

Binary, Complex Numbers and the Other Things We Haven't Seen Before.

Technical Mathematics

SEARTEC 

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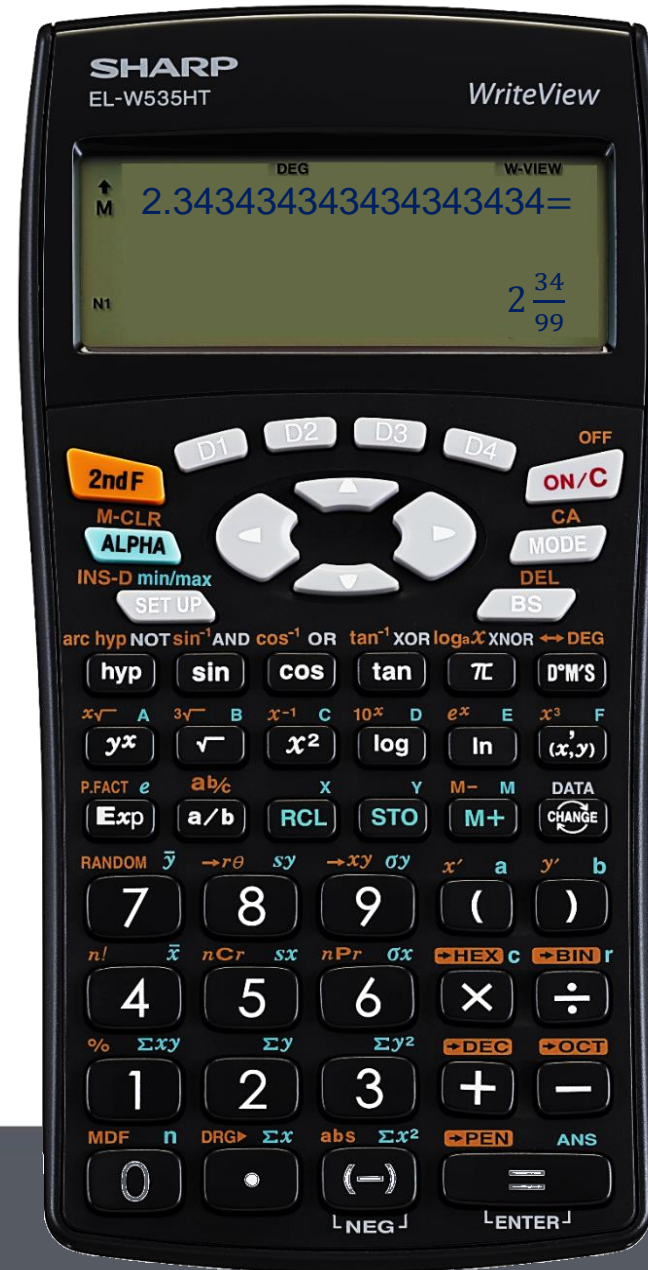
What's on the Agenda?

- Terminating and Recurring Decimals
- Surds
- Binary Numbers
- Complex Numbers
- Highest Common Factor and Lowest Common Multiple
- Factorising
- Trigonometry
- Radians

Terminating and Recurring Decimals

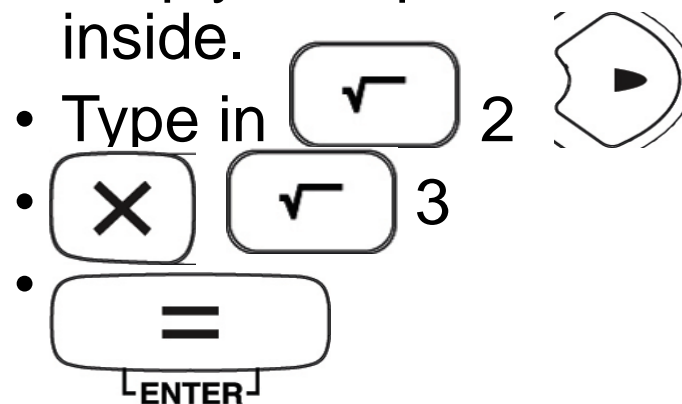
- Convert a recurring decimal to a fraction.
 - Type in the decimal and repeat the recurring part several times
 - E.g. 2.3434343434343434
- You can also type in the fraction and get back the decimal.

- E.g. 5 $\frac{\text{a/b}}{\text{99}}$ $\frac{\text{=}}{\text{ENTER}}$
- Press $\frac{\text{CHANGE}}{\text{CHANGE}}$



Surds

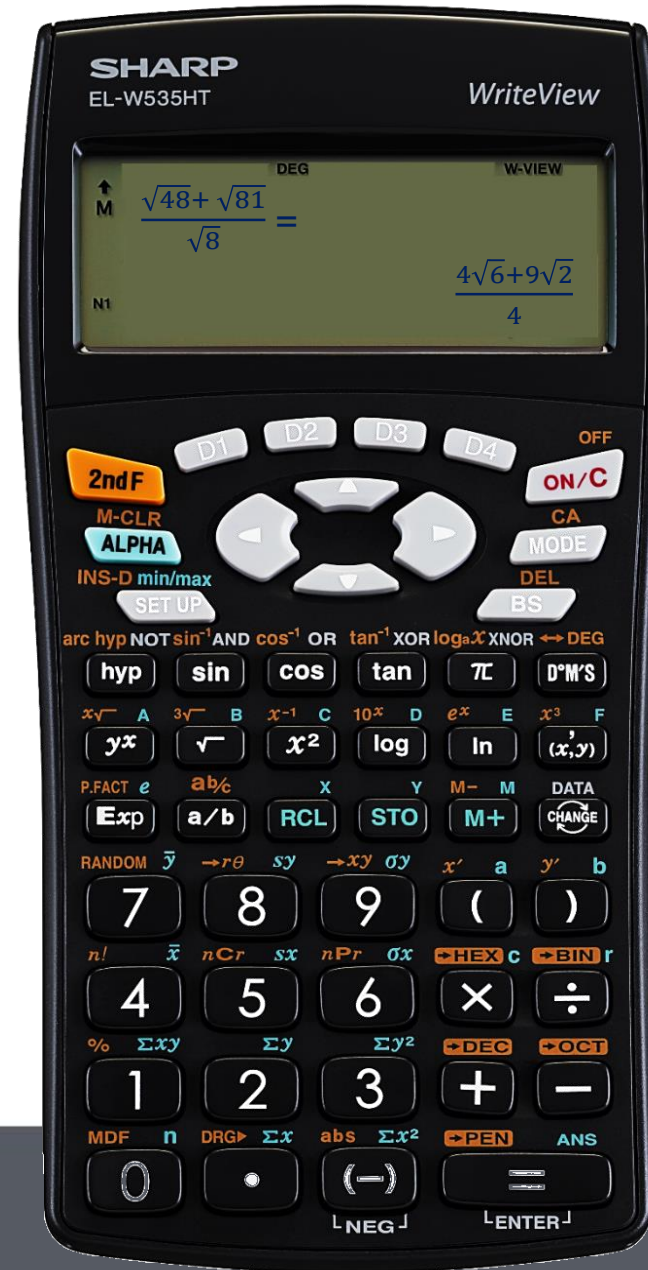
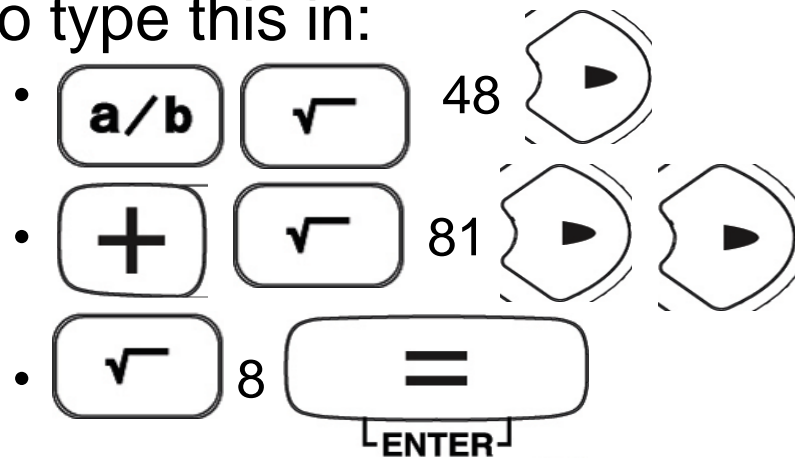
- You can teach surd rules using the calculator:
 - For example – a surd multiplied by another with the same root, simply multiplies the numbers inside.



- You can check your answers as well:


- E.g. $\frac{\sqrt{48} + \sqrt{81}}{\sqrt{8}}$

- To type this in:



Binary Numbers

- Changing from Decimal to Binary:

- E.g. 258 to binary is:
- Type in 258 **→BIN** r
- Press **2ndF** 

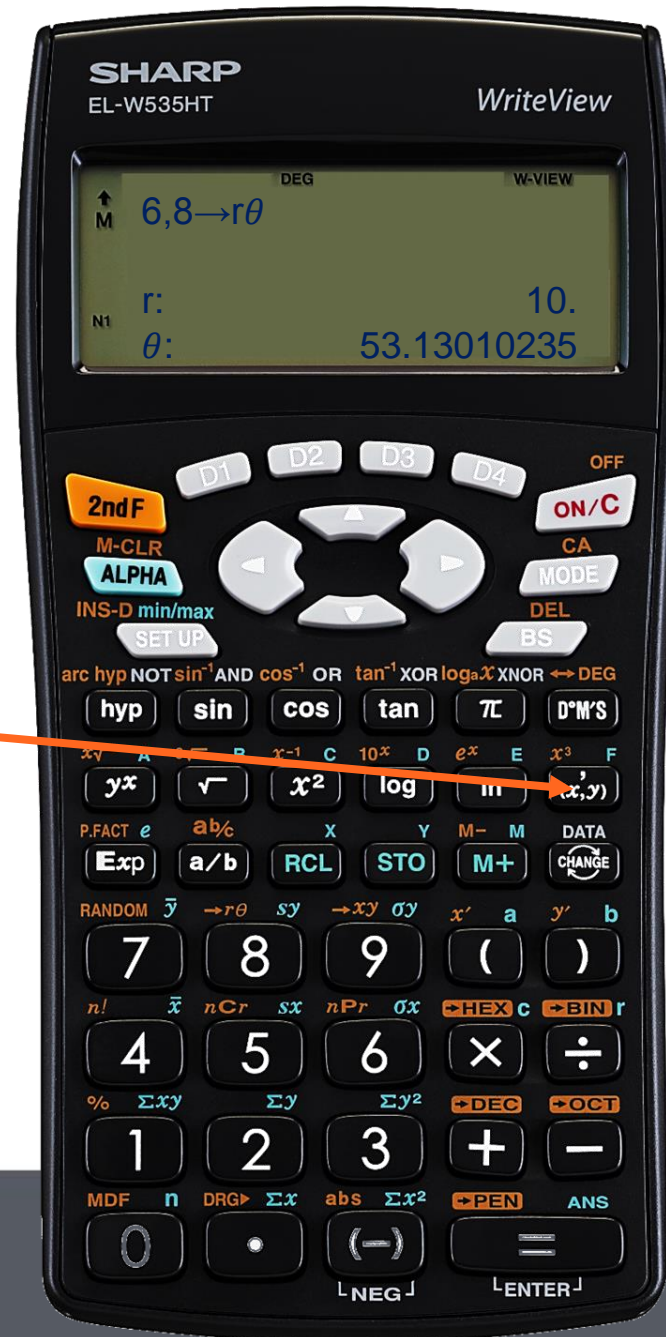
- Changing Binary back to decimal:

- Type in 10110 **→DEC**
- Press **2ndF** 



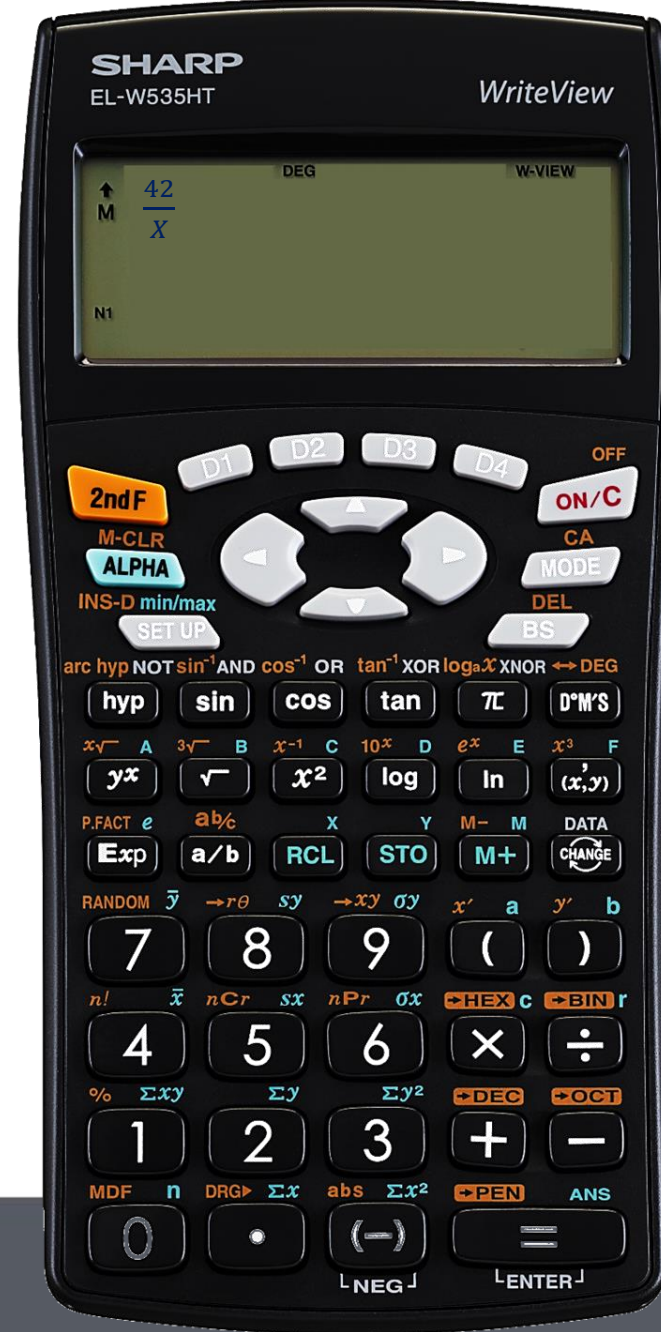
Complex Numbers - Pythagoras

- This only works if we are looking for the hypotenuse of a right-angled triangle.
- Type in the shorter sides (or x and y values) of the triangle, e.g. our triangle has sides 6 and 8, so we type in 6 then (x,y) .
- Now press **2ndF** $(\rightarrow r\theta)$ **8** (sy) .
- This gives us the hypotenuse (r) and the angle (θ) the hypotenuse makes with the base.



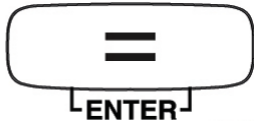
Factorising

- Press **MODE** 3
- Type in the number you would like to find all the factor pairs of – e.g. 42
- Press **a/b**
- **RCL** **RCL**
- **=**
ENTER



Factorising



- Leave your start at 0 so press



- Make your step 1 by typing in 1 and press



Factorising

- You should now have a table with the first line as 0 and - - -
- Use your  and  arrow keys to scroll through the table.
- Anything in the ANS column with a decimal is NOT a factor because it has a remainder.
- Your factors are 1 and 42, 2 and 21, 3 and 14, 6 and 7.



Factorising

- E.g. $x^2 + 14x + 48$
- Press **ON/C** twice.
- Type in the c value (48)
- Press **a/b** **RCL** **RCL**
- Press **=** three times
- Because the sign at the back is a plus, we add the two columns together.



Factorising

- So – 1 and 48 don't make 14
- 2 and 24
- 3 and 16
- 4 and 12
- 5 and 9,6 (not factors)
- 6 and 8



Factorising

- So now we put it into the brackets:
- $(x \quad)(x \quad)$
- $(x + 6)(x + 8)$

- Second example:
 - $x^2 - 9x - 36$



Factorising

- Because the sign at the back is a minus – we subtract the second column from the first column.
- So $- + 1 - 36$ doesn't give -9
- $+ 2 - 18$ etc
- $(x \quad)(x \quad)$
- $(x + 3)(x - 12)$



Trigonometry - Graphs

- Press **ON/C** twice
- Type in 3 **tan** **(**
- **RCL** **RCL**
- **+** 30 **)**
- **=**
- Leave start at 0 and press **=**
- Make step 15 and press **=**



Trigonometry – The D keys

- You can use these keys as shortcut keys. (Mode 0)
- For example: You can save \sin^{-1} into D1.

- Press



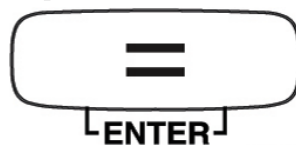
- **2ndF**



- To use it – press



- 1 **a/b** 2





Radians – Converting to Degrees, Minutes and Seconds

- Choose 1 for RAD
- Type in the radians to convert:
 - E.g. $\frac{\pi}{4}$
 - Then press **2ndF** **D°M'S**

[Super Awesome introduction to Radians 😊](#)



Don't forget the competition 😊

- Drill mode (Press **MODE** 2 0)
- Choose 25 questions (press )
- Choose + - x ÷ (press )
- Fastest time this week wins a microwave 😊



Thank you 😊

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