NUMERACY -
The Essentials

Learning Development Service

The following guide will provide an overview of the basic numeracy skills required for first year Nursing students.

If you experience difficulty in answering the sample questions, then please feel free to get in touch with us for tailored one-to-one support.

Contact Details:

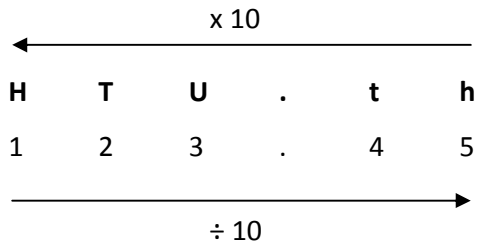**Tel:** 028 9097 2874   **Email:** tim.crawford@qub.ac.uk   **Web:** www.qub.ac.uk/sgc/learning

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1. Place Value

In any number each digit has a different place value. Going from left to right we have **H**undreds, **T**ens, **U**nits, **t**enths, and **h**undredths.

x 10 ←

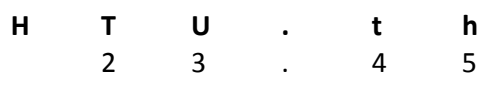| H	T	U	.	t	h
1	2	3	.	4	5

÷ 10 →

There are
10 hundredths in 1 tenth,
10 tenths in 1 unit,
10 units in 1 ten, and
10 tens in 1 thousand

The numbers AFTER a decimal point represent a fraction of 1

To move one column to the left e.g. Units to Tens, you x 10.
To move one column to the right, e.g. Hundreds to Tens, you ÷ 100

Example: if we multiply the following number by 10

H	T	U	.	t	h
	2	3	.	4	5

it becomes:

H	T	U	.	t	h
2	3	4	.	5	

Note what has happened to the **decimal point**. From 23.45 it has become 234.5, moving 1 place to the **right**.

The decimal point moves	1	place to the	**right**	when	**multiplying**	by	10
The decimal point moves	2	places to the	**right**	when	**multiplying**	by	100
The decimal point moves	3	places to the	**right**	when	**multiplying**	by	1000
The decimal point moves	1	place to the	**left**	when	**dividing**	by	10
The decimal point moves	2	places to the	**left**	when	**dividing**	by	100
The decimal point moves	3	places to the	**left**	when	**dividing**	by	1000

If you find this difficult to remember, then think of **L** for **less**, **L** for **Left**.

Ordering Numbers

To determine the highest number start from the left and go through each place value selecting the highest digit(s) until just one number is left.

1 5 . 1 8	1 5 . 1 8	1 5 . 1 8
1 4 . 9 4	1 4 . 9 4	
1 5 . 3	1 5 . 3	1 5 . 3 **15.3 is the highest number**
1 4 . 0 9	1 4 . 0 9	
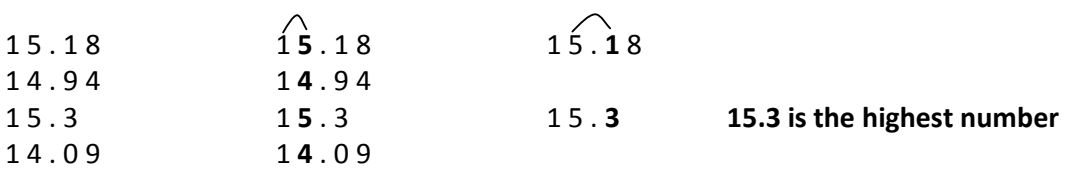
Examples to try; find the lowest number in the following questions:

(a)	(i) 87.87	(b)	(i) 0.23	(c)	(i) 624.01
	(ii) 87.97		(ii) 0.2		(ii) 642.01
	(iii) 88.07		(iii) 0.32		(iii) 624.0
	(iv) 88.1		(iv) 0.3		(iv) 624.1

2. Times Tables

✗	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

TIPS

Try learning by rote.

5 times tables always end in either 5 or 0

You can use your fingers for 9 times tables:

- Hold your hands in front of you with your fingers spread out.
- For 9 X 3 bend your third finger down. *(9 X 4 would be the fourth finger etc.)*
- You have 2 fingers in front of the bent finger and 7 after the bent finger
- Thus the answer must be 27!

One of the best interactive web resources for times tables is BBC Skillswise:

http://www.bbc.co.uk/skillswise/numbers/wholenumbers/multiplication/timestables/index.shtml

Examples to try; using the table above, calculate the following:

(a) 9 x 8   (b) 7 x 12   (c) 6 x 9   (d) 4 x 7   (e) 5 x 11   (f) 3 x 8   (g) 11 x 12

3. Addition

- Keep the decimal point in the same place.

- If you get a number greater than 10 then write down the number of units and carry the number of tens over to the next column on the left.

e.g.
```
  8 9
+₁1 5
1 0 4
```
9 + 5 = 14

write down 4 and carry the 1 over

Examples to try:

(a)
```
  3 7 . 4
+ 7 8 . 9
```
↑
Keep decimal point
in same place

(b)
```
INPUT:  I.V. Fluids    1 3 0 0
        Oral Fluids  +   2 7 5
```

(c)
```
OUTPUT:    Urine    1 2 5 0
           Vomit      1 0 0
           Wound  +    4 5
```

4. Multiplication

- Ignore the decimal point until the end. The rule is that you count the number of decimal places in your question and apply the same number to the answer.

- Carry over tens as before.

- If multiplying by a number with two or more digits, treat them separately, remembering to put one zero on the far right column when multiplying by tens, two zeros for hundreds etc.

e.g.
```
        4 . 2
      x 8 1
      ───────
        4 2
    3 3 6 0 ←── one zero is put down when multiplying by the 8
    3 4 0 . 2 ←── since there is one decimal place in the question, there should be one
                  same in the answer.
```

Examples to try:

(a) A patient is to receive 2.5 micrograms per kilogram. What dose is required if the patient weighs 79 kilograms?

(b) If one tablet contains 20 milligrams, how many milligrams would 4 tablets contain?

5. Subtraction

- Keep the decimal point in the same place.

- Borrow 1 from the column on the left if necessary.

  e.g. $^6\!7^1\!2$. $^1\!6$
  -    2 4 . 9
  _____
      4 7 . 7

Examples to try:

(a) Jamie weighed 4.2 kilograms at birth. By week 2 his weight had dropped to 3.8 kilograms. How much weight had he lost in grams?

(b) What is the difference in kg between 1.6 kilograms and 825 grams?

6. Division

- Keep the decimal point in the same place.

- Divide into each digit in turn, from left to right.   e.g. $8\,|\,1^1\!2^4\!0$
                                                                        $0\,1\,5$

- Carry over tens if applicable.

- If dividing by decimals then make into whole numbers by multiplying.

  e.g. $\dfrac{20}{3.2} = \dfrac{200}{32} = \dfrac{100}{16} = \dfrac{50}{8} = \dfrac{25}{4} = $ $4\,|\,2^2\!5\,.^1\!0^2\!0$
                                                                                    $0\,6\,.\,2\,5$

- Simplify fractions by halving (if even), or try ÷ by 3, 5, or 7. This should reduce the need for long division.

- Furthermore, the same number of zeros can be removed in top and bottom numbers in the fraction to aid simplification.

Examples to try:

(a) 225 ÷ 6
(b) 1500 ÷ 250
(c) 1000 ÷ 8

7. Combined

A baby is to be fed 75mL every 3 hours. How much is this per day?

24 ÷ 3 = 8   8 x 75 = 600mL

Examples to try:

(a) If 5mL contains 100mg, how many milligrams would there be in 20mL?

(b) If a patient is to receive 1500ml over 24hrs, how much is this in mL/hr?

8. Converting Weights

The following diagram can help remind you whether to x or ÷
Put in order from smallest to largest, then draw an arrow up with x 1000 beside it, and an arrow down with ÷ 1000 beside it.

<div>

÷ 1000 | nanograms ↑
micrograms
milligrams   x 1000
grams
↓ kilograms
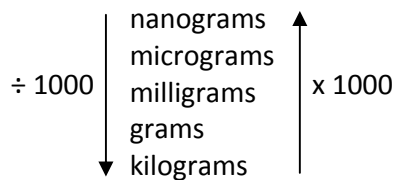
milligrams to micrograms = x 1000
grams to kilograms = ÷ 1000

e.g. 568 milligrams to grams = 568 ÷ 1000 (move 3 d.p. to left)
                                                    = 0.568
</div>

Examples to try:

(a) 45 grams to kilograms
(b) 0.75 grams to milligrams
(c) 0.025 milligrams to micrograms
(d) 650mL to litres

9. Fractions & Decimals

Learn the following fractions:

1/10 = 0.1	Therefore	6/10 = 6 x 0.1 = 0.6
1/5 = 0.2		4/5 = 4 x 0.2 = 0.8
1/4 = 0.25		3/4 = 3 x 0.25 = 0.75
1/3 = 0.33		2/3 = 2 x 0.33 = 0.66
1/2 = 0.5		

$$\frac{2}{5} \text{ of } 250 = \frac{2}{5} \times \frac{250}{1} = \frac{500}{5} = 100$$

When rounding decimals to 1 decimal place, look at the second d.p. and if it is 5 or above then round up, if less than 5 then keep it the same.

For example: 1.2**7**4 = 1.3   1.2**3**4 = 1.2

When adding decimals, keep d.p. in the same place.
When multiplying decimals, count the number of d.p.'s in the question and apply the same to the answer.

Examples to try:
(a) Find 4/10 of 42   (b) Find ¾ of 420   (c) Find 1/3 of 39.6   Write questions d, e & f correct to 1 d.p.
(d) 3.333   (e) 0.657   (f) 23.97

10. Basic Drug Calculations

Use the following formula:

$$\frac{\text{Dose required}}{\text{Dose available}} \text{ x } \frac{\text{Volume}}{1}$$

e.g.   240 milligrams is prescribed. The stock dose is 120 milligrams/5mL
What volume would you give?

Examples to try:

(a) 6 milligrams is required. Stock is 10 milligrams/4mL. What volume is required?
(b) A patient required 10000 units. Stock is 25000 units/mL. What volume is required?

11. Percentages

- Always out of 100
- As a decimal, 0.10 = 10%   0.60 = 60%   (use the hundredths column to determine value)

$$30\% \text{ of } 150 = \frac{30}{100} \text{ x } \frac{150}{1} = \frac{450}{10} = 45$$

Examples to try:
(a) Work out 20% of 65
(b) A patient is to receive IV Fluids over 8 hours. What % would be administered after 6hrs?
(c) How long would it take to administer 50%?

ANSWERS

1. Place Value
(a) (i) 87.87   (b) (ii) 0.2   (c) (iii) 624.0

2. Times Tables
(a) 72   (b) 84   (c) 54   (d) 28   (e) 55   (f) 24   (g) 132

3. Addition
(a) 116.3   (b) 1575   (c) 1395

4. Multiplication
(a) 197.5 milligrams   (b) 80 milligrams

5. Subtraction
(a) 400 grams   (b) 0.775 kilograms

6. Division
(a) 37.5   (b) 6   (c) 125

7. Combined
(a) 400 milligrams   (b) 62.5 mL/hr

8. Converting Weights
(a) 0.045 kilograms   (b) 750 milligrams   (c) 25 micrograms   (d) 0.65L

9. Fractions & Decimals
(a) 16.8   (b) 315   (c) 13.2
(d) 3.3   (e) 0.7   (f) 24.0

10. Basic Drug Calculations
(a) 2.4mL   (b) 0.4mL

11. Percentages
(a) 13   (b) 75%   (c) 4 hours