WORKSHOPS & TUTORIALS:

http://tiny.cc/ldubooking

VIDEOS:

http://www.YouTube.com/user/ellsmdx
http://www.YouTube.com/user/ldumdx
These videos are useful because you can play them over again.

BOOKS:

Gatford, JD. and Phillips, N. 2008. Nursing Calculations. Churchill Livingstone.
This is a good book to start with. It is easy to read and has lots of exercises to work from.

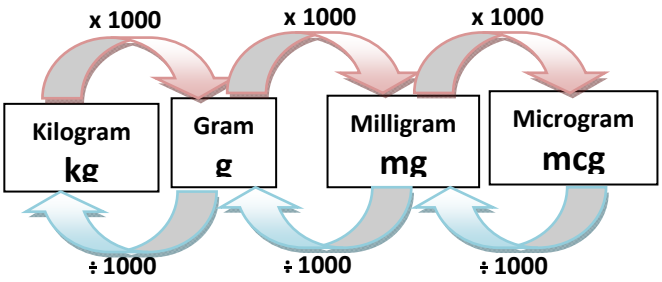
WEBSITES:

www.testandcalc.com
This site has nursing calculation quizzes with answers that you can access immediately – no need to download.

www.snap.nhs.uk
This site is free and has a mixture of numeracy and nursing calculation quizzes

EMAIL: numeracy@mdx.ac.uk

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



$$\textbf{\textit{Tablets/Capsules}} = \frac{prescription}{stock\ strength}$$

$$\textbf{\textit{Volume}} = \frac{prescription}{stock\ strength}\ x\ stock\ volume$$

DOSAGE BASED ON BODY WEIGHT

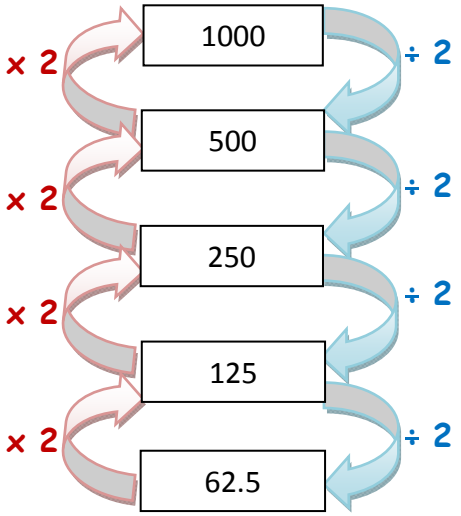
Total Daily Dose *= patient's weight x dose*

$$\textbf{\textit{Single Dose}} = \frac{Total\ Daily\ Dose}{Number\ of\ Doses}$$

INFUSION RATES

$$\text{mL/hr} = \frac{millilitre}{number\ of\ hours}$$

$$\text{drop/min} = \frac{mL}{hr}\ x\ \frac{drop\ factor}{60}$$



BIG to small multiply (x)

To multiply by	Move the decimal point
1000	3 places to the right
100	2 places to the right
10	1 place to the right
0.3824 x 1000 = 382.4	
0.3824 x 100 = 38.24	
0.3824 x 10 = 3.824	

Small to BIG divide (÷)

To divide by	Move the decimal point
1000	3 places to the left
100	2 places to the left
10	1 place to the left
5713 ÷ 1000 = 5.713	
5713 ÷ 100 = 57.13	
5713 ÷ 10 = 571.3	

$\frac{1}{5} = \frac{2}{10} = 0.2$ $\frac{2}{5} = \frac{4}{10} = 0.4$ $\frac{1}{2} = 0.5 = 50\%$ $\frac{1}{4} = 0.25 = 25\%$

$\frac{3}{5} = \frac{6}{10} = 0.6$ $\frac{4}{5} = \frac{8}{10} = 0.8$ $\frac{3}{4} = 0.75 = 75\%$ $\frac{3}{2} = 1.5 = 150\%$

You can cut and laminate these into pocket sized reminder cards

Easy Ways to Deal with Difficult Number Calculations

Halving fractions

This is really useful if you have large, even numbers.
If you halve the top number and then halve the bottom number as well you can get to the answer quite quickly without the need for 'school type' division.

Here's an example that works well

$$\frac{2000}{16} = \frac{1000}{8} = \frac{500}{4} = \frac{250}{2} = 125$$

Here's an example that doesn't work $\frac{2000}{19}$ why not?

Doubling fractions

This is good for getting rid of .5 in a fraction. If you double the top number and then double the bottom number as well you can then work with nice whole numbers.

Here's an example that works well

$$\frac{62.5}{12.5} = \frac{125}{25} = 5$$

Here's an example that doesn't work $\frac{62.6}{12.6}$ why not?

Moving the decimal point by multiplying by 10 or 100

This is useful when doubling and halving won't help. You can multiply the top and bottom number by 10 which will move the decimal point 1 place to the right.

Here's an example

$$\frac{0.6}{0.8} \; x \; \frac{10}{10} = \frac{6}{8} = \frac{3}{4} = 0.75$$

Here are 2 examples where you can multiply by 100

$$\frac{0.75}{0.25} \; x \; \frac{100}{100} = \frac{75}{25} = 3 \qquad \frac{0.75}{0.5} \; x \; \frac{100}{100} = \frac{75}{50} = 1.5$$

Using approximations

This is great if you are not sure where the decimal point should go. In fact it is a very important skill to learn as it can guide you to checking whether your answer is 'sensible'.

Here's an example

$$318.75 \div 1.97$$

Round these numbers to more simple, easy to work with ones to get an approximate answer $320 \div 2 = 160$

This is the 'rough guide' to your calculation.
The actual answer is 161.8 (1dp) so if you got 1.618 or 16.618 you know this is wrong and have the **decimal point in the wrong place**.

Here's another example 0.45×500

Round 0.45 to 0.5 and remember that 0.5 is a half ($\frac{1}{2}$)

Half of 500 = 250

The actual answer is 225 NOT 2.5 or 25.

Always check the decimal point.

Equations for Infusion Rates, Time and Volume (ml per hour)

R = the rate (speed) that fluid enters the patient's body, measured in ml/hour. V = the volume of fluid the patient is to receive (ml). T = running time for the infusion (hours).

Example: 1 litre of fluid is to be given over 8 hours. What is the rate in ml per hour?

$$R = \frac{V}{T} = \frac{mL}{hour}$$

$$\frac{1000\ mL}{8\ hours} = \frac{500}{4} = \frac{250}{2} = 125\ mL/hour$$

Example: A patient is to receive 1 litre of fluid at a rate of 125ml/hour. How long will this infusion take?

$$T = \frac{V}{R} = \frac{\cancel{mL}}{\cancel{mL}/hour} = \text{hours}$$

$$\frac{1000\ mL}{125\ mL/hour} = 8\ hours$$

Example: An infusion of fluid has been running for 8 hours at a rate of 125ml/hour. How much fluid has been infused?

$$V = R \times T = \frac{mL}{\cancel{hour}} \times \frac{\cancel{hours}}{1} = \text{ml}$$

125 x 8 = 1000 ml = 1 Litre

Infusion Rates

$$\frac{\mathbf{mL}}{\mathbf{hour}} \mathbf{x} \frac{\mathbf{drop\ factor}}{\mathbf{60}} = \frac{\mathbf{drops}}{\mathbf{minute}}$$

When the drop factor is 15 we have...

$$\frac{\mathbf{mL}}{\mathbf{hour}} \mathbf{x} \frac{\mathbf{15}}{\mathbf{60}} = \frac{\mathbf{drops}}{\mathbf{minute}}$$

$$\frac{\mathbf{mL}}{\mathbf{hour}} \mathbf{x} \frac{\mathbf{1}}{\mathbf{4}} = \frac{\mathbf{drops}}{\mathbf{minute}}$$

$$\frac{\boldsymbol{mL}}{\boldsymbol{hour}} \div \mathbf{4} = \frac{\boldsymbol{drops}}{\boldsymbol{minute}}$$

When the drop factor is 20 we have...

$$\frac{\mathbf{mL}}{\mathbf{hour}} \mathbf{x} \frac{\mathbf{20}}{\mathbf{60}} = \frac{\mathbf{drops}}{\mathbf{minute}}$$

$$\frac{\mathbf{mL}}{\mathbf{hour}} \mathbf{x} \frac{\mathbf{1}}{\mathbf{3}} = \frac{\mathbf{drops}}{\mathbf{minute}}$$

$$\frac{\boldsymbol{mL}}{\boldsymbol{hour}} \div \mathbf{3} = \frac{\boldsymbol{drops}}{\boldsymbol{minute}}$$

Drug Calculations Practice 1

1) You have 450 mcg of Digoxin, how many mg is this?

2) How many micrograms are there in 0.06 milligrams?

3) The doctor prescribes 500 mg of Flucloxacillin. The bottle you have contains 200 mg in 1 ml. How many ml do you give?

4) 1.5 g of Paracetamol is prescribed. The drug is available in 500 mg tablets. How many tablets do you give?

5) Mrs. X weighs 70 kg. It has been decided to give her 6mg/kg/dose of Ibuprofen. Work out the dose to be given.

6) Mrs. B needs Paracetamol, 20 mg/kg/day (in four divided doses). She is 46 years old and weighs 80 kg. Work out the single dose to be given.

7) A patient is given 1.5 litres of Dextrose 5% over 4 hours. How many grams of Dextrose do they receive?

8) A patient is given 1.5 litres of Dextrose 5% over 4 hours. What is the rate in ml per hour?

9) 600 ml of fluid is to be given over 4 hours. What is the infusion rate (drops per minute) if the drop factor is 15?

10) 2 litres of normal saline is to be infused in 10 hours. The giving set delivers 20 drops/ml. How many drops/min is this?

Drug Calculations Practice 1 - Answers

1) 0.45 mg

2) 60 mcg

3) $\frac{500}{200} = \frac{5}{2} = 2.5$ ml

4) 1.5 g = 1500 mg $\frac{1500}{500} = 3$ tablets

5) 70 x 6 = 420 mg

6) 20 x 80 = 1600 and $\frac{1600}{4} = 400$ mg

7) $\frac{1500\ x\ 5}{100} = \frac{15\ x\ 5}{1} = 75$ g

8) $\frac{1500}{4} = 375$ ml/hr

9) $\frac{600}{4}\ x\ \frac{15}{60} = \frac{150}{1}\ x\ \frac{1}{4} = \frac{150}{4} = 37.5$
Rounded up to 38 drops/min

10) $\frac{2000}{10}\ x\ \frac{20}{60} = \frac{200}{1}\ x\ \frac{1}{3} = 66.6$
Rounded up to 67 drops/min

Drug Calculations Practice 2

Convert these values:

1) 270 mcg to mg =

2) 7.6 g to mg =

Calculate the number of millilitres required:

3) Penicillin 60 mg prescribed, 100 mg dispensed in 5 ml

4) Phenergan 4 mg prescribed, 10 mg dispensed in 2 ml

5) Insulin 60 units prescribed, 20 units dispensed in 5 ml

Calculate the infusion rate:

6) 800 ml of dextrose to be given over 4 hours.
   a) What is the rate in ml/hour?
   b) What is the rate in drops per minute if the drop factor is 15?

7) 2 litres of saline to be given over 12 hours.
   a) What is the rate in ml per hour?
   b) What is the rate in drops /minute if the drop factor is 20?

Calculate the dose based on weight:

8) A baby is 2 days old and requires penicillin IV. She weighs 4kg and has been prescribed 3mg/kg/day in three divided doses. The penicillin comes as 5 mg in 1 ml.

   a) Work out the total daily dose for the baby.
   b) What is the single dose?
   c) How many ml should be given at each dose?

Drug Calculations Practice 2 - Answers

1) 0.27 mg

2) 7600 mg

3) $\frac{60\ x\ 5}{100} = 3$ ml

4) $\frac{4\ x\ 2}{10} = 0.8$ ml

5) $\frac{60\ x\ 5}{20} = 15$ ml

6) a) $\frac{800}{4} = 200$ ml/hr

b) $\frac{800}{4} x\ \frac{15}{60} = 200\ x\ \frac{1}{4} = \frac{200}{4} = 50$ drops/minute

7) a) $\frac{2000}{12} = \frac{1000}{6} = \frac{500}{3} = 166.6$

Rounded up to 167 ml/hr

b) $\frac{2000}{12}\ x\ \frac{20}{60} = \frac{2000}{12}\ x\ \frac{1}{3} = \frac{2000}{36} = \frac{1000}{18} = \frac{500}{9} = 55.5$

Rounded up to 56 drops/minute

8) a) 4 x 3 = 12 mg for the total daily dose

b) $\frac{12}{3} = 4$ mg for the single dose

c) $\frac{4}{5} = \frac{8}{10} = 0.8$ ml

Nursing Glossary

Most of these abbreviations originate from Latin, as it used to be the language of medicine.

3/12 old – 3 months old, as there are 12 months in a year
2/7 – for two days, as there are seven days in a week
4/52 – for four weeks, as there are 52 weeks in a year
BD – ***bis die*** – twice a day,
Crystalloids - are clear fluids such as saline or dextrose solutions.
gtt – ***guttae*** – drops
IM or i/m – ***intramuscular*** – directly into the muscle
IV or i/v – ***intravenous*** – directly into the vein
o.d. or OD – ***omne in die*** – once daily
o.m. or mane – ***omne mane*** – every morning
o.n. or nocte – ***omne nocte*** – every night
p.c. – ***post cibum*** – after meals
po – *per os* - by mouth or orally
post-op – ***post operative*** – after surgery
pre-op – ***pre operative*** – before surgery
prn – *pro re nata* – take as needed
qad – ***quaque alternis die*** - every other day,
qd – ***quaque die*** – every day
QDS – ***quater in die*** – four times per day
qh - ***quaque hora*** – every hour
SC or s/c – ***subcutaneous*** – under the skin
Stat – ***statum*** – immediately
TDD – total daily dose
TDS – ***ter die sumendus*** – three times daily

For more abbreviations please visit:

http://en.wikipedia.org/wiki/List_of_abbreviations_used_in_medical_prescriptions
http://www.jdmd.com/glossary/medabbr.pdf