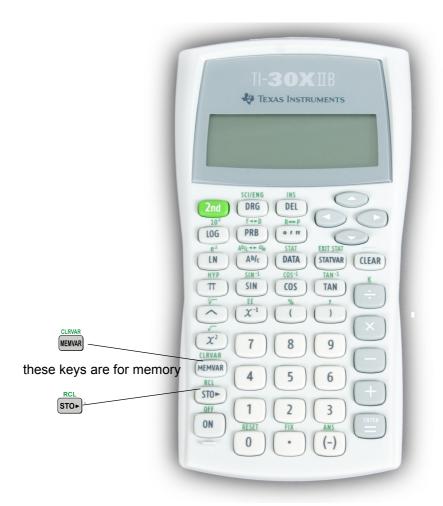
$$n! = n \times (n-1) \times (n-2) \times ... \times 3 \times 2 \times 1$$

9. Using memory

To calculate the following it may be useful to use memory for each term:

Example 1

$$\frac{(9-16)^2}{16} + \frac{(23-16)^2}{16} + \frac{(17-16)^2}{16}$$



To make sure memory is clear, first press 2nd MEMVAR.

To do the calculation above, press the following keys

(9 - 1 6)
$$x^2 \div 1$$
 6 $\xrightarrow{\text{ENTER}}$ STO-

- select a letter (eg. A) and press
- this puts the first term (3.0625) into the memory as A.

then press

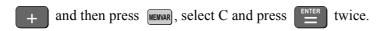
(23 - 16)
$$x^2 \div 16$$
 STO-

- select a different letter from the first (e.g. B) and press
- this adds the second term (3.0625) into memory as B.

then press

- select a different letter from the previous two (e.g. C) and press
- this adds the third term 0.0625 to memory as C.

To find the answer press (MENNAR) then select A, then press (T), press (MENNAR), select B, press



The answer should be 6.1875.

Example 2

calculate the following:

$$\frac{18}{\sqrt{17}} + \frac{17}{\sqrt{17}} + \frac{12}{\sqrt{17}}$$

first 2nd MEMVAR to clear the memory then

press the following keys:



your answer should be 11.39917438.

10. Statistics

10.1 Mean and standard deviation - single data

The formula for the mean is $x = \frac{\sum x}{n}$

The formulas for the sample standard deviation are

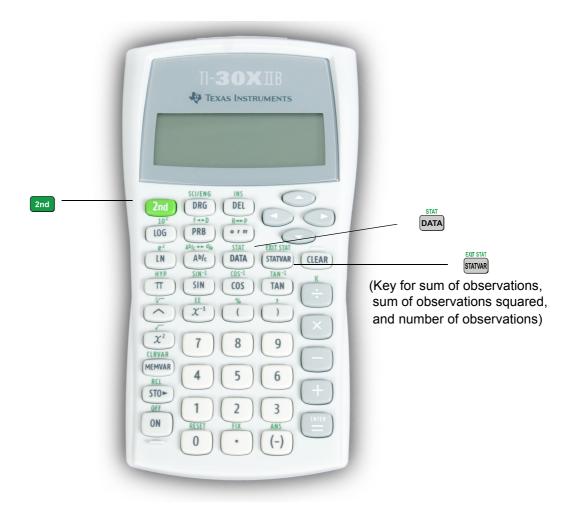
$$\sigma_{n-1} \text{ or } s = \sqrt{\frac{\sum \left(x_i - \bar{x}\right)^2}{n-1}}$$

$$(sample)$$

$$\sigma_n = \sqrt{\frac{\sum \left(x_i - \bar{x}\right)^2}{n}}$$
(population)

Your calculator will calculate the mean and standard deviation for you (the population standard deviation σ_n or the sample standard deviation σ_{n-1} – in data calculations you will usually use the sample standard deviation.)

On the TI-30XIIB, σ and s are found in STAT. The positions of keys needed are shown on the diagram below.



To find the mean and standard deviation,

firstly you must access the statistics mode of the calculator by using the keys DATA. You then have a choice of 1–Variable, 2–Variables or to clear data.

Select 1-Var using the and press . STAT will appear at the bottom of the display.

I will use the data set A (-5, 2, 3, 4, 11) to demonstrate the use of the calculator. Note that I have shown the use of the 2nd key where necessary.

Step 1: Input the observations.

Use the DATA key and the keys to input the data.

Note that the default value for the frequency is 1.

The required key strokes are

and so on until the entire database has been inputted.

Step 2: Display the mean and standard deviation.

Press STATUAR and move across using the keys to display the desired statistics.

$$\overline{x} = 3$$

$$\sigma_{x}$$
 or $x_{n} = 5.099019514$

$$S_x$$
 or $x_{n^{-1}} = 5.700877126$

Note: to clear stat data, just press arrow across to CLRDATA followed by

Example

Use your calculator to find the mean, standard deviation and variance for data set B: -18, 1, 3, 9, 20.

(the variance is the square of the standard deviation)

After you are in the statistics mode and cleared the statistics memories and input the data.

Press the STATVAR key and select the desired statistics.

Select \bar{x} and the display will read 3

Select S_x and the display will read 13.87443693

and press x^2 and the display will read 192.5

The mean is 3, the standard deviation is 13.87 and the variance is 192.5.

The STATVAR key also accesses a number of extra statistical functions.

$$\Sigma x^2 = 815$$

$$\Sigma x = 15$$

$$n = 5$$

If you have made an **error** with inputting your data you can correct it by going back to the data.

For example, you input

4, 5, 60, 7, 9 and you meant to input 6 instead of 60. Go to the data no. 3 by pressing the key followed by the down arrow until you get to X3 = 60. Then press 6. You now have the correct data.

10.2 Mean and standard deviation of frequency distribution

Given below is the frequency table for the weights (kg) of a random sample of 30 first year university female students. Find the standard deviation, the variance and the mean.

Graduate's weight (kg)	Frequency	Cumulative frequency			
60	2	2			
61	14	16			
62	8	24			
63	1	25			
64	5	30			

The calculations needed to obtain the standard deviation without statistical keys for these data are:

$$\Sigma x^2 = 60^2 \times 2 + 61^2 \times 14 + 62^2 \times 8 + 63^2 + 64^2 \times 5 = 114495$$

$$\Sigma x = 60 \times 2 + 61 \times 14 + 62 \times 8 + 63 + 64 \times 5 = 1853$$

$$s = \sqrt{\frac{\sum x_i^2 - (\sum x_i)^2 / n}{n - 1}}$$

$$= \sqrt{\frac{114495 - (1853)^2 / 30}{29}} = \sqrt{\frac{114495 - 114453.6333}{29}} = \sqrt{1.4264}$$

Thus: $s = 1.2 \text{ kg and } s^2 = 1.4 \text{ kg}^2$

$$\bar{x} = \frac{\Sigma x}{n} = \frac{1853}{30} = 61.8 \text{ kg}$$

Note: In calculations like the above you should carry as many decimals as possible until the final result. The number of decimals to be retained at the end depends on the accuracy of the data values – one rule of thumb is to have one more decimal than in the original data.

Notice how the frequencies were used in the above calculation.

The calculator usage now has a small modification because we have been given the frequencies for the variable values. (There is no need to input each single observation, but instead of skipping over the frequency when inputting the data enter the appropriate frequency for each data point. Once you are in the single variable STAT mode, the required keystrokes are

and so on until the data set has been entered.

The mean, standard deviation and variance are found as before by pressing the STATUAR key.

Thus, as expected

$$s = 1.2 \text{ kg}, s^2 = 1.4 \text{ kg}^2 \text{ and } \overline{x} = 61.8 \text{ kg}$$

To exit STAT mode press 2nd STATVAR

Exercise 6

Find the mean, standard deviation and variance of

(a) The annual rainfall data for the years 1971 - 1990

Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Rain (mm)	1 340	990	1 120	1 736	260	1 100	1 379	1 125	1 430	1 446
Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
	1 459	1 678	1 345					1 672	1 467	1 123

(b) The sample of snail foot lengths

Snail foot length (cm)											
2.2	4.1	3.5	4.5	3.2	3.7	3.0	2.6				
3.4	1.6	3.1	3.3	3.8	3.1	4.7	3.7				
2.5	4.3	3.4	3.6	2.9	3.3	3.9	3.1				
3.3	3.1	3.7	4.4	3.2	4.1	1.9	3.4				
4.7	3.8	3.2	2.6	3.9	3.0	4.2	3.5				

Answers:

(a) Rainfall statistics

mean:

$$\mu$$
 = 1 265.3 mm

standard deviation:

$$\sigma_{n-1} = 336.4 \text{ mm}$$

variance:

$$\sigma^2 = 113141.7 \text{ mm}^2$$

(b) Snail statistics

mean:

$$\bar{x} = 3.4 \text{ cm}$$

standard deviation:

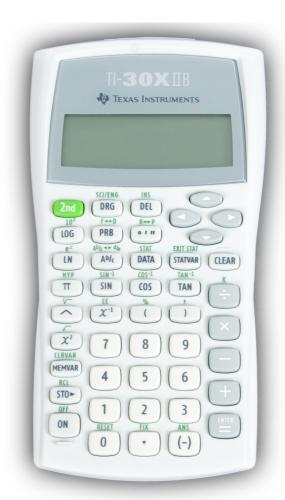
$$s = 0.70 \text{ cm}$$

variance:

$$s^2 = 0.49 \text{ cm}^2$$

11. Linear regression

To access the linear regression mode you press the 2nd key and select 2-Var on the display.



Example

Suppose we had a sample of 10 of the same type of banana. Their lengths and skin thicknesses were measured. Below is a summary of the results.

Banana	1	2	3	4	5	6	7	8	9	10
Length (mm)	16.2	15.8	16.5	14.9	16.9	16.8	15.6	15.6	15.7	15.4
Thickness (mm)	1.1	1.2	1.1	1.0	0.9	1.2	1.1	1.2	0.9	0.8

STEPS

- 1. Think of the sample of bananas as having two variables:
 - let x be the variable length of banana
 - let y be the variable thickness of banana

For each banana you have to put in both numbers.

To put in the first set of numbers, press the following keys:

Continue in this manner.

To find the linear regression equation in the form

$$y = ax + b$$

you need to find the value of a and b. These values are found by pressing STATVAR once the data has been entered.

Select a and b by moving the cursor across the top of the display using the \bigcirc keys until the desired coefficients are found. This gives a = 0.0430

b = 0.3651 or the equation 0.0430×0.3651 .

To find the correlation coefficient select r

$$r = 0.1928$$

There is not a high correlation between the thickness of bananas and the length of bananas tested.

The calculator will also give you other statistics about this sample, through selecting them using the keys.

$$\bar{x}$$
: = 15.94

Sx or
$$x_{\sigma_{n-1}}$$
: = 0.6432

$$\bar{y}$$
: to get 1.05

Sy or
$$\mathcal{Y}_{\sigma_{n-1}}$$
: to get 0.1434

You can also use the x^1 function in the STATVAR menu to predict the length, given the thickness. If 0.6 is the thickness then select x^1 then press = 5.47mm.

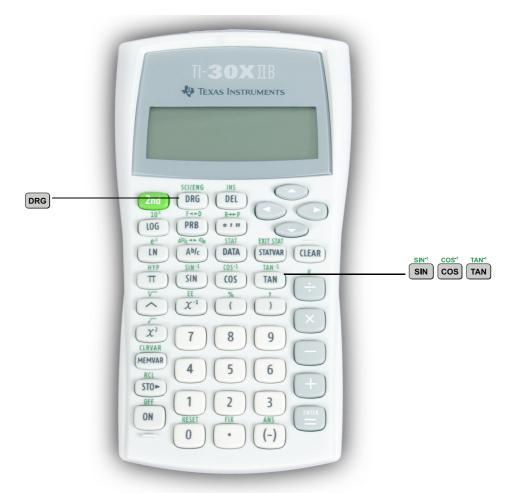
Similarly, if the length is 12mm then select y^1 then press

to get 0.88 mm as the predicted thickness.

To exit STAT mode press 2nd STATVAR ENTER

12. Trigonometric functions

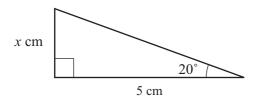
The keys involved are:



Important: Make sure that your calculator is in the correct mode. For example, if your calculator has RAD or GRAD on the display and you wish to work in degrees, press and then select degrees. Your screen should now display DEG.

Example 1

In the right-angled triangle below, the length of the side opposite the 20° angle needs to be calculated.



To find the length of the side labelled x cm, use

$$\tan 20^\circ = \frac{x}{5}$$

$$\Rightarrow x = 5 \tan 20^\circ$$

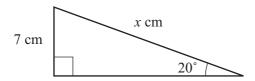
The keystrokes on the calculator are:



The display should read 1.819851171, so the length of x is about 1.8 cm.

Example 2

In the right-angled triangle below, the length of the hypotenuse needs to be calculated.



To find the length of the side labelled x cm, use:

$$\sin 20^\circ = \frac{7}{x}$$

$$\Rightarrow x = \frac{7}{\sin 20^\circ}$$

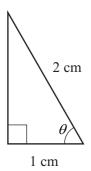
The keystrokes on the calculator are:



The display should read 20.466631, so the length of the hypotenuse is about 20.5 cm.

Example 3

Given the lengths of two of the sides in the right-angled triangle below, find the value of the angle θ in degrees:



In the diagram, $\cos \theta = \frac{1}{2}$

To find the value of θ , you need to use the \cos^{-1} key. The calculator keystrokes are:

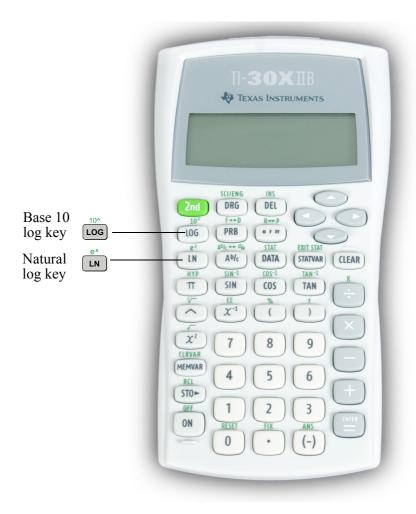


Note: You must first get the value of the division by using the brackets, but this calculator atuomatically inserts the first one for you.

Your display should read 60°. If it does not, check that you are in degree mode.

13. Exponential and logarithmic functions

There are two log keys on your calculator, with their associated exponential keys. The latter are accessed by first using the shift key:



The 'log' key uses base 10 and the 'ln' key uses base *e* (natural logarithm).

Example 1

Solve equation $2^a = 20$

Taking logs of both sides;

$$\log 2^{a} = \log 20$$

$$\Rightarrow a \log 2 = \log 20$$

$$\Rightarrow a = \frac{\log 20}{\log 2}$$

To find the value of *a*, the keystrokes are:



The display should read 4.3219281.

So, $2^{4.32} \approx 20$. Confirm this by using the \land key.

Example 2

Given $\log y = 1.584$, find the value of y

$$\log y = 1.584$$

$$\Rightarrow v = 10^{1.584}$$

The 10^x key is above the log key. Hence the keystrokes are:



The display should read 38.370725

Example 3 (harder)

Given $\log_x 6 = 1.5$, find the value of x

$$\log_x 6 = 1.5$$

$$\Rightarrow \frac{\log 6}{\log x} = 1.5$$

$$\Rightarrow \frac{\log 6}{1.5} = \log x$$

To find $\log x$, the calculator keystrokes are:



The display should read 0.5187675.

Since this is the value of $\log x$, you still need to find x where $x = 10^{0.5187675}$

Without removing the answer of 0.5187675 on your display, press:



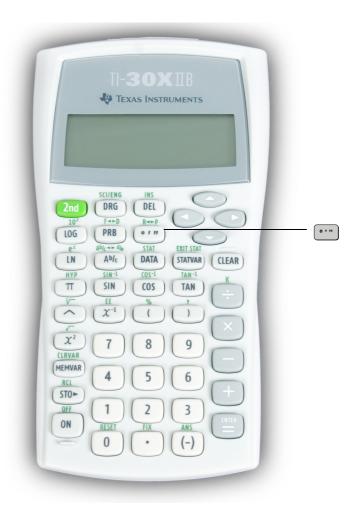
Your display should now read 3.3019272

Note: You could use the 'ln' key instead of the 'log' key – the answer would still be the same. Try it!



14. Degrees, minutes, seconds

The key involved is

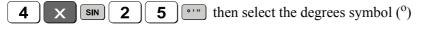


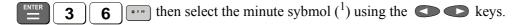
This key can be used for problems involving degrees, minutes and seconds or hours, minutes and seconds.

Example 1

Suppose that you have a trigonometric problem where the angle involved is given in degrees and minutes. e.g. Find x where $x = 4 \times \sin 25^{\circ} 36$ '

The keystrokes involved are:





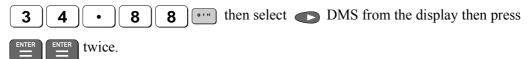


The display should read 1.728342995.

Example 2

If you wish to convert an angle in degrees to its equivalent in degrees, minutes and seconds:

e.g. 34.88°, the keystrokes are:



The display should read 34°52'48".

Review calculator exercises

1. Perform the following calculations

(i)
$$(5+4) \times 3$$

(ii)
$$12.5 - 8 \div 0.5$$

(iii)
$$\frac{3\times 6-8}{4}$$

(iv)
$$\frac{12.8}{16.5 - 3.8}$$

(v)
$$\frac{7 \times 0.41 + 17}{(4+7) \times 2}$$

(vi)
$$\frac{2.4}{\frac{3}{4}}$$

(vii)
$$\sqrt{145.6 - 17.2^2/5}$$

(viii)
$$\sqrt{345.6 - 17.2^2} / 5$$

(ix)
$$25 + \frac{3 \times 27}{1.02\sqrt{30}}$$

(x)
$$(4.1333 - 3.000) \pm 2.015 \sqrt{\frac{0.1366^2}{6} + \frac{0.2000^2}{6}}$$

(xi)
$$\frac{(100-90)^2}{90} + \frac{(50-60)^2}{60} + \frac{(20-30)^2}{30}$$

2. The following data is on growth (in \$m) in an economy over a 8 year period:

2.5 6.2 -2.1 0.04 8.2 7.4 2.1 -1.7

Calculate (i) Σx (ii) Σx^2 (iii) $(\Sigma x)^2$. Explain in words what each of these mean.

Calculator solutions

1.

(i)
$$(5+4) \times 3$$
 = 27
Make sure your calculation is in comp mode.

(ii)
$$12.5 - 8 \div 0.5$$
 = -3.5

$$(iii) \frac{3 \times 6 - 8}{4} = 2.5$$

Either $(3 \times 6 - 8) \div 4 = \text{ or } 3 \times 6 - 8 = \div 4 =$

(iv)
$$\frac{12.8}{16.5 - 3.8}$$
 = 1.007874

Either $12.8 \div (16.5 - 3.8) = \text{ or } 16.5 - 3.8 = x^{-1} \times 12.8 =$

(v)
$$\frac{7 \times 0.4 + 17}{(4+7) \times 2}$$
 = 0.9

Either ... \div ((4 + 7) × 2) = or ... \div (4 + 7) \div 2 =

(vi)
$$\frac{2.4}{\frac{3}{4}}$$
 = 3.2

Either 2.4 \div (3 \div 4) =, or 2.4 \div 3 ab/c 4 =

(vii)
$$\sqrt{145.6 - 17.2^2/5}$$
 = 9.296..
Either $145.6 - 17.2x^2 \div 5 =$ and x^2 and $(-)$ = or and x^2 (145.6 - 17.2 $x^2 \div 5$) =

(viii)
$$\sqrt{345.6 - 17.2^2} / 5$$
 = 1.41..
Either $345.6 - 17.2x^2 =$ 2nd x^2 2nd $(-)$ = ÷ 5 = or $(345.6 - 17.2x^2)$ 2nd x^2 ÷ 5 =

(ix)
$$25 + \frac{3 \times 27}{1.02\sqrt{30}}$$
 = 39.4985
 $25 + 3 \times 27 \div 1.02 \div \sqrt{30} =$

(x)
$$(4.1333 - 3.000) \pm 2.015 \sqrt{\frac{0.1366^2}{6} + \frac{0.2000^2}{6}}$$
 = 1.3325 or 0.9341

Calculator keys:
$$2.015 \times 200 \times 200$$

(xi)
$$\frac{(100-90)^2}{90} + \frac{(50-60)^2}{60} + \frac{(20-30)^2}{30} = 6.1111$$
Calculator keys:
$$(100-90) x^2 \div 90 + (50-60) x^2 \div 60 + (20-30) x^2 \div 30 = 6.1111$$

- 2. The following data is on growth (in \$m) in an economy over a 8 year period:
 - 2.5 6.2 -2.1 0.04 8.2 7.4 2.1 -1.7
- Calculate (i) Σx (ii) Σx^2 (iii) $(\Sigma x)^2$ Explain in words what each of these mean.

To do this on the calculator, you must be in STAT mode. Enter the data in chapter 10.

(i) 22.64 Find the statistics through the status menu.

This gives the total growth over the last 8 years.

- (ii) 178.4016 This gives the sum of the squares of the growth in each year.
- (iii) 512.5696 Find Σx and press x^2 . This gives the square of the sum of the growth.