

Math Literacy webinar with the Sharp EL-W506T and EL-W506

SHARP

Plan of Action

- Introduction
- Basics
 - Where to download the simulator
 - Shortcut for Class marks
- Maths stuff
 - Numbers and Calculations
 - Rounding off
 - Squares, cubes and roots
 - Fractions
 - Percentages
 - Memory keys
 - Basics
 - Finance
 - Break even
 - Tariffs
 - Interest
 - Tax
 - Vat
 - Present Value investigation
 - Hire Purchase
 - Measurement
 - Conversions
 - Time
 - Data Handling
 - Probability

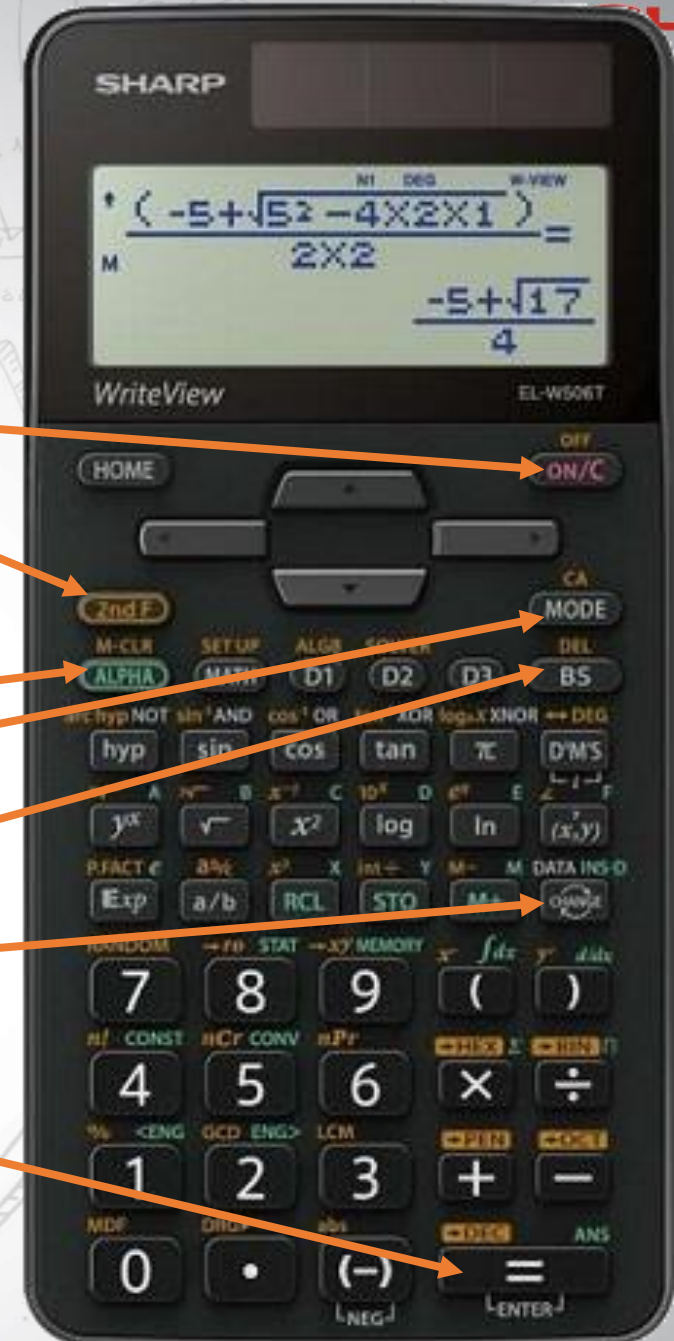
Calculator Introduction

- 640 Functions
- Upgraded for the CAPS and AP maths curriculum
- Amazing new functions include a multiplicand function, highest common factor, lowest common multiple and many more!
- Download the simulator from www.mathsatsharp.co.za




Calculator Basics


- Turn the calculator on
- 2nd Function – used to activate orange functions
 - Turn the calculator off by pressing 2nd F and ON
- ALPHA – used to activate teal functions
- Mode – change to different modes
- BS – backspace – to delete something.
- Change – change between mixed, improper and decimal answers.
- Equals – to find an answer or used as enter.



Modes

- Press 
 - 0: Normal
 - Fractions, integers, probability, trigonometry and much more
 - 1: Stat
 - Single data, linear regression and more
 - 2: Table
 - Functions but can also be used for teaching finance and factorising
 - 3: Complex
 - For doing complex number calculations
 - 4: Equation
 - Solving various equations – linear, quadratic and cubic.

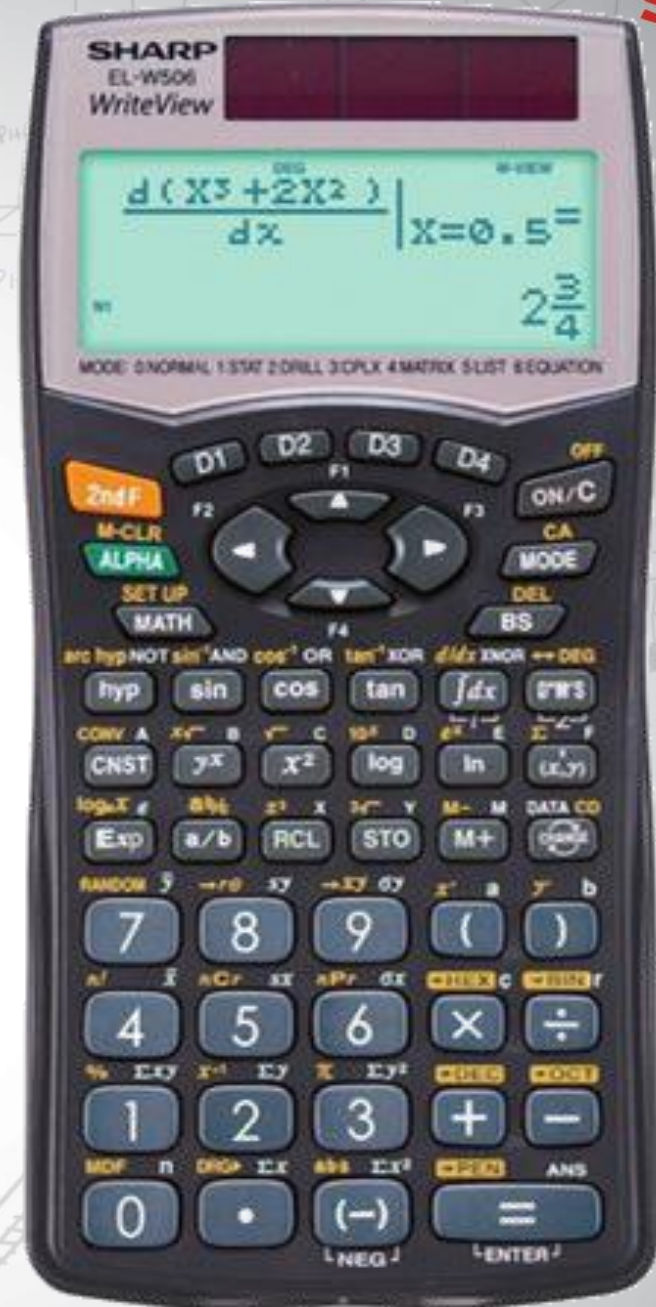


- Press 
- 5: Matrix
 - Up to 4 x 4 matrices
- 6: Vector
 - Up to 3 elements, solve cross and dot products
- 7: Distribution
 - Various statistical distributions – normal, binomial and Poisson.
- 8: Drill
 - Practice basic mental maths.
 - Great for grade 8 and 9 students



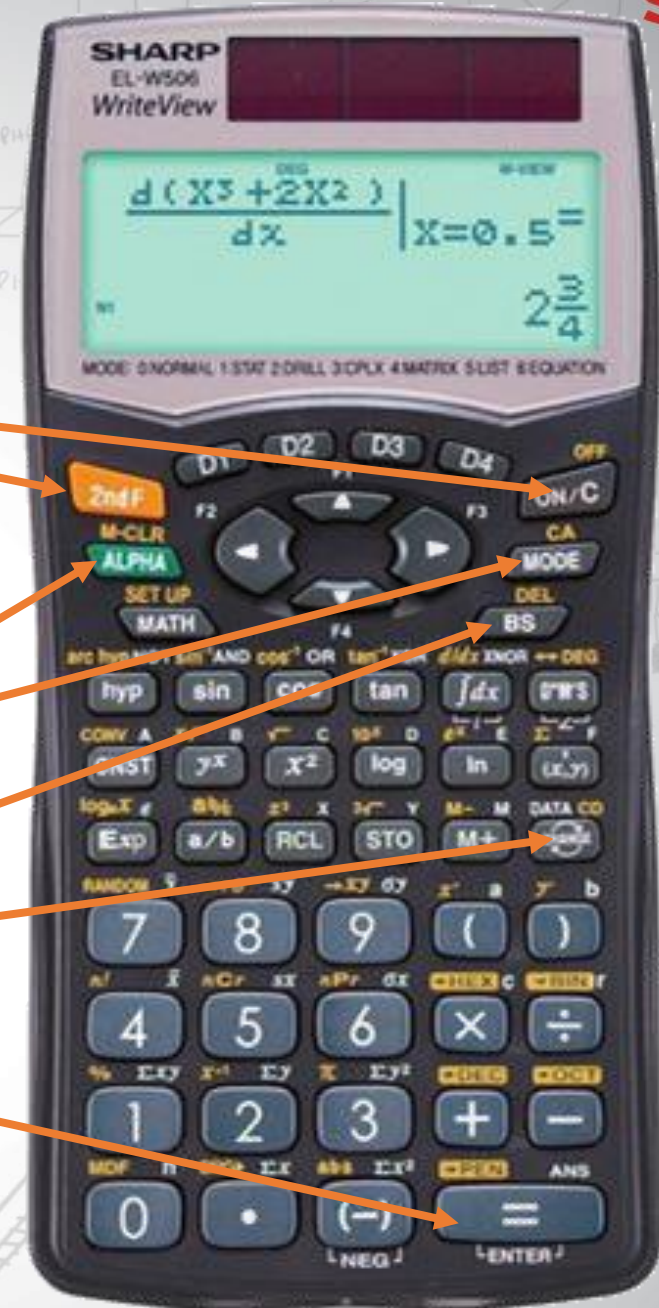
Calculator Introduction

- 556 Functions
- Displays equations in writeview (i.e. just like the textbook).
- Solves equations
- Integrates and differentiates
- Does 44 different conversions and has 52 constants



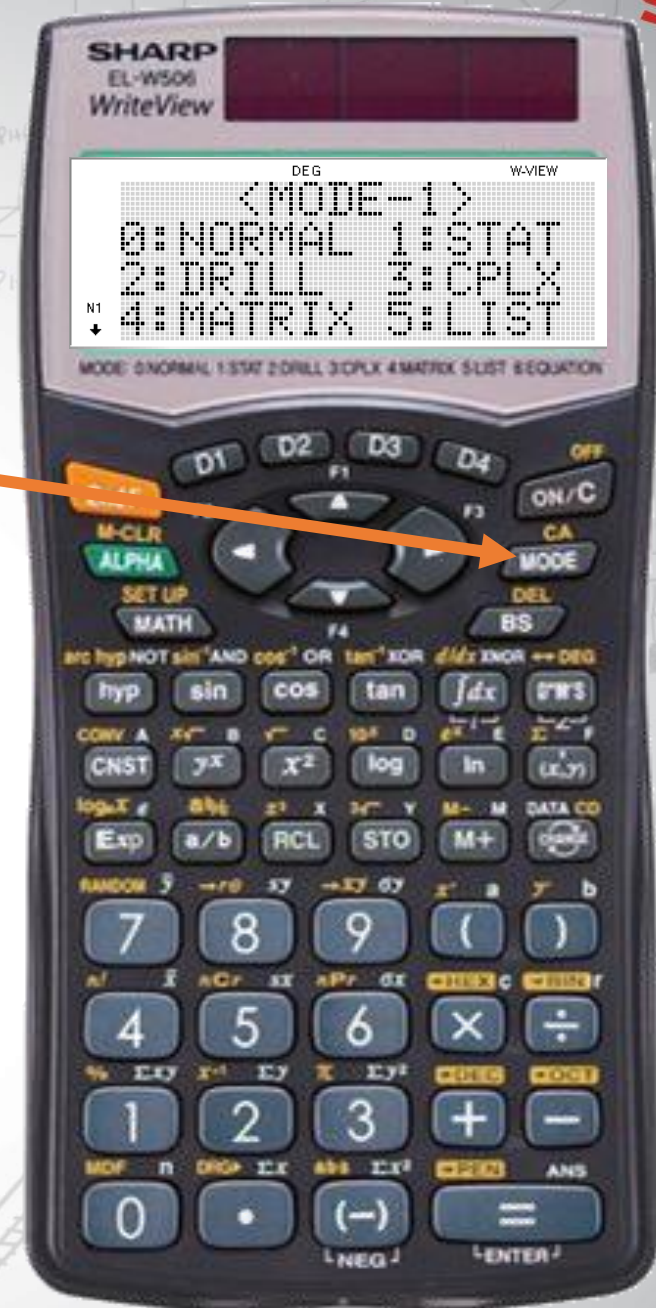
Calculator Basics


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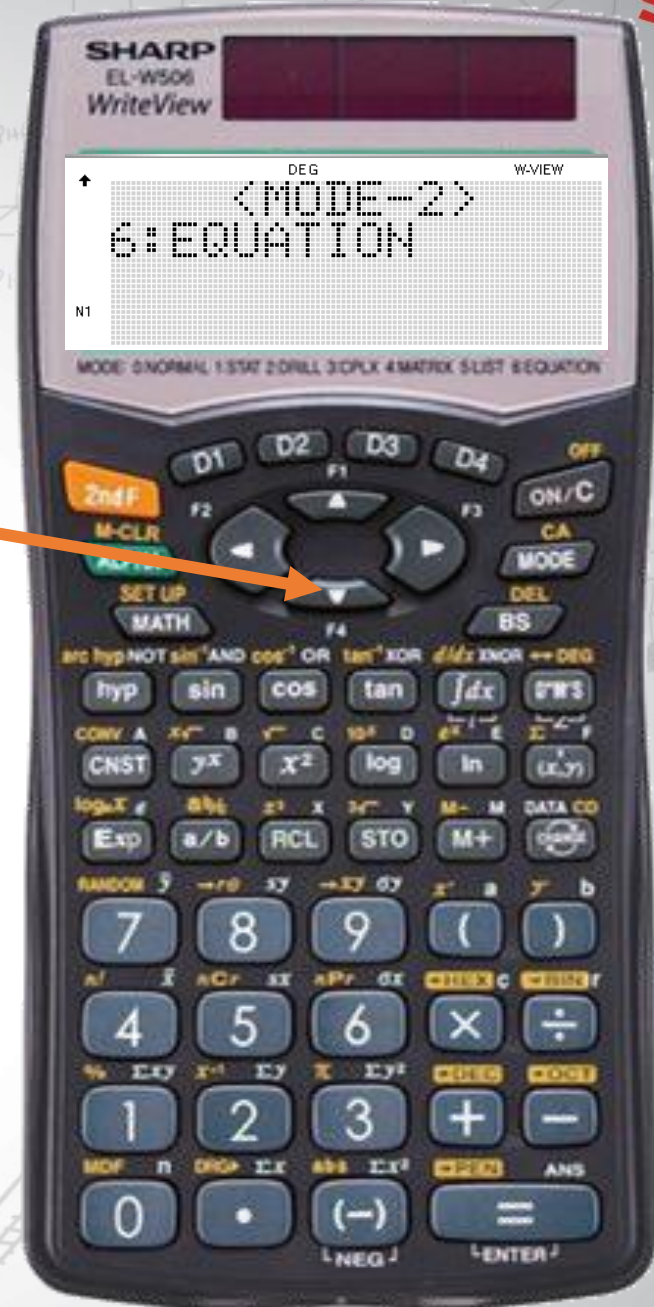


Modes

- Press **MODE**
- 0: Normal
 - Fractions, integers, probability, trigonometry and much more
- 1: Stat
 - Single data, linear regression and second common differences.
- 2: Drill
 - Practice basic mental maths.
 - Great for grade 8 and 9 students
- 3: Complex
 - For doing complex number calculations
- 4: Matrix
 - Up to 4 x 4 matrices
- 5: List
 - Up to 3 elements, solve cross and dot products



- Press 
- 6: Equation
 - Solving various equations – linear, quadratic and cubic.



Teacher Shortcut – Class marks

- E.g. First 3 students get 40, 55 and 23 out of 70 for test.
- To calculate their percentages quickly:
- Press

1 0 0 $\frac{ab}{c}$ $\frac{a}{b}$

7 0 \rightarrow

\times 4 0

=

DATA INS-D DATA INS-D

CHANGE CHANGE

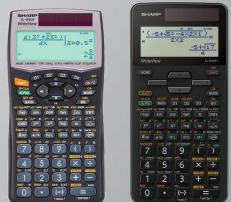
$$\frac{100}{4}$$

$$\frac{100}{70}$$

$$\frac{100}{70} \times 40$$

$$\frac{100}{70} \times 40 = 57\frac{1}{7}$$

$$\frac{100}{70} \times 40 = 57.14285714$$



- For the next mark just type in the mark

5 **5**

- And press

=

55_ NI DEG W-VIEW

Kx55= NI DEG W-VIEW
78 $\frac{4}{7}$

↑ Kx55= NI DEG W-VIEW
↓ 78.57142857

- And again, mark

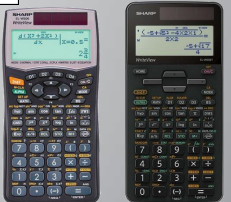
2 **3**

=


23_ NI DEG W-VIEW

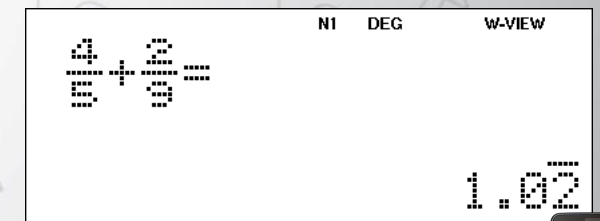
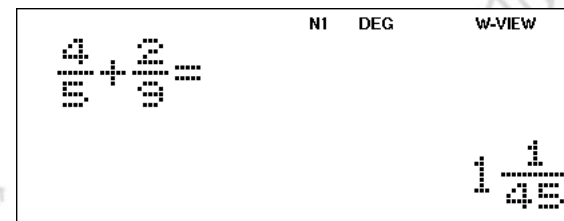
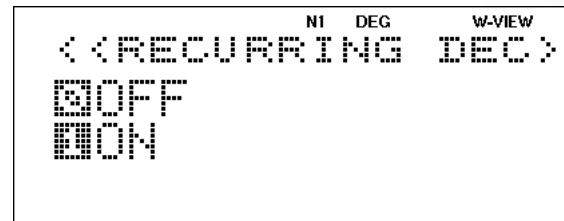
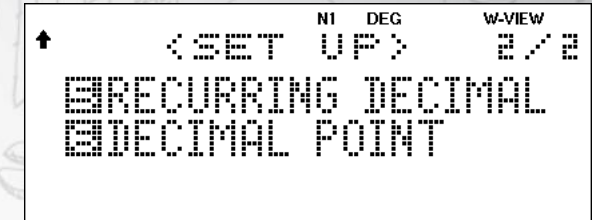
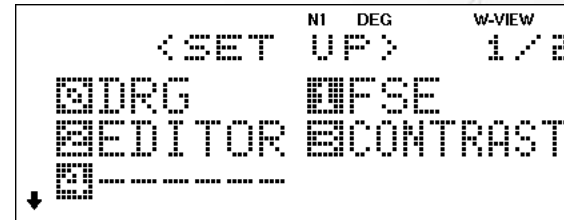
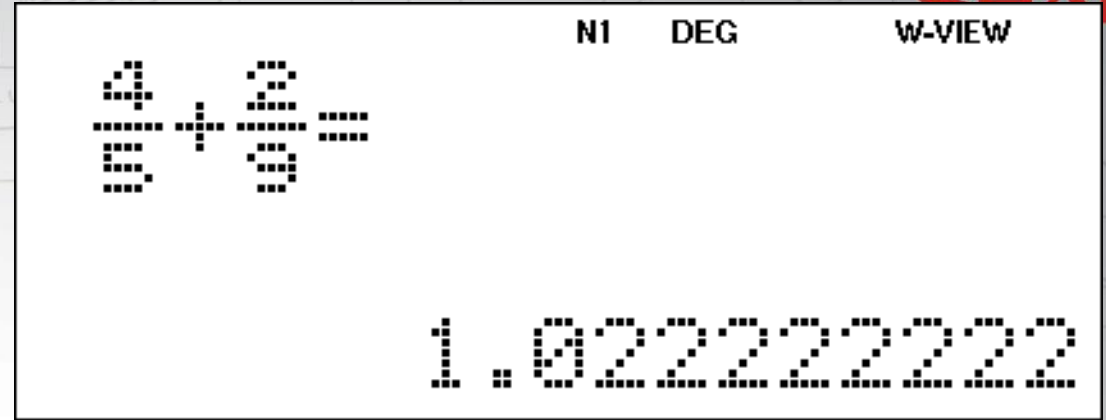
Kx23= NI DEG W-VIEW
32 $\frac{6}{7}$

↑ Kx23= NI DEG W-VIEW
↓ 32.85714286



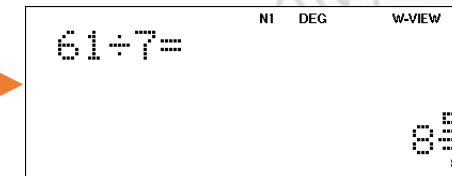
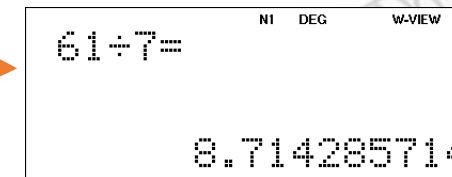
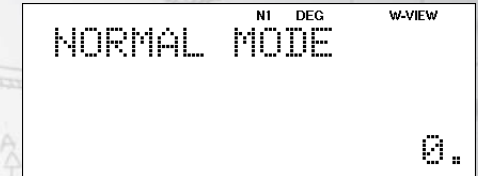
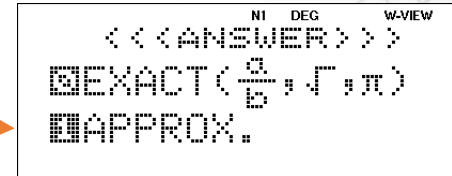
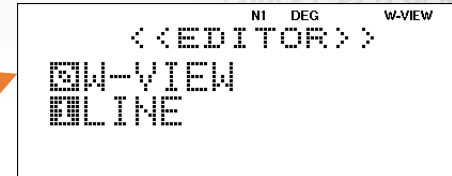
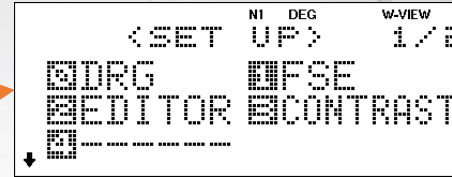
Recurring decimals

- The calculator can also show recurring decimals.
- Press **SET UP** 
- Choose **5**
- And press **1** to turn it on
- Press **CHANGE** to see the recurring decimal format of the number



Changing the way answers are displayed.

- Press **SETUP**
- And choose **2** for EDITOR
- Choose **0** for W-VIEW
- **1** for APPROX
- Test **6** **1** **+BIN** **÷**
- **7** **=**
- Press **CHANGE** to see the fraction forms.



To change back to the original setting: **SETUP** **2** **0** **0**



Rounding Off

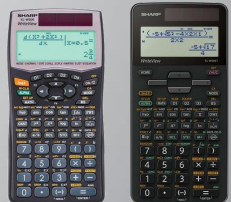
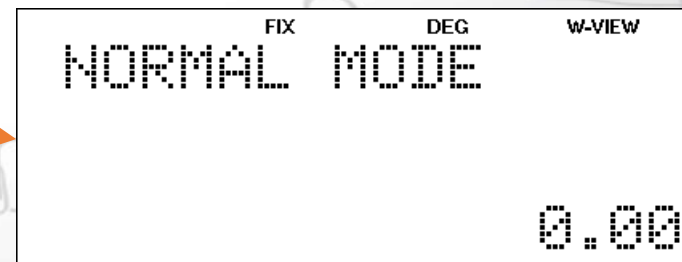
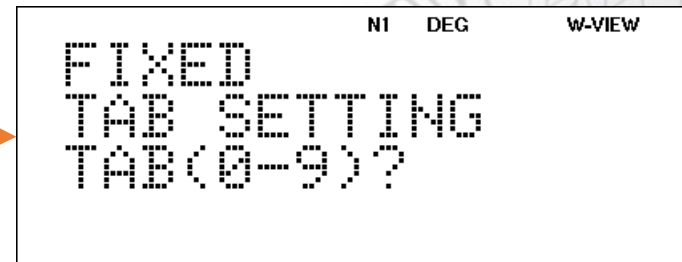
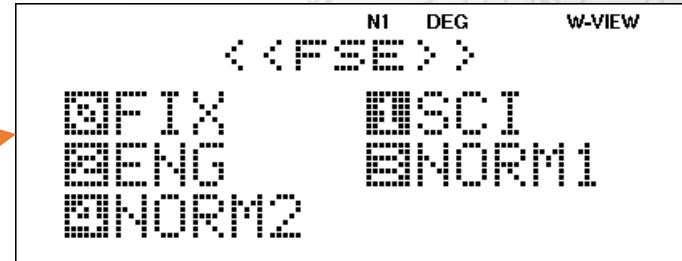
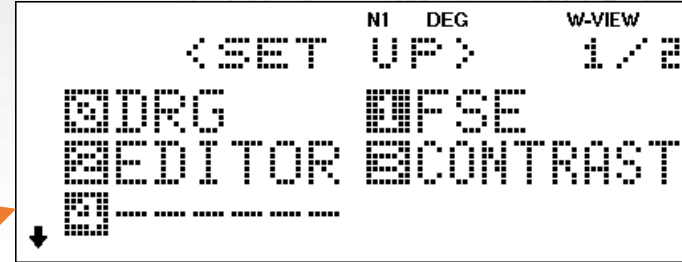
- We can set the fix setting on the calculator to 2 decimal places.

- Press **2ndF** **SET UP** **MATH**

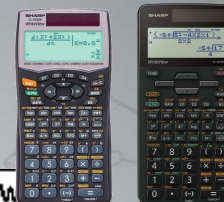
1

0

2



Squares, Cubes and Roots



- To square a number press x^2
- To cube a number press $2ndF$ RCL
- To find the root press

E.g. 2^2 press

2 x^2 $=$

E.g. 3^3 press

3 $2ndF$ RCL $=$

E.g. $\sqrt{16}$ press

$\sqrt{}$ 1 6 $=$

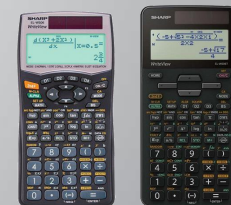
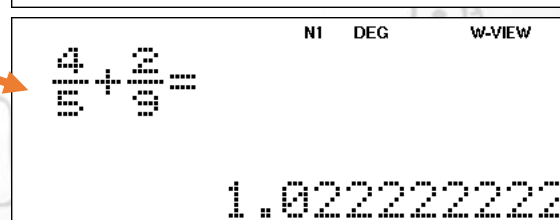
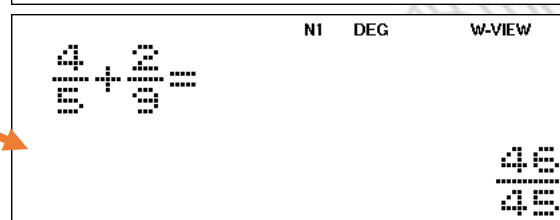
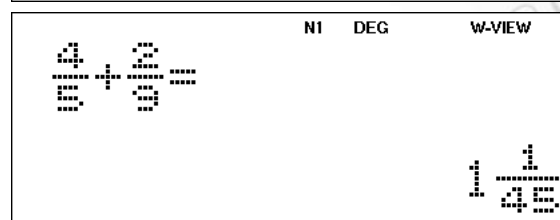
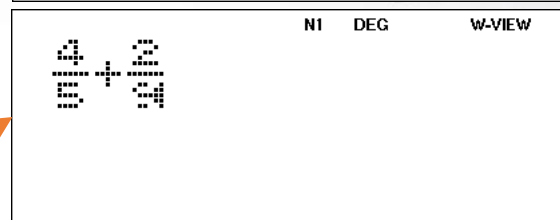
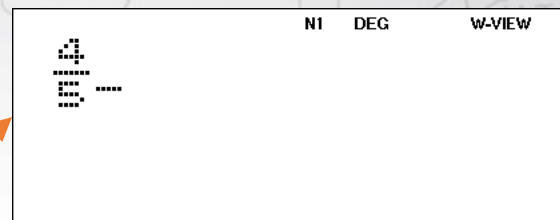
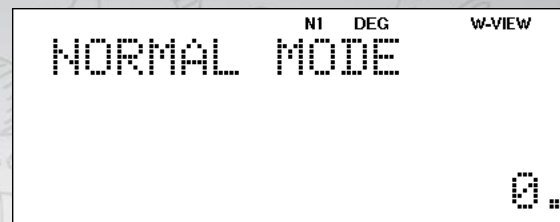
FIX DEG W-VIEW
 $2^2 =$
 4.00

FIX DEG W-VIEW
 $3^3 =$
 27.00

FIX DEG W-VIEW
 $\sqrt{16} =$
 4.00

Fractions

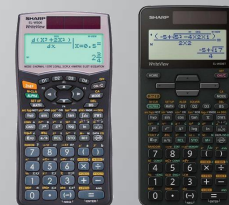
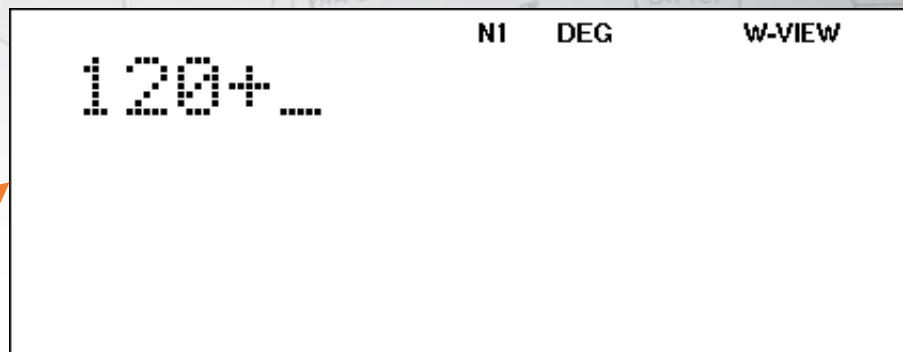
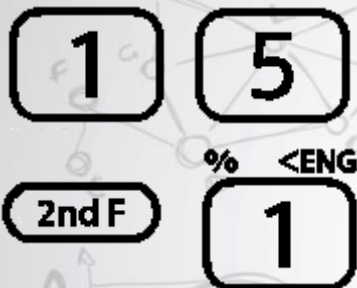
- Press **HOME**
- E.g. Add $\frac{4}{5} + \frac{2}{9}$
- Press 4 **a/b** 5 **▶**
- **+** 2 **a/b** 9 **=**
- Press **CHANGE** to change between the various ways to write the answer (mixed fraction, improper fraction, decimal)



Percentages

- Adding 15% to 120:

- Press **1** **2** **0** **+**



Memory Keys

- To save something into memory we use the button.

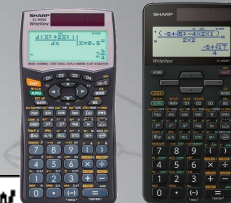
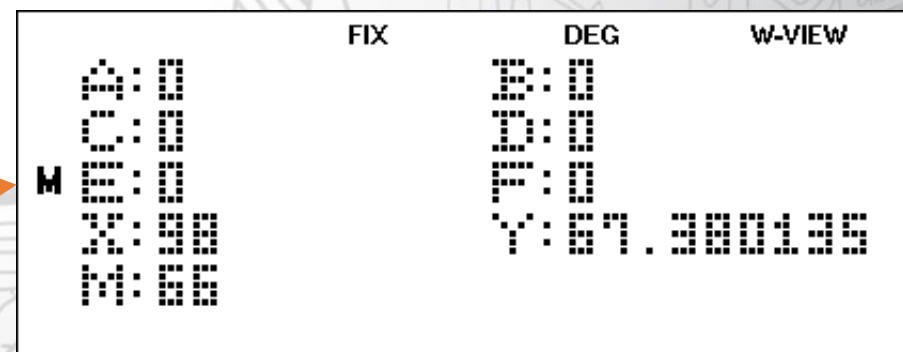
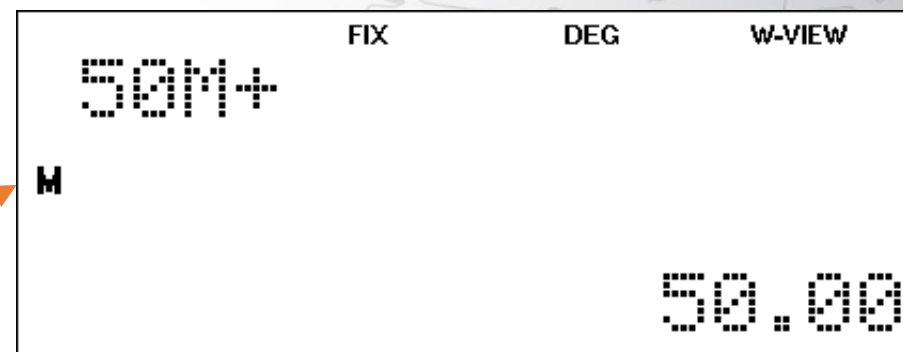
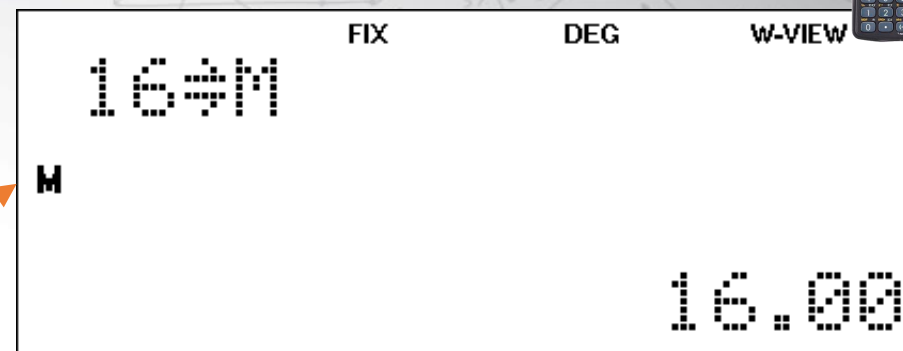
- E.g. Save 16 into M



- Add another value to M

- Press 5 0 M^- M
 5 0 M+

- Check M's value: M-CLR ALPHA 9



Comma vs Decimal

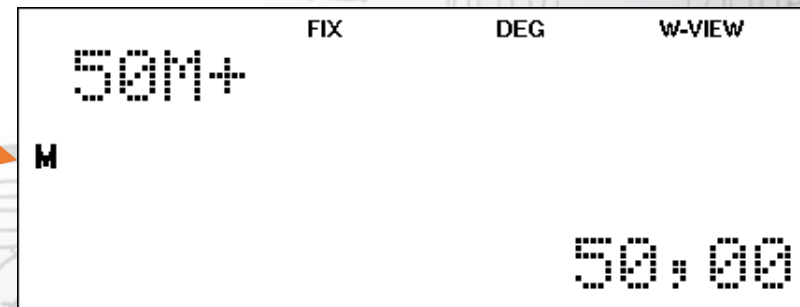
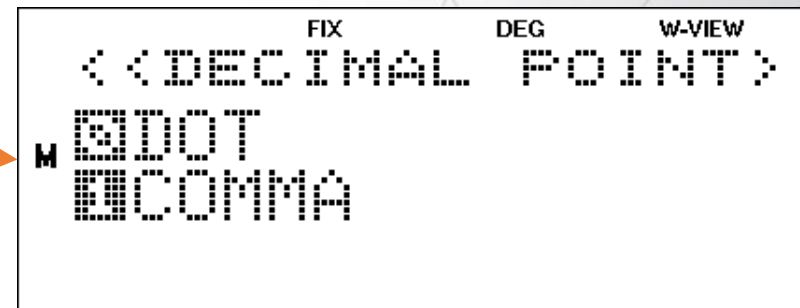
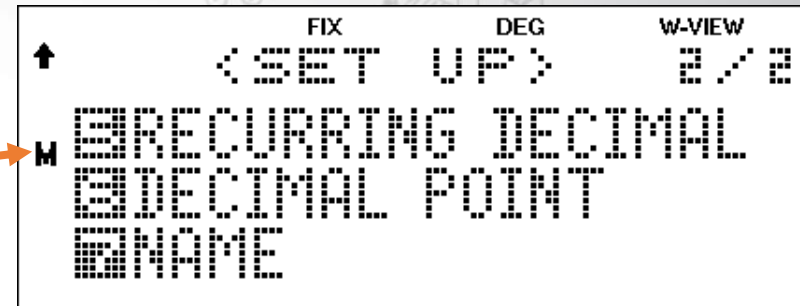
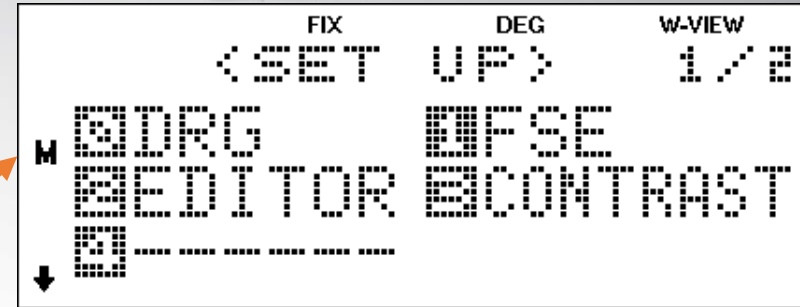
- You can change the point on your calculator to a comma.

- Press **2ndF** **SET UP** **MATH**



6

1



1000's separator

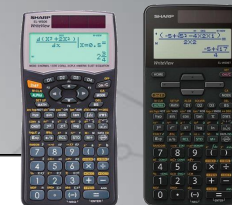
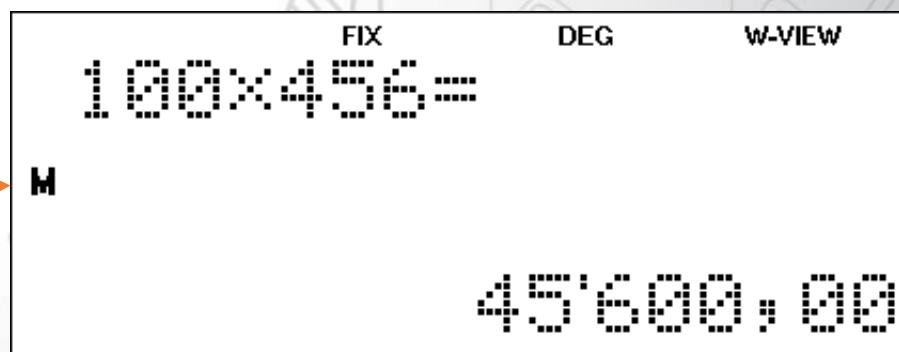
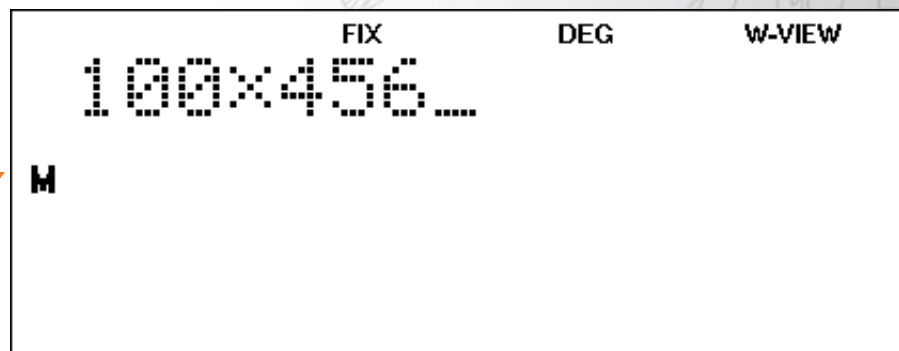
- When getting the answer and the value is larger than 999, the ' is used as a 1000's separator.

• E.g. 100 x 456

• **1** **0** **0** **x**

4 **5** **6**

=



Finance – Break Even

- Cost equation:
 - $Cost = 500 + 20x$
- Profit equation:
 - $Profit = 40x$
- Go to table mode: **MODE** **2**

5 **0** **0** **+**

2 **0** **RCL** **x³** **x** **RCL** **x³** **x**

=

FIX DEG W-VIEW
TABLE MODE
Function1?

FIX DEG W-VIEW
500+...

FIX DEG W-VIEW
500+20X...

FIX DEG W-VIEW
Function2?



- Now for the second function:

4 0 x^3 x^3
RCL RCL

=

=

=

FIX DEG W-VIEW

40X...

M

FIX DEG

X_Start: 0,00

M X_Step: 1,00

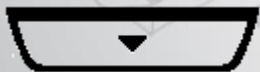
FIX DEG

X_Start: 0,00

M X_Step: 1,00

FIX DEG

	X	ANS1	ANS2
↑	0	500	0
M	1	520	40
	2	540	80
↓			0,00



FIX DEG

	X	ANS1	ANS2
↑	10	860	720
M	19	880	760
	28	900	800
↓			20,00

FIX DEG

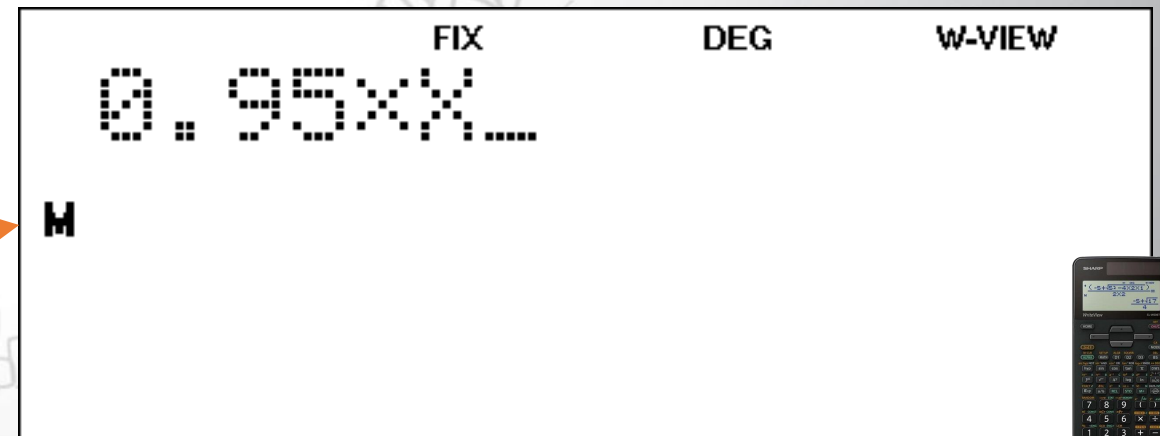
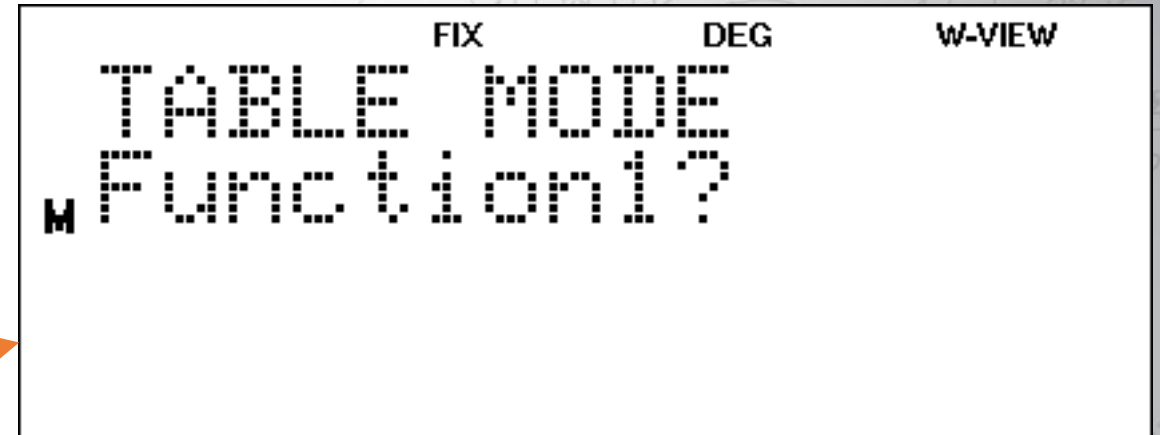
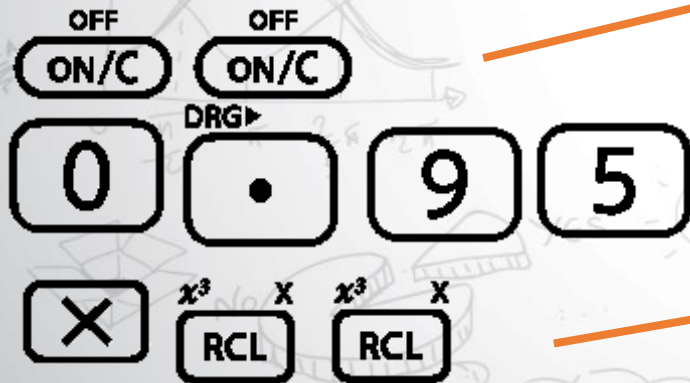
	X	ANS1	ANS2
↑	23	960	920
M	24	980	960
	25	1000	1000
↓			25,00

FIX DEG

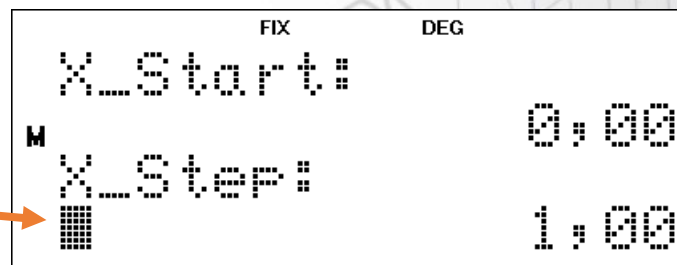
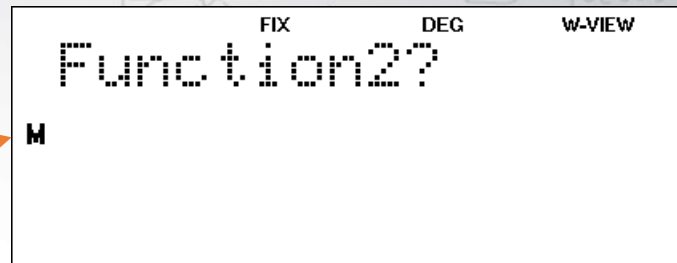
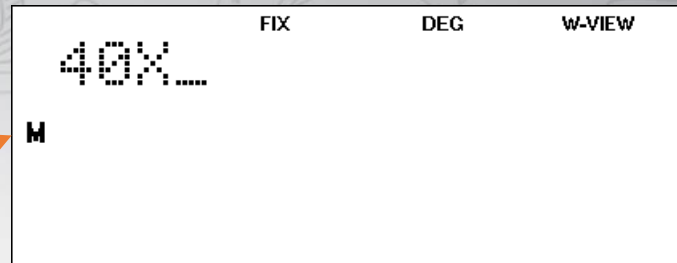
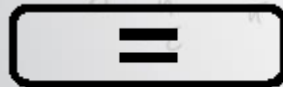
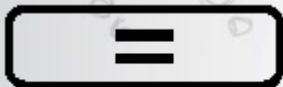
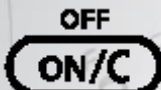
	X	ANS1	ANS2
↑	31	1120	1240
M	32	1140	1280
	33	1160	1320
↓			33,00

Tariffs

- E.g. pay R0.95 per minute on a call.
- Formula would be
 - $Cost = 0.95 \times minutes$
- Can also use the table mode here:



- Now we press


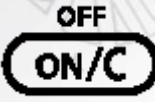


	X	ANS
M	0	0
	1	0,95
	2	1,9
		0,00

	X	ANS
M	8	7,5
	9	8,55
	10	9,50
		9,50

Finance - Interest

- Simple Interest

- Press  

- E.g. $A = 1000 (1 + 5\% \times n)$

- Press     

NI DEG W-VIEW
TABLE MODE
Function1?

NI DEG W-VIEW
1000(

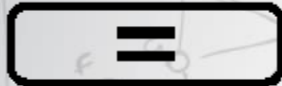
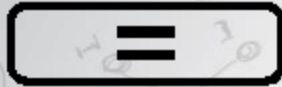
NI DEG W-VIEW
1000(1+

NI DEG W-VIEW
1000(1+ $\frac{5}{100}$

NI DEG W-VIEW
1000(1+ $\frac{5}{100} \times X$)



• Press



NI DEG W-VIEW
Function2?

NI DEG
X_Start: 0.
X_Step: 15.

NI DEG
X_Start: 0.
X_Step: 15.

NI DEG
X_Start: 0.
X_Step: 1

NI DEG

X	ANS
0	1000
1	1050
2	1100

0.

NI DEG

X	ANS
6	1300
7	1350
8	1400

8.

NI DEG

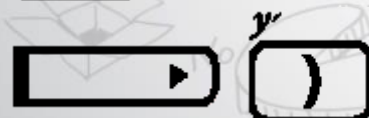
X	ANS
19	1950
20	2000
21	2050

20.

Compound interest

- Lets add compound interest into function 2.

- Press **ON/C**



$$1000\left(1+\frac{5}{100}\times X\right)_-$$

Function2?

$$1000($$

$$1000(1+_$$

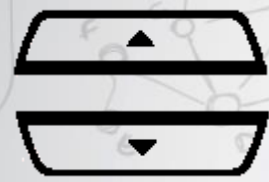
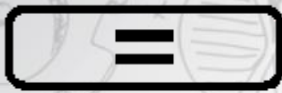
$$1000\left(1+\frac{5}{100}\right)$$

$$1000\left(1+\frac{5}{100}\right)_-$$

$$1000\left(1+\frac{5}{100}\right)^4$$



• Press



NI DEG

X_Start:		0.
X_Step:		1.

NI DEG

X	ANS1	ANS2
1	1000	1000
1	1050	1050
2	1100	1102.5

NI DEG

4	1200	1215.50
5	1250	1276.28
6	1300	1340.09

NI DEG

18	1800	2406.61
19	1950	2526.95
20	2000	2653.29

NI DEG

34	2750	5516.01
35	2800	5791.81
37	2850	6081.40

Tax

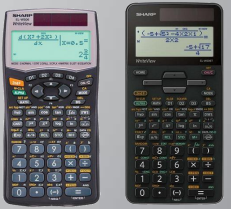
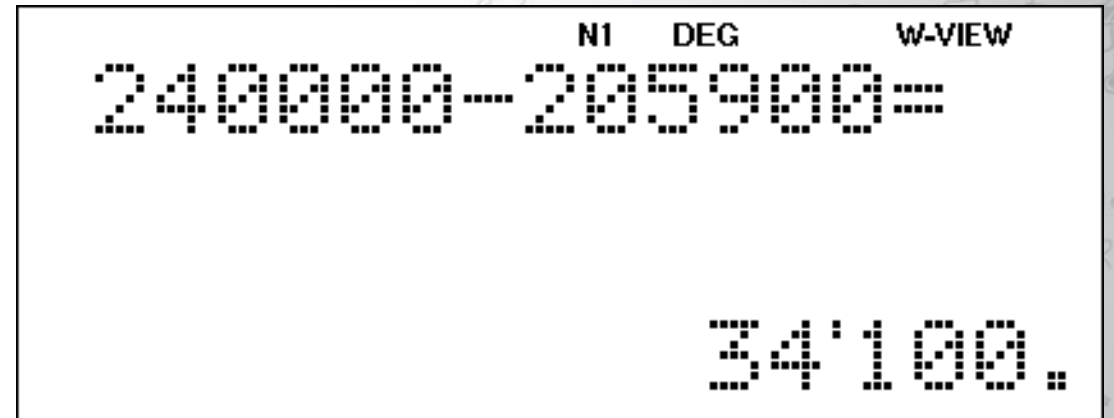
Taxable income (R)	Rates of tax (R)
1 – 205 900	18% of taxable income
205 901 – 321 600	37 062 + 26% of taxable income above 205 900
321 601 – 445 100	67 144 + 31% of taxable income above 321 600
445 101 – 584 200	105 429 + 36% of taxable income above 445 100
584 201 – 744 800	155 505 + 39% of taxable income above 584 200
744 801 – 1 577 300	218 139 + 41% of taxable income above 744 800
1 577 301 and above	559 464 + 45% of taxable income above 1 577 300

Tax Rebates

Tax Rebate	Tax Year						
	2021	2020	2019	2018	2017	2016	2015
Primary	R14 958	R14 220	R14 067	R13 635	R13 500	R13 257	R12 726
Secondary (65 and older)	R8 199	R7 794	R7 713	R7 479	R7 407	R7 407	R7 110
Tertiary (75 and older)	R2 736	R2 601	R2 574	R2 493	R2 466	R2 466	R2 367

E.g. Earning R20 000 per month

- Press **HOME**
- Find what is earned per year:
- $20\ 000 \times 12 = R240\ 000$
- Between :205 900 – 321 600
- gives:
 - R37 062 + 26% of taxable income above 205 900
- So $240\ 000 - 205\ 900 = R34\ 100$



- So $37\ 062 + 26\%$ of $34\ 100$.
- Press $34\ 100 \times 26$ **2ndF** **%** **<ENG** **1**
- $+ 37\ 062 = R45\ 928.00$
- Take away the 2021 rebate of $R14\ 958$
- $R45\ 928 - R14\ 958$
 $= R30\ 970$
- Divide this by 12 to get monthly tax payments:
 $R2\ 580.83$

ANS \times 26%

NI DEG

W-VIEW

8'866.

ANS+37062=

NI DEG

W-VIEW

45'928.

ANS-14958=

NI DEG

W-VIEW

30'970.

ANS \div 12=

NI DEG

W-VIEW

2'580.833333

What happens if we get a bonus?

- Tax is calculated in two ways:
 - Adding the bonus to the total yearly earnings, and reworking the monthly tax rate.
 - Only works if we know that we are going to receive this bonus and we can pay the tax in advance.
 - This is the way sars will calculate your final tax amount owed.
 - Alternatively, we can calculate the tax as though you earn that amount every month. And pay the monthly tax just for that month.
 - You will pay more in tax this way.
 - But it will be refunded to you in tax return.
- Medical aid works the same way.
 - Although now there is no direct tax benefit to the company
 - The rebate is refunded to you.

Vat

- Adding 15%

• $R120 + 15$

2ndF

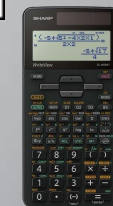
% <ENG
1

- To find what the amount was before tax

• $R138 \div 115$

2ndF

% <ENG
1


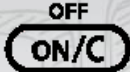


Present value annuity







































- $PV = \frac{x[1-(1+r)^{-n}]}{r}$
- How much could we borrow with various amounts at 10% interest p.a. compounded monthly, over 5 years?
- Substitute what we know into the formula:

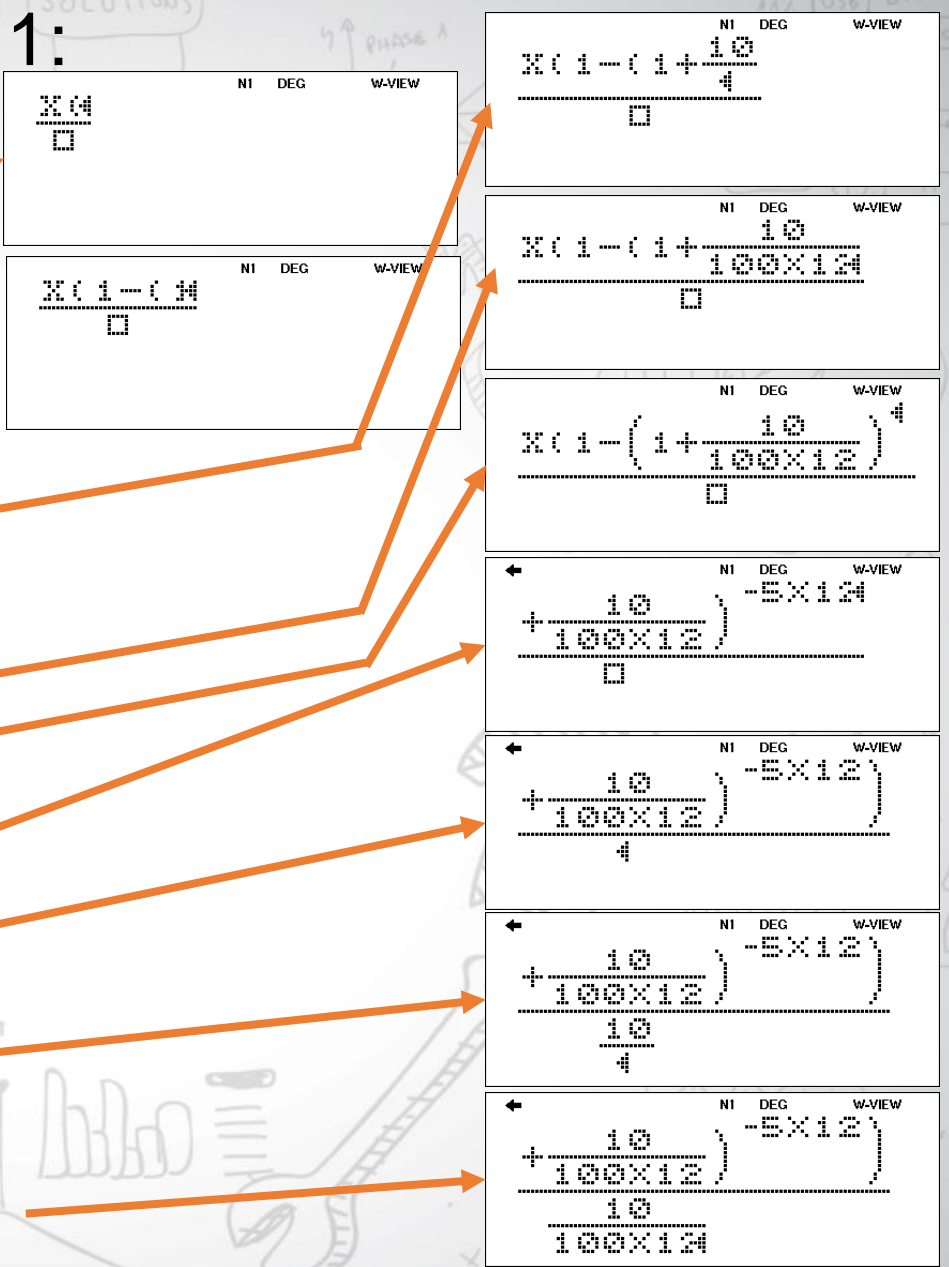
$$PV = \frac{x \left[1 - \left(1 + \frac{10}{100 \times 12} \right)^{-5 \times 12} \right]}{\frac{10}{100 \times 12}}$$









- Lets use table mode:  
- Now type this into function 1:

$$x \left[\frac{1 - \left(1 + \frac{10}{100 \times 12}\right)^{-5 \times 12}}{10} \right]$$

-    
-    
-    
-      
-   
-     
-   
-   
-      



- Press  
- Lets make our payments go up in steps of R100 each time.
- Type in    and press 
- Use your up and down arrows to scroll down the table and see what you can get as a loan.

NI DEG W-VIEW
Function2?

NI DEG
X_Start: 0.
X_Step: 1.

NI DEG
X_Start: 0.
X_Step: 1.

NI DEG
X_Start: 0.
X_Step: 100.

X	ANS
0	0
100	4706.53
200	9413.07

0.

X	ANS
800	37652.2
900	42358.8
1000	47065.3

1'000.

X	ANS
1800	84717.6
1900	89424.2
2000	94130.7

2'000.

X	ANS
3100	145902.
3200	150609.
3300	155315.

3'300.

Hire Purchase

- The purchase of a “big ticket” (more expensive) item that is paid off through a deposit and simple interest.
- Steps:
 - Work out how much the deposit is.
 - Work out how much is left to pay (this is your P value)
 - Work out your final amount to pay (over the time given)
 - Divide this by the number of months (or whatever period is given) to work out the monthly payment.



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Example:

- Mandisa decides to purchase a lounge suite from House and Home. Here is a picture of the advert:
- a) If Mandisa pays a 15% deposit, how much will she have to take out a hire purchase loan for?
- b) House and Home charges her 22% interest per year, with the loan payable over 3 years. What is the total amount Mandisa will have to pay back?
- c) If she also pays a monthly insurance of R29 and administration fee of R13, how much will Mandisa have to pay a month.
- d) How much more is Mandisa spending because she bought the lounge suite on hire purchase, than paying the cash price.



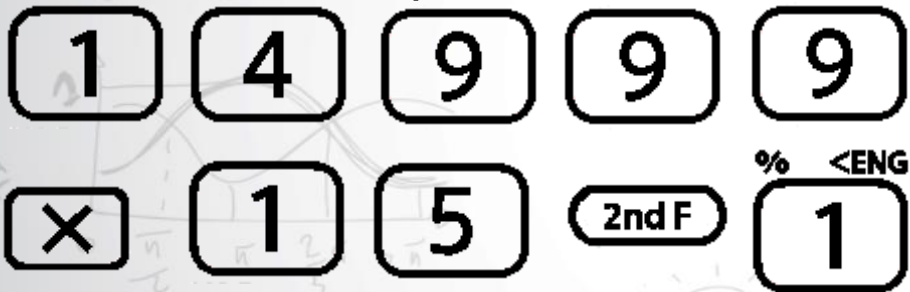
**ALCAZAR 9459 2M 4PCE LOUNGE
SUITE LATTE *I***

R14,999.00

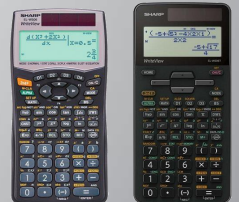
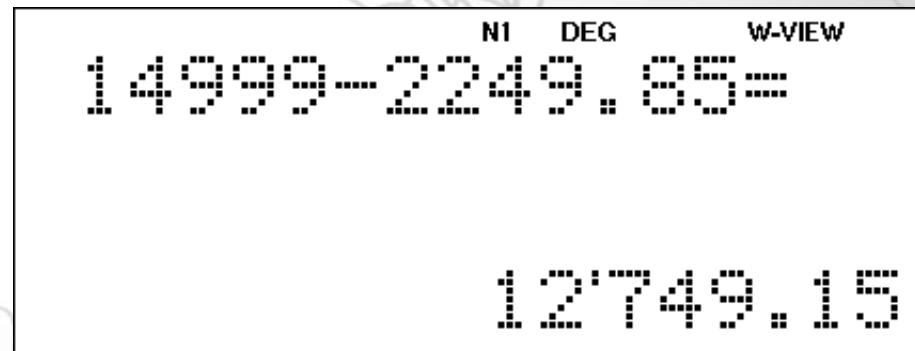
a)

- If Mandisa pays a 15% deposit, how much will she have to take out a hire purchase loan for?

- Total amount = R 14 999
- Deposit = R14 999 x 15%
- On the calculator press

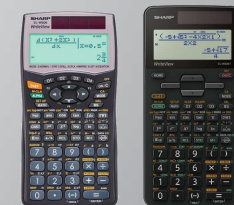
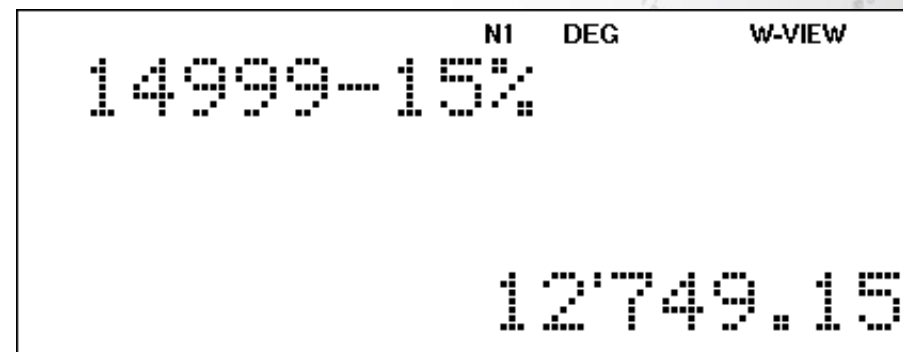
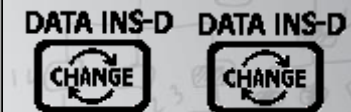
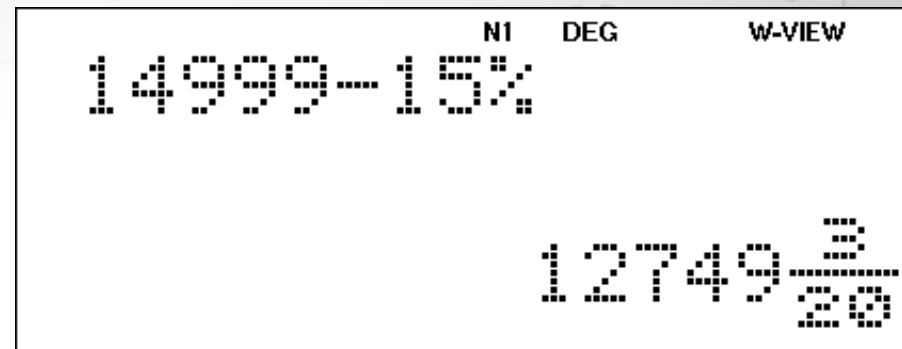
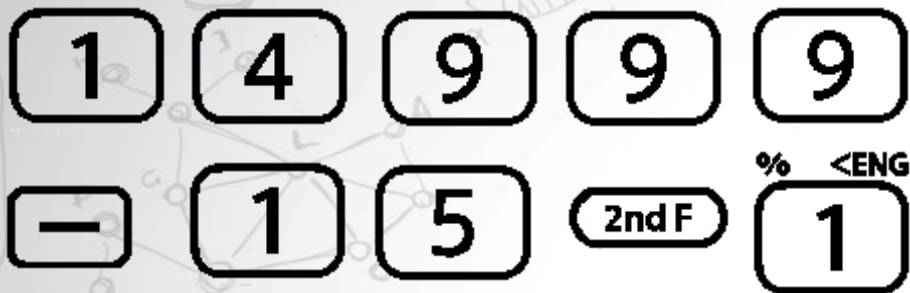


- Now we say R14 999 – R2 249.85



Bonus shortcut 😊

- Press

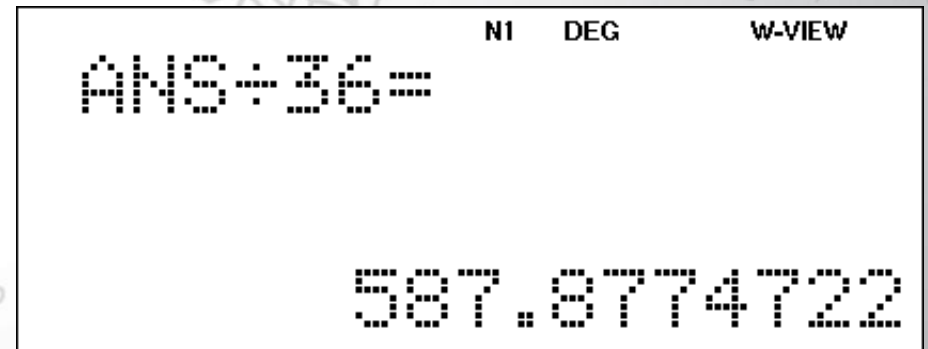
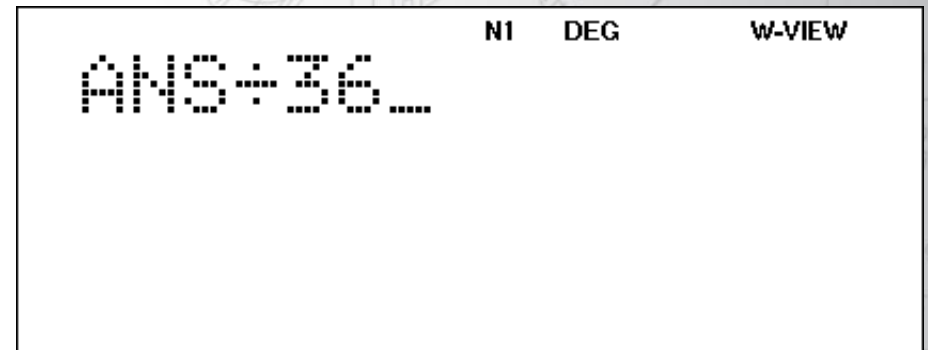
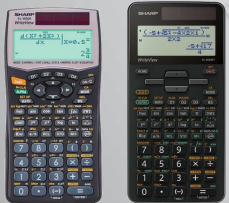


b)

- House and Home charges her 22% interest per year, with the loan payable over 3 years. What is the total amount Mandisa will have to pay back?
- So what do we have?
- $A = ?$
- $P = R12\ 749.15$
- $i = 22\%$
- $n = 3$ years
- Interest over 3 years: $= 22\% \times R12\ 749,15 \times 3$
 - $= R2\ 804,813 \times 3$
 - $= R8\ 414,439 = R8\ 414,44$
- Total to borrow $= R12\ 749,15 + R8\ 414,44 = R21\ 163,59$

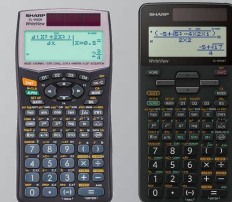
c)

- If she also pays a monthly insurance of R29 and administration fee of R13, how much will Mandisa have to pay a month.
- First, we find how many months Mandisa will have to pay for the lounge suite:
 - $3 \times 12 = 36$ months
- Next we divide the total found in b) by 36:
 - $21\,163.589 \div 36$
 - $= 587.88$
 - Press



- Now we add the monthly total calculated to the insurance and admin fee:
- = R587,88 + R13,00 + R29,00
- = R629,88

	N1	DEG	W-VIEW
ANS+13+29=			
629.8774722			



d)

- How much more is Mandisa spending because she bought the lounge suite on hire purchase, than paying the cash price?
- She pays over 36 months
 - = R629,88 x 36
 - = R22 675,59
- How much more means subtract the original from the end total (don't forget the original deposit)
 - = R22 675,59 + R2 249,85 – R14 999
 - = R9 926,44

NI DEG W-VIEW

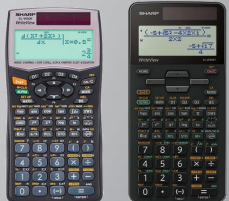
ANS×36=

22'675.589

NI DEG W-VIEW


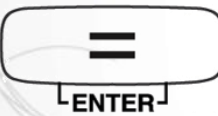
ANS+2249.85-1499

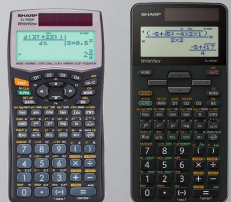
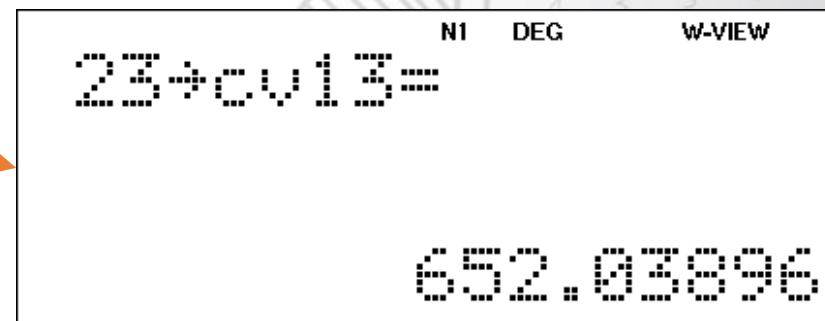
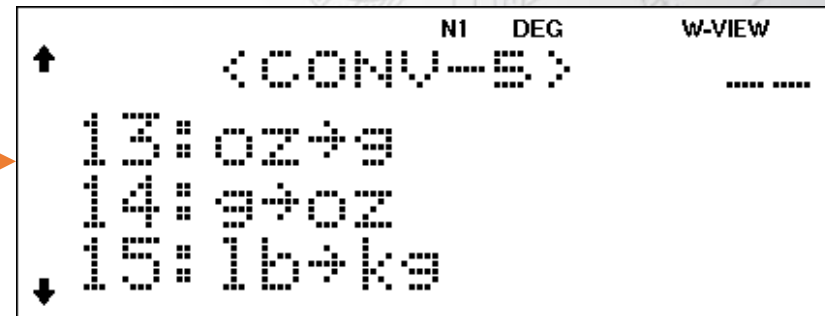
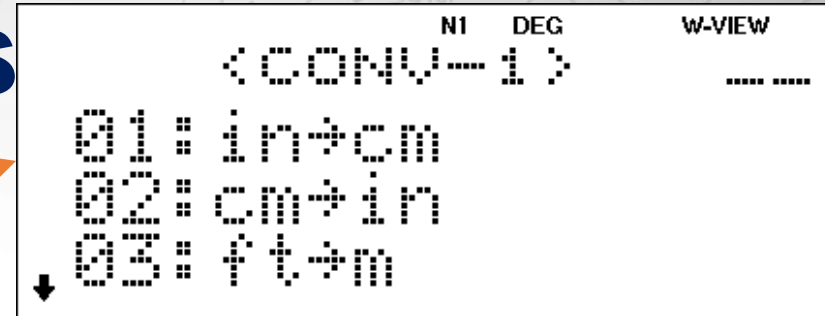
9'926.439



Conversions

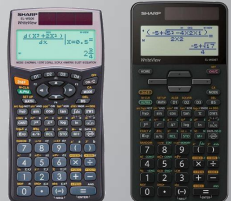
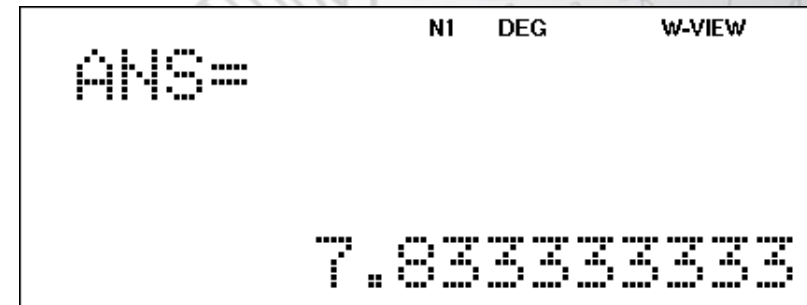
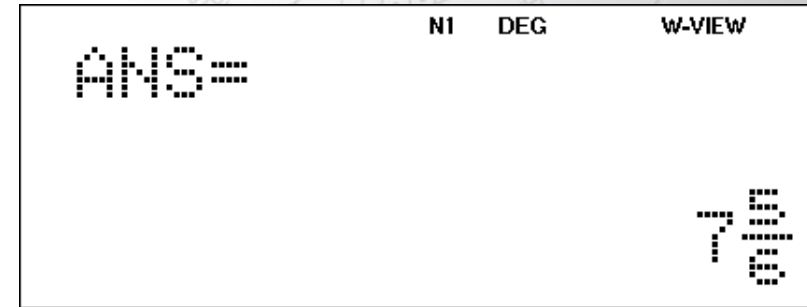
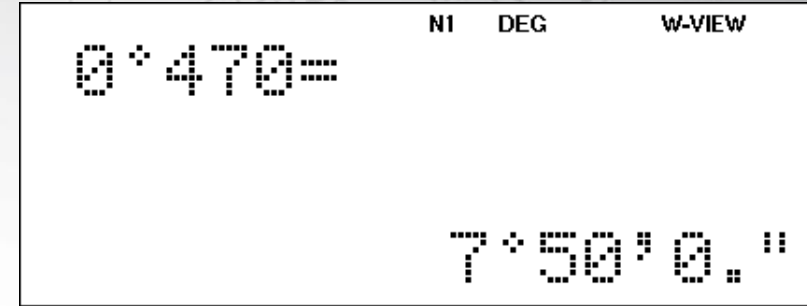
E.g. Ounces to grams

- 23 ounces:
- Press 23
- **2ndF** CNST
- Press  until you find
OZ → g
- Press 1 3 
- There are 44 different conversions.



DMS / Time Functions

- Changing minutes to hours
- E.g. How many hours are 470 minutes?
 - Press **ON/C** to clear any chain calculations
 - Press **0** **↔DEG D°M'S** **4** **7** **0** **=**
 - Press **2ndF** **↔DEG D°M'S** to change it into fraction or decimal format (remember to use your **DATA INS-D CHANGE** button).



DMS/ Time Functions

- Finding time in a speed-distance-time calculation.
- E.g. How long does it take to travel 450km at an average speed of 117km/h?

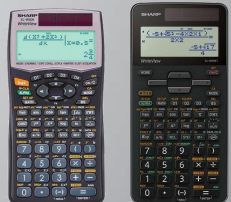
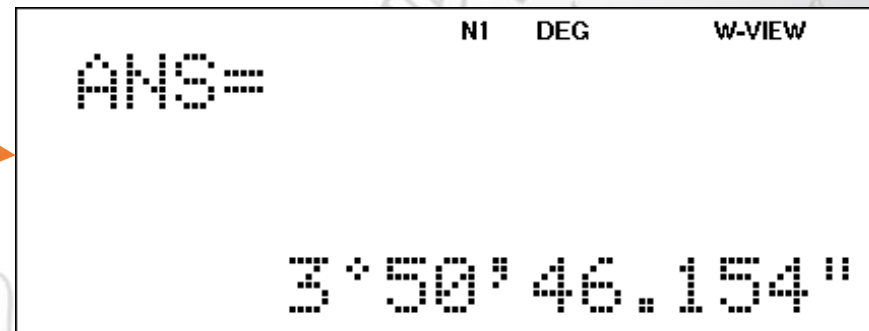
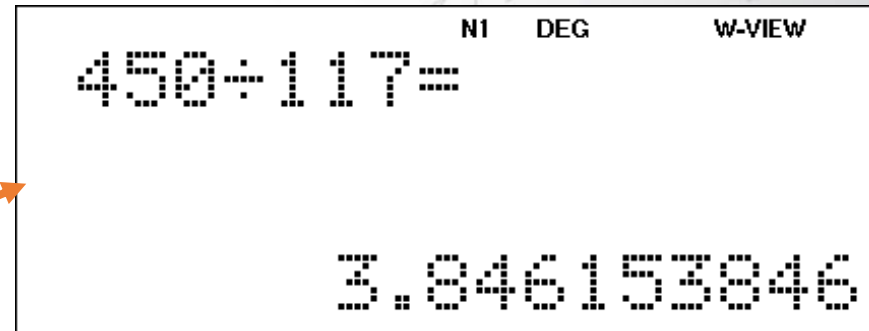
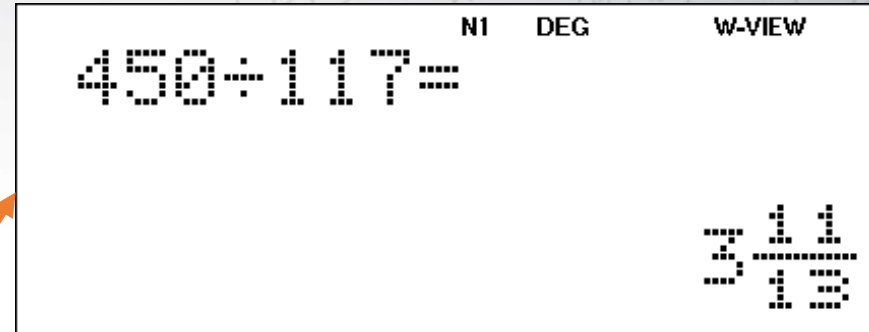
• Press **4** **5** **0** **÷**

1 **1** **7** **=**

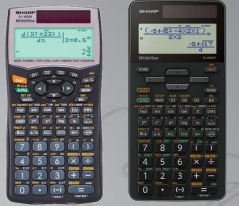
• Press **DATA INS-D CHANGE** **DATA INS-D CHANGE**

• Press **2nd F** **D°M'S**

- The answer is 3 hours, 50 minutes and 46.154 seconds.



DMS / Time Functions



- Adding / Subtracting Time
- E.g. find the length of time spent on a bus if the bus left at 9.45 and arrived at 12.32.

• Press **1** **2** **↔DEG** **D°M'S** **3** **2**
− **9** **↔DEG** **D°M'S** **4** **5** **=**

• The answer is 2 hours and 47 minutes

• To change back to a fraction notation press **2nd F** **↔DEG** **D°M'S**

NI DEG W-VIEW

$$12^{\circ}32' - 9^{\circ}45' =$$



$$2^{\circ}47'0.00''$$

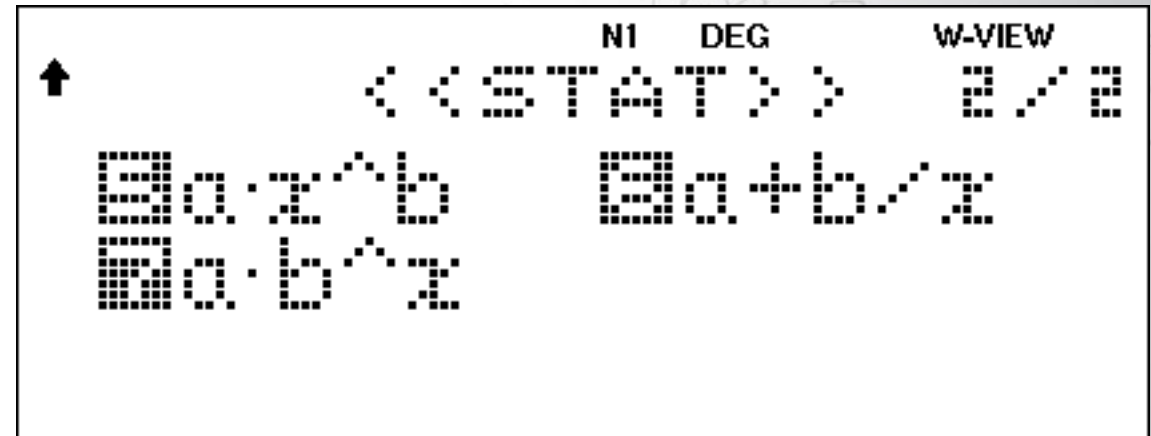
NI DEG W-VIEW

ANS=

$$2\frac{47}{60}$$

Statistics Mode

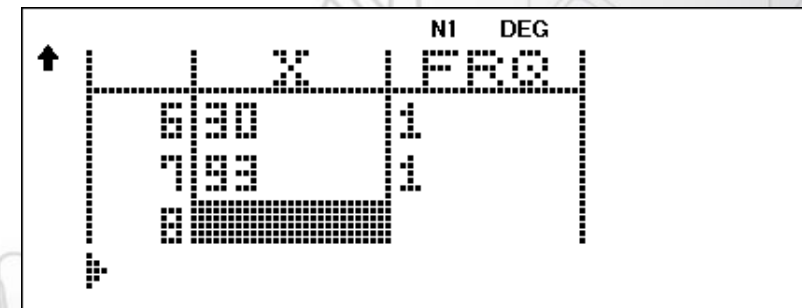
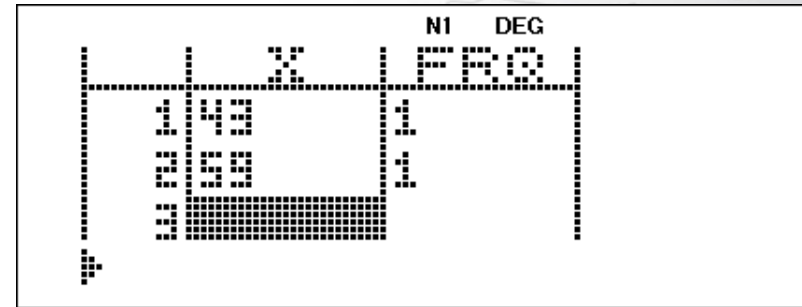
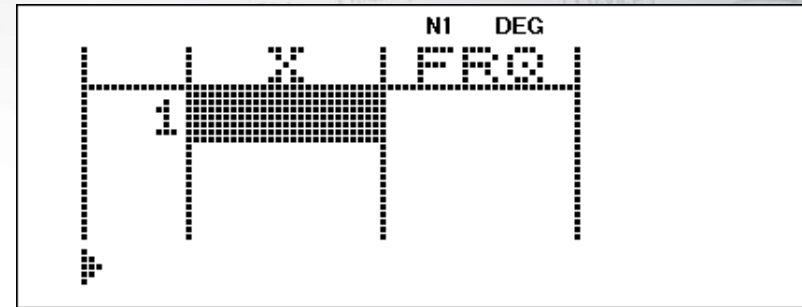
- Press  
- You have several options
 - 0: SD
 - Does statistical analysis for univariate data
 - 1: $a + bx$
 - Does statistical analysis for bivariate data
 - 2: $a + bx + cx^2$
 - Does statistical analysis for quadratic data
 - The rest of statistical analysis options are not relevant to students.





Univariate Data

- Press **CA** **MODE** **1** **0**
- Insert data by typing in the data point and pressing **=**
- E.g. Type in the data points below:

- Press **4** **3** **=**
- 5** **9** **=** **8** **4**
- =** **7** **2** **=**
- 6** **1** **=** **3** **0**
- =** **9** **3** **=**



- Press  to change the screen from the data table to the calculation screen.
 - You can also press  to go back to the data table.

- Press  

NI DEG

Stat 0[SD] 0.



NI DEG

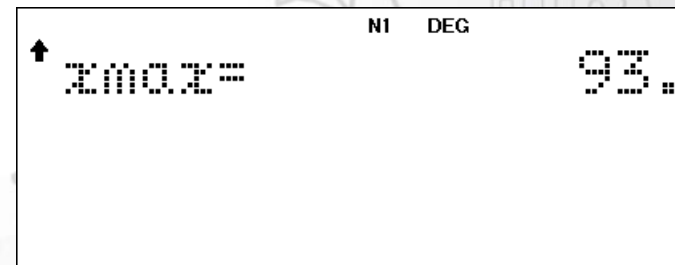
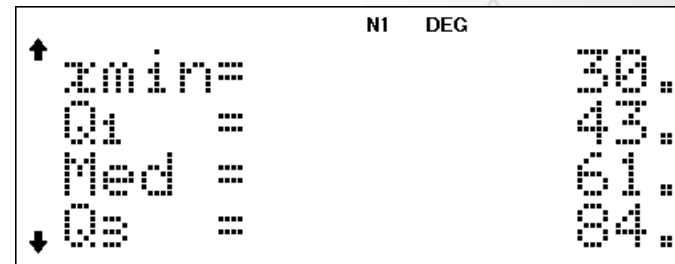
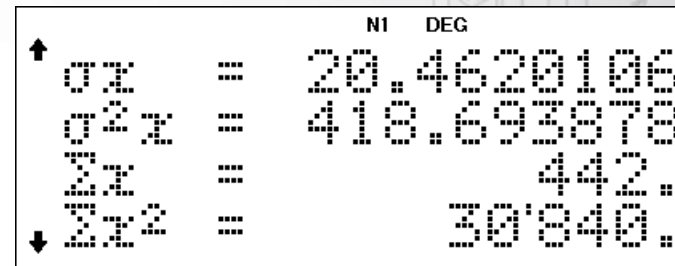
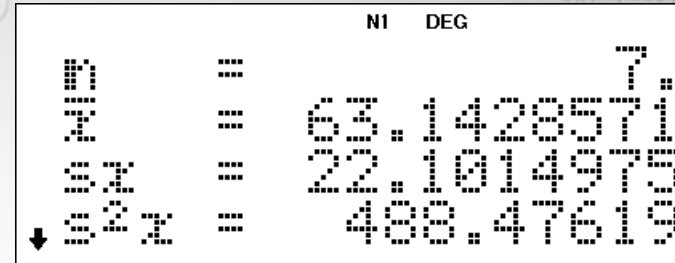
<STATISTICS> 1/2
 STATISTICS VAL
 ↓ VARIABLE

NI DEG

↑ <STATISTICS> 2/2
 SUM
 MIN/MAX(QUARTILE)

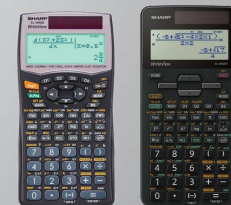
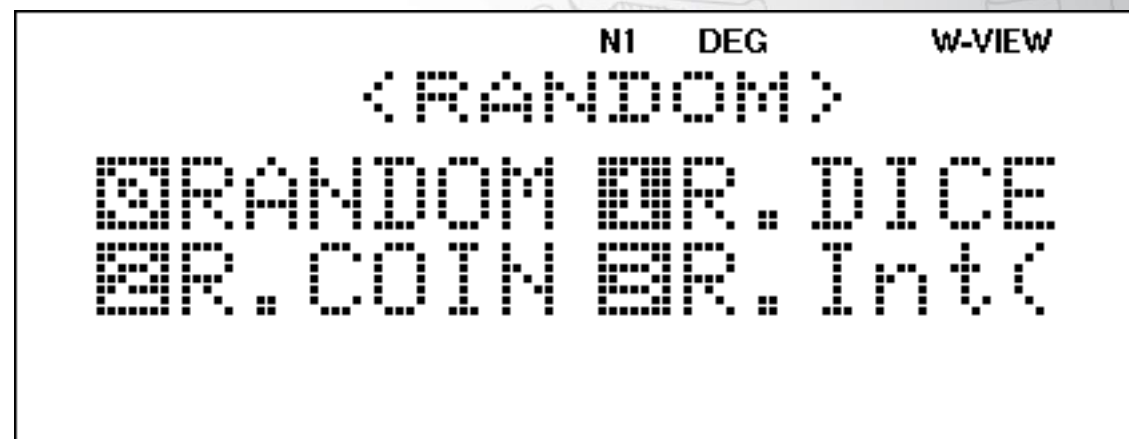
- 0: Statistics Val

- Gives the various values for the statistics.
- Press  to see each of the screens.
- Press  to clear away the statistics.



Probability

- Press **HOME**
- The random function:
- Press **2ndF** **7**
 - 0: Random
 - Random decimals between 0 and 1 to 3 decimal places
 - 1: R.Dice
 - Random numbers between 1 and 6
 - 2: R.Coin
 - Heads and Tails displayed as 0 or 1
 - R.Int(
 - Random whole number between any two numbers given



Playing the lottery

- Press **2ndF** **7**
- Choose **3**
- Type in **1**
- Then press **(x,y)**
- Type in **5** **2**
- Press **=** to generate the random numbers.

NI DEG W-VIEW
<RANDOM>
RANDOM R. DICE
R. COIN R. Int<

NI DEG W-VIEW
R. Int<_

NI DEG W-VIEW
R. Int<1_

NI DEG W-VIEW
R. Int<1;_

NI DEG W-VIEW
R. Int<1;52_

NI DEG W-VIEW
R. Int<1;52=
30.

NI DEG W-VIEW
R. Int<1;52=
22.

NI DEG W-VIEW
R. Int<1;52=
5.



Comments

- EL-W506T is the perfect calculator for AP and IEB maths curriculum
- Can be ordered in bulk from SMD directly at better than retail pricing.
- Available at Takealot, PNA, Loot, Makro and more!



Junior Calculator

- EL-W535SA – cheaper and 422 functions
 - Ideal for grade 7 – 9 students
- 500 000 calculators given to No-Fee school students in Gauteng by the department of education
 - With a 40% improvement between the pre- and post-tests after training.



Thank you for your valuable time!

Free worksheets and simulator:

www.mathsatsharp.co.za

