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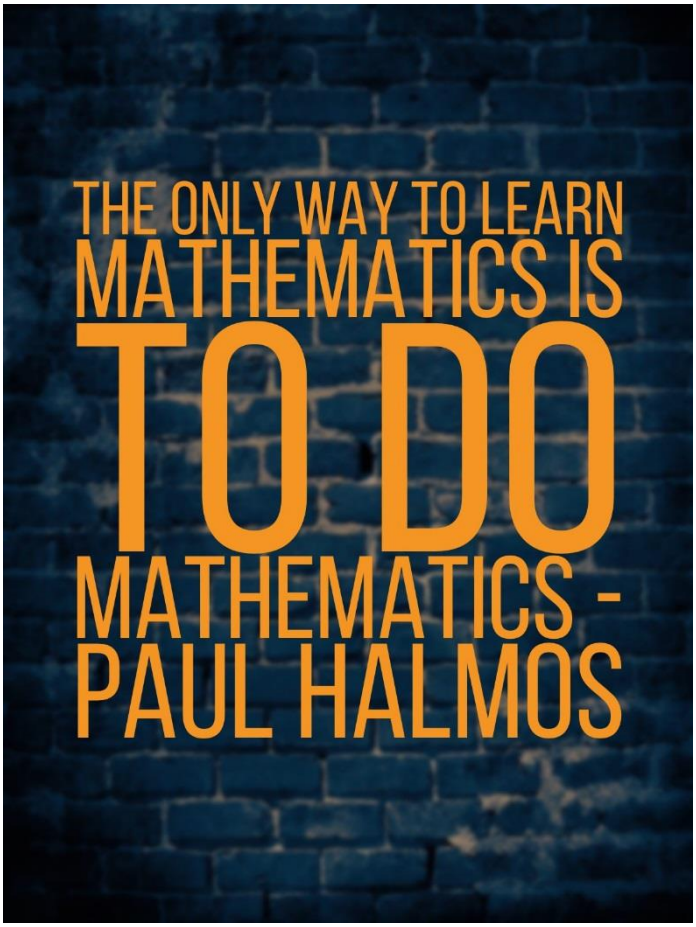
Student Mathematics workbook 2020



Student name

ENGINEERING UNITS WORKSHEET

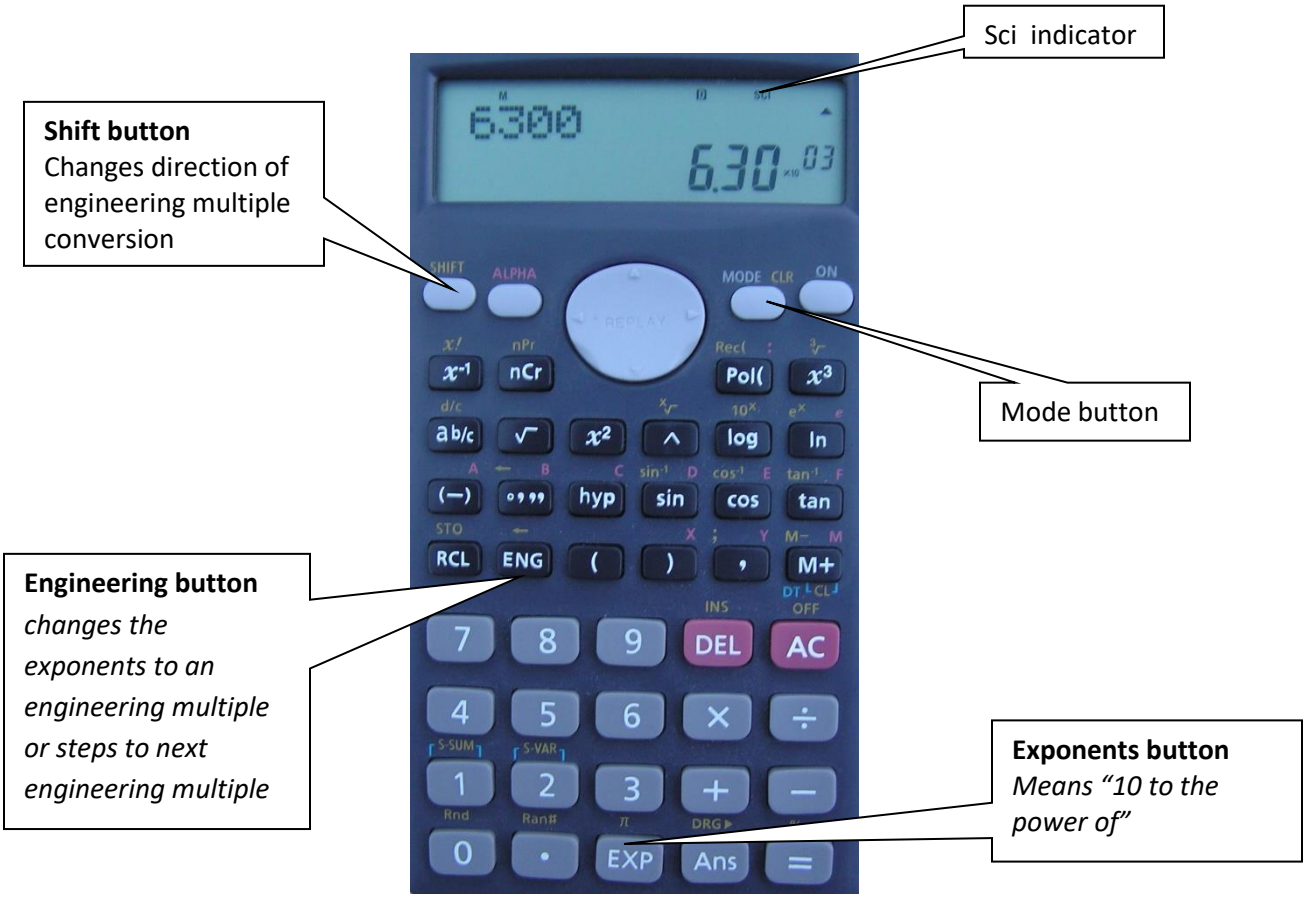
Engineering units worksheet

Calculator use

The casio fx-82MS can be set up for scientific notation by pressing the mode button 3 times. Select option 2 and then 3.
Scientific format should now appear on the screen and a small **sci** icon at the top of the screen. We are set up for engineering conversions now.

Obviously we need to know the scaling or multiples of the engineering values shown in line format below. We are constantly referring to this conversion chart and need to memorize it.

ρ	n	μ	m	unit	k	M	G	T
10^{-12}	10^{-9}	10^{-6}	10^{-3}	1	10^{3}	10^{6}	10^{9}	10^{12}
pico	nano	micro	milli		kilo	mega	giga	tera



Practically we would not ask for 3000mls of milk at the supermarket, instead we would say 3 litres. It means the same quantity but not appropriate.

A 0.006 metre drill bit sounds a bit silly too, but 6mm(the same size) is easier to understand.

Example A Converting 220000 volts to an appropriate engineering multiple would be easier to communicate values to another tradesman
Using the calculator check the sci indicator is on and write **220000 =**
2.20×10^{05} appears at the bottom part of the display. *This is now in scientific form*
Press the **ENG (engineering) button**.
The answer displayed changes to 220×10^{03} (*10^3 from the chart means kilo)*
So the appropriate value unit is 220 kilo and the accompanying unit is volts
220 kilovolts or kV
(Note the 220 is a number between 0 and 1000)

Example B Convert 120000ρF to microfarads.
From the chart we see ρ is 10^{-12}
Write 120000 exp –12 =
1.20×10^{-07} appears at the bottom part of the display.
Microfarads are 10^{-6} Farads so we want to see this unit displayed.
Press ENG
120×10^{-09} appears now rather than 10^{-6}
Press SHIFT then ENG
0.12×10^{-6} appears now which is 0.12 microfarads

Practice these methods to complete the chart below, paying attention to units.

Ordinary number	**Scientific notation**	**Engineering notation**	**Appropriate form**
220000v	2.2×10^5	220×10^3	220kV
0.0003Ω			
	5.67×10^{-4}		
			17kA
65000000000W			
	2.2×10^{-7}		
33000000V		33×10^6	
			92µA
	1.7×10^5		
0.000056F			
		2×10^{-9}	
			100TBytes
	4×10^2		
476A			
0.0000000009C			
	5×10^{12}		