

Teaching Exponent Laws and Other Fun Tricks

Grade 7, 8, 9

SEARTEC 

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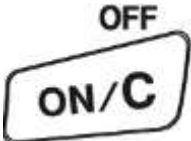

What's on the Agenda?

- Drill Mode
- Multiples and Factors
- Prime Factors, HCF and LCM
- Exponents
 - Squares, cubes and roots
 - Laws
- Fractions
- Percentages
- Pythagoras
- Time

Modes

- There are 4 different modes:
- Normal
 - Which has things like a shortcut for converting to class marks, a random function, prime factorization, shortcut for Pythagoras, etc.
- Stat
 - An easy to use statistics function – no long sequence of keys
- Drill
 - This allows students to practice their times tables and other math basic (addition, subtraction and division as well)
- Table
 - Allows a function to input and gives back coordinate pairs, but can also be used to find factors of a number and to teach financial maths.

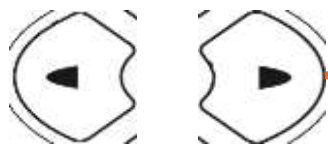
Drill

- Press 
- Press 
- And choose 2 for Drill
 - You have two options:
 - Math
 - Table




Choose 0 for Math

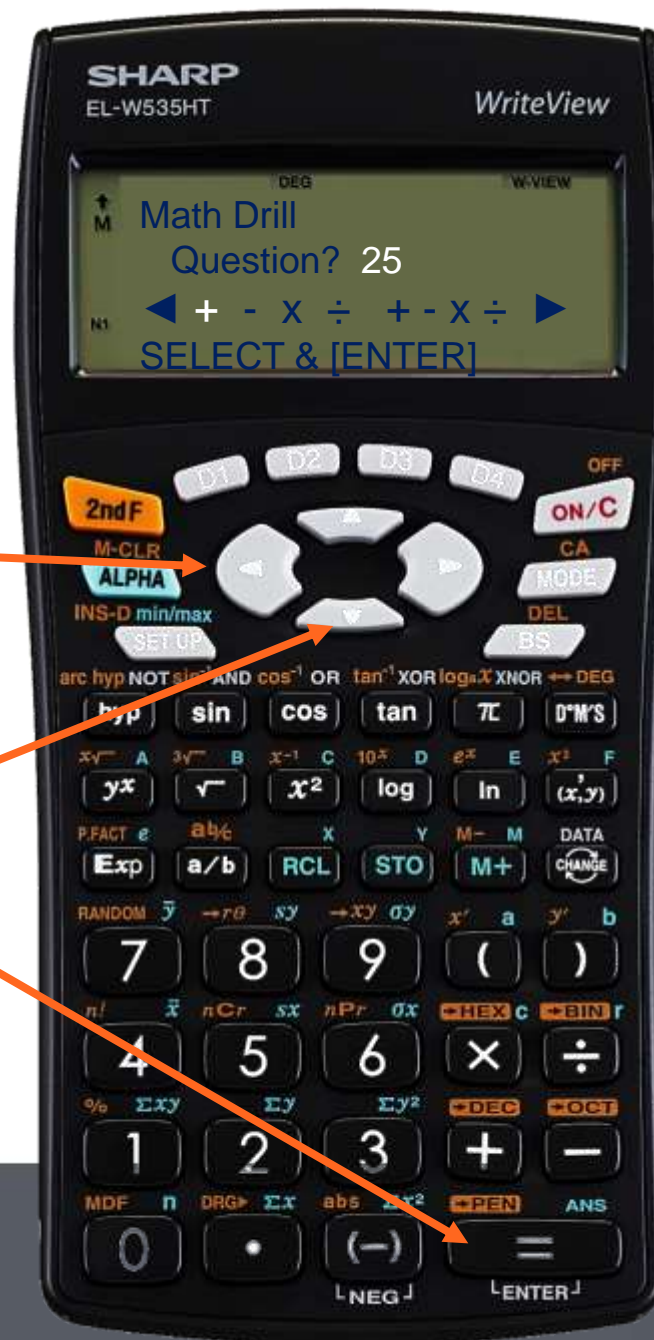
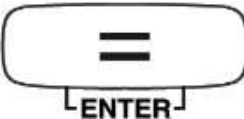
- Use your left and right arrows to choose between + , - , X, ÷, or + - X ÷.



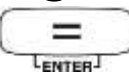
- Use your up and down arrows to choose between the different numbers of questions: 25, 50 or 100



- Press the  button when you are ready to start.



On your screen you should see:

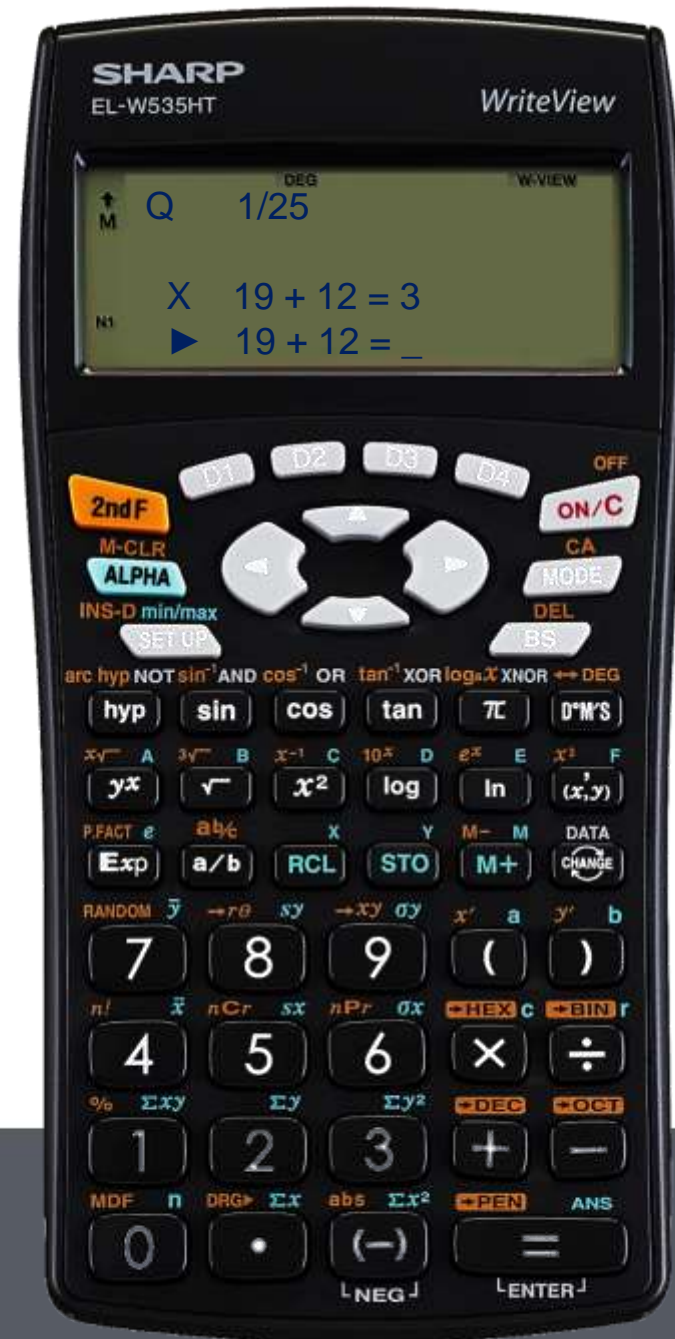
- Q 1/25
 - Means that you are on question 1 of 25 questions
- Your question may not be the same as the example because all the questions are generated randomly.
- Type in the answer to you question, e.g. mine would be 31 and press 
- If you are correct you will get a tick, if you are wrong, the question will be marked wrong and will be repeated again.



Correct answer



Incorrect answer



Multiples

- Press **MODE** 3
- Type in the number you would like multiples of – e.g. 17.
- Then press **RCL** **RCL**
- And **=** 3 times to get back to the table.
- Scroll down your table to see all the multiples!



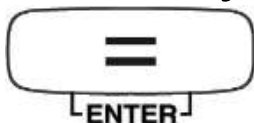
Factors

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

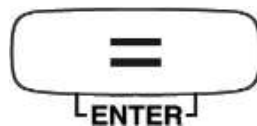


Factor Pairs Cntd.



- Leave your start at 0 so press



- Make your step (what you are counting in) 1 by typing in 1 and press




Factor Pairs Cntd.

- 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.



Remember that the - - - - line means that the answer is undefined 😊

Remember that you can go up the table
Press 
And look at the negative side of the number line as well

Prime Factors

- Press **MODE** 0
- Prime Factorisation
 - Type in the number you want to find prime factors of e.g. 42.

- Press **=**
ENTER
- Press **2ndF** **Exp**



How to find the LCM and HCF

- E.g. Given two numbers 42 and 63, what is their LCM and HCF?
 - Find the prime factors of 42 and 63

- $42 = 2 \times 3 \times 7$
- $63 = 3^2 \times 7$
- Line up the factors that are the same in the same columns and create new columns for each factor that doesn't match:
 - $2 \times 3 \times 7$
 - $3 \times 7 \times 3$
- That means our HCF is $3 \times 7 = 21$ and our LCM = $2 \times 3 \times 7 \times 3 = 126$ (This is our denominator).








Alternative method (After teaching exponents)

- $42 = 2 \times 3 \times 7$
- $63 = 3^2 \times 7$

- For the HCF find the bases that are common and keep the lowest exponent, so $\text{HCF} = 3^1 \times 7^1 = 21$

- For the LCM (or denominator), keep each base and the highest power of each base, so $\text{LCM} = 2^1 \times 3^2 \times 7^1 = 126$.

Exponents - Squares, Cubes and Roots

- E.g. $\sqrt{9} + \sqrt[3]{-27}$
- Press  9 
- 
-  
-  27
- 



Exponents

• E.g. $(-3)^3 + 4^2 - 7^4$

• Press $($ $(-)$ 3 $)$

• $2^{nd}F$ (x^y)

• $+$ 4 x^2

• $-$ 7 yx 4

• $=$
ENTER



Exponents - Laws









- Let's teach the multiplication exponent law – when multiplying with the same bases we add the exponent.
- So for example: $2^3 \times 2^4$
- Type in 2 y^x 3 \rightarrow
- \times 2 y^x 4 $=$
ENTER
- Now press **2ndF** **Exp**
- Which proves the rule 😊



Fractions

- Let's add a mixed number and improper fraction together:

- E.g. $\frac{5}{2} + 3\frac{3}{4}$

- Press  5  2
-   3  
- 3  4  [ENTER]

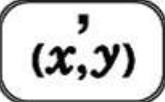





Percentages

- If we want to add 25% to 250 – there is a short cut.
- Type in 250
- $+$
- 25 **2ndF** $\frac{\%}{1}$
- The answer should be $312 \frac{1}{2}$



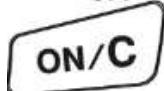

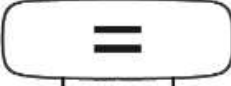


Pythagoras Shortcut!

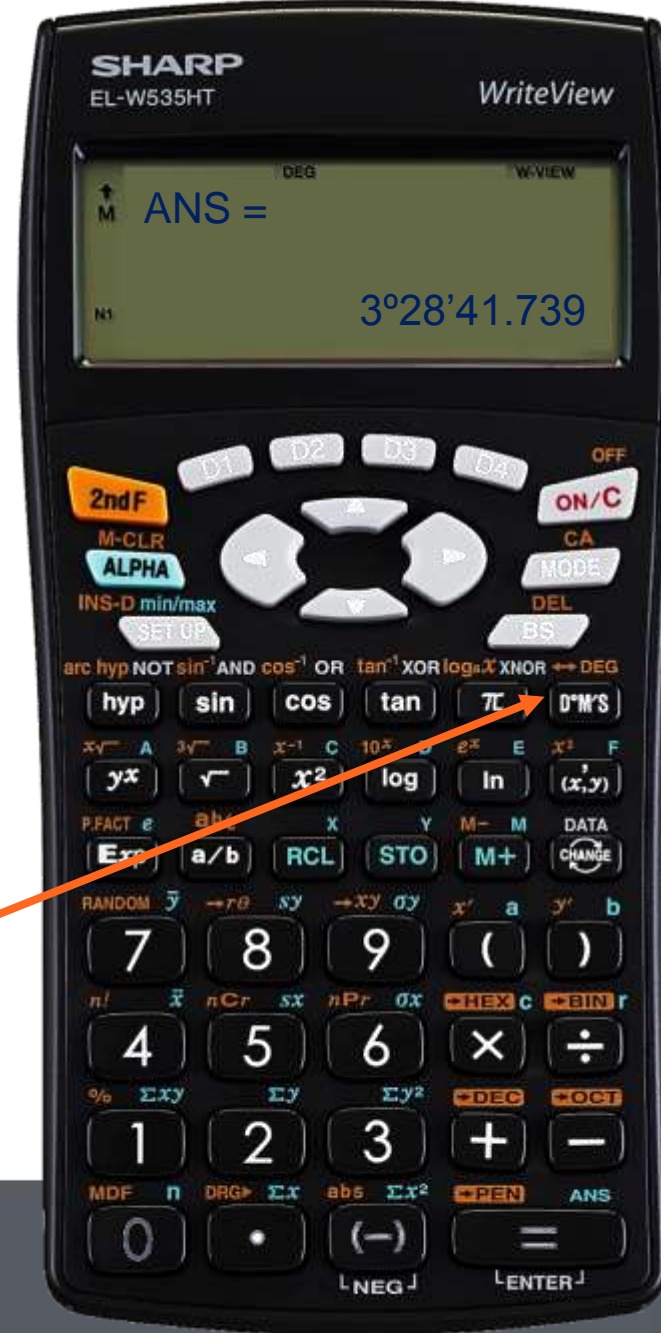
- This only works if we are looking for the hypotenuse of a right-angled triangle.
- Type in the shorter sides (or x and y values) of the triangle, e.g. our triangle has sides 6 and 8, so we type in 6 then  $\rightarrow r\theta$ 
- Now press  
- This gives us the hypotenuse (r) and the angle (θ) the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



Time calculations




- Speed, distance, time.
- To find time, for example – travel 400km at a speed of 115km/h, how long does it take?

- Press 
- 400 
- 115 
↳ ENTER
-  



Answer – 3
hours, 28
minutes and
41.739 seconds

Don't forget the competition 😊

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



Thank you 😊

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