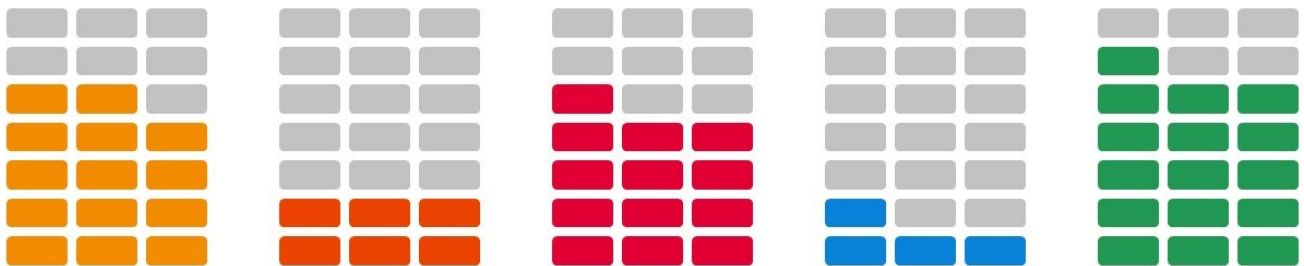


Study Skills Series

Numeracy for health and social care



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Numeracy: it is not as scary as you think

MATHS - it may be a small word but it often elicits fear and trembling among the most hardy of individuals. Being made to recite times tables, add up at speed in front of the class and worse yet, being humiliated by the teacher are just some of the terrible experiences people have suffered. Some individuals do have a condition called dyscalculia which is similar to dyslexia but involves numbers. This can be diagnosed through screening processes and managed with specific interventions. The College of Further Education can help with this.

However, love it or hate it, maths plays an important part in the health and social care of people. Completing drug calculations, monitoring fluid balance, calculating weight gain or loss, interpreting statistics, calculating ratios and monitoring trends are just some examples of how maths are used in practice. This leaflet will provide you with an overview of the main mathematical principles you will need to know to be able to undertake your role. In addition the Institute library has a number of texts which address this topic.

Multiplying and dividing decimals by units of 10,100,1000 etc.

You need to be able to do this to convert one SI unit into another

Multiplication of decimals

Multiply by	Move decimal point	Examples
10	1 place to the right	$1.4\text{cm} \times 10 = 14\text{mm}$ $2.23\text{cm} \times 10 = 22.3\text{mm}$
100	2 places to the right	$1.4\text{m} \times 100 = 140\text{cm}$ (Add 0s to help ie 1.40×100)
1000	3 places to the right	$1.4\text{m} \times 1000 = 1400\text{mm}$ (Add 0s to help ie 1.400×1000)

Divide by	Move decimal point	Examples
10	1 place to the left	$24\text{mm} \div 10 = 2.4\text{cm}$ $23.4 \div 10 = 2.34$
100	2 places to the left	$54\text{cm} \div 100 = 0.54\text{m}$ (Add 0s to help ie $054 \div 100$)
1000	3 places to the left	$22\text{mm} \div 1000 = 0.022\text{m}$ (Add 0s to help ie $0022 \div 1000$)

Multiplication of decimals

1.4×0.002 Does this look a bit tricky? Ignore the decimal points so that you are left with 14×2 which = 28

Now add up the number of digits on the right hand side of the decimal point for both of the original numbers ie 1 and 3 = 4. This total indicates the number of digits which should appear to the right of the decimal point of the final answer ie 0.0028

$0.8 \times 0.4 = 0.32$ quite straight forward?

Division of decimals

$3.2 \div 1.6$ Do you feel a cold sweat coming on? Okay firstly make the divisor a whole number, You do this by multiplying by 10,100, 1000 until the number is whole.

$1.6 \times 10 = 16$.

Next multiply the other number by the same amount, so in this case $3.2 \times 10 = 32$
Then perform the calculation $32 \div 16 = 2$, in this case don't worry about inserting decimal points, the answer is 2

Fractions

$3/4$ - where 3 is the numerator and 4 is the denominator

Simplifying—identify a common factor for both numerator and denominator i.e.

simplify $2/6$ by dividing both by 2 = $1/3$

$8/32$ can be simplified to $1/4$ by dividing both by 8.

Multiplying fractions

Involves the multiplication of the numerators together and the denominators together

$2/3 \times 1/4 = \frac{2 \times 1}{3 \times 4} = 2/12$ which when simplified is $1/6$

Division of fractions

Invert the divisor and multiply!

$1/4 \div 1/2$ (Looks horrible but it isn't really)

Since $1/2$ is the divisor, it becomes inverted to $2/1$

Then multiply $1/4 \times 2/1 = 2/4 = 1/2$

$3/10 \div 4/7 = ?$ (invert $4/7$ to $7/4$ then multiply)

$3/10 \times 7/4 = 21/40$ (3×7 and 4×10)

Changing decimals to fractions

How to change 0.4 to $4/10$ or $2/5$...

The numbers to the right of the decimal point denote the following $0.1 = 1/10$, $0.01 = 1/100$, $0.001 = 1/1000$

$0.4 = 4/10 = 2/5$

$0.12 = 12/100 = 3/25$

$0.125 = 125/1000 = 1/8$

Changing fractions to decimals

Divide the numerator by the denominator

$$3/8 = 3 \div 8,$$

You then need to complete long division

$$\begin{array}{r} | \\ 0.375 \end{array}$$

$$3/8 = 8 \quad 3.30 \quad 60 \quad 40$$

8 doesn't go into 3, put a 0 on the answer line.

The decimal point comes next, so put it next to the 0 on the answer line, put a small 3 before the 0 in the first decimal place

Next 8 goes into 30 (3x8 is 24, so 8 goes into 30

3 times but 6 remain) so put the 3 on the answer line and a small 6 before the 0 in the second decimal place.

Next 8 goes into 60 (7x8 is 56, so 8 goes into 60

7 times but 4 remain) so put the 7 on the answer line and a small 4 before the 0 in the third decimal place.

Finally 8 goes into 40 exactly 5 times. Put the 5 on the answer line.

Writing an answer correct to one decimal place

If the number in the second decimal place is 5 or more you round up if it is 4 or less the number stays the same.

0.82 rounded is 0.8

0.86 rounded is 0.9

Calculating drug dosages

Firstly take your time, and check with another person if ever unsure.

So how do you know how much to give? Use the following formula:

$$\text{Dose required} = \frac{\text{Strength required} \times \text{vol of stock available}}{\text{Strength available}}$$

$$\text{Or What we need} = \frac{\text{What we want} \times \text{the amount it comes in}}{\text{What we have}}$$

So if we need 500mg and the tablets are dispensed in 250mg doses

Strength required is 500mg. **Volume of stock** will be 1 as the drug is dispensed as individual tablets. **What we have** is 250mg tablets

$$\text{Dose} = \frac{500 \times 1}{250} = 2 \text{ tablets}$$

If we need 0.3mg of drug Z which is dispensed as 0.4mg/2mls.

$$\text{Dose} = \frac{0.3 \times 2}{0.4} = \frac{3 \times 2}{4} = \frac{6}{4} = 1\frac{1}{2} = 1.5 \text{ mls}$$

Note how I got rid of the decimals by multiplying both by 10, you can do this as long as you multiply the decimal at the bottom in the same way as the one at the top.