

Dear Student:

As a faculty member of the Johns Hopkins University School of Nursing, we are pleased to welcome you to the School. In preparation for a key nursing course, Foundations of Nursing Practice, all students must enter with core knowledge of medication dosage calculation. In order to achieve a consistent level of knowledge within the student population, each student must purchase the medication dosage book noted below, study the chapters outlined, and complete the mathematics and medication problems at the end of each chapter. By doing so, you will become knowledgeable in the basics of dosage calculation.

During the course, the basic information you have learned will be expanded upon and presented in greater detail. Thus, it is important that you achieve a preliminary level of knowledge before additional information is presented. As you will see when reviewing the content of the book, this is an extensive subject area. However, much of the information is based on basic math and will only require drill and practice and, at times, some memorization to master.

### Book Purchase Information

The following book is required for purchase prior to the beginning of the semester:

Title: Henke's Med Math: Dosage Calculation Preparation and Administration, 8<sup>th</sup> edition

Author Susan Buchholz

Publisher: Lippincott Williams and Wilkins

ISBN: ISBN- 9781496302847

Publication date: 2016

List price: **\$79.95**

You may purchase the book at: <http://www.webmedbooks.com/hopkins/default2.aspx>

### Outline of Study

You are responsible for knowing the material presented in chapters 1 (review as needed), 2, 3, 4 5, 6, 7 and 8. You should be able to complete the practice problems in an accurate and timely fashion after studying these chapters. These chapters offer different mathematical approaches to solving dosage problems. While reading these chapters, evaluate the various methods presented. You may use any of these methods to solve the practice problems. Please know, however, that classroom presentation will focus on the

use of ratio and proportion as the primary method used to problem solve. I have enclosed standard conversion tables between the apothecary, metric, and household methods of measurement. **Those conversions preceded by an \*asterisk must be memorized, as they are commonly used in clinical practice.** You should be familiar with and comfortable using the remaining conversions; but, they do not require memorization. These conversions that do not have an asterisk will be made available to you during testing. Additional assistance is available with the online component of the package you are to purchase. This online material includes additional explanations, practice problems, and interactive exercises. I will put additional practice problems on our blackboard web site once you are at the SON.

There will be one dosage calculation assessment after the material is presented in class. The assessment will cover the content described in this letter as well as additional content that will be presented during class time. You must complete dosage calculation assessment with a 90% or greater. **The first grade on the dosage assessment counts as 15% of course grade. Students who receive less than 90% will need to retake the assessment. However, if you need to retake the dosage assessment to achieve a 90%, subsequent grades will not be factored in the course grade.**

Additional practice problems and answers are included in this packet. These problems are very similar to some of those you will encounter on the assessment; consequently, I encourage you to complete them, prior to starting the program and receiving new drug calculation content. A list of abbreviations is included for your convenience and you will need to memorize those also.

Please feel free to contact me at (410) 614-5299 if you have any questions or problems. I am looking forward to meeting you. Welcome to Foundations of Nursing Practice!

Sincerely,

Kathryn Kushto-Reese  
Course Coordinator

Approximate Equivalents in  
Household/Apothecary/Metric

Household

## Volume

*60 gtt.	=	1 tsp.
* 3 tsp.	=	1 tbs.
* 2 tbs.	=	1 oz.
* 8 oz.	=	1 cup
* 2 cups	=	1 pint
* 2 pts.	=	1 qt.
* 4 qts.	=	1 gal.

Often included in apothecary system

## Apothecary

### Volume

* 16 fluid	=	1 pint (pt.)
* 2 pts.	=	1 quart (qt.)
* 4 qts.	=	1 gallon (gal.)

### Weight

Basic unit of weight is the grain (gr.)

1 gr.	=	60 mg
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## Metric

### Volume

Basic unit of measurement = liter  
cc & ml can be used interchangeably  
\*1 cc. = 1 mL. = 1 g.  
\*1000 mL. = 1 L. = 1 kg.

### Weight

Basic unit of measurement  
= gram

*1000 mcg.	=	1 mg.
*1000 mg.	=	1 g.
*1000 g.	=	1 kg.

## Basic Unit of Length

Basic unit of measurement = meter

*1000 microns	=	1 mm.
*10 mm.	=	1 cm.
*1000 mm.	=	1 m.
*100 cm.	=	1 m.
*1000 m.	=	1 km.

## Common Approximate Weight Equivalents for Metric and Apothecary Systems

Metric                      Apothecary and Household

1 mg.	=	1/60 gr.
60 mg.	=	1 gr.
1 g.	=	15 gr.
4 g.	=	60 gr.
*30 g.	=	1 oz.
* 1 kg.	=	2.2 lbs.

Common Approximate Volume Equivalents for  
Metric and Apothecary and Household Systems

<u>Metric</u>	<u>Apothecary</u>	<u>Household</u>
* 5 mL.		*60 gtt. (1 tsp.)
* 30 mL.	*1 oz.	* 2 tbs. (6 tsp.)
240 mL.	8 oz.	1 cup
500 mL.	1 pt.	1 pt.
* 1000 mL.	*1 qt.	* 1 qt.

**\*\*\*\*\* BE SURE TO MEMORIZE THE EQUIVALENTS WITH THE \***

**ROMAN NUMERALS**

ARABIC NUMBER

ROMAN NUMERAL

1	=	i, $\bar{i}$ , I
2	=	ii, $\bar{ii}$ , II
3	=	iii, $\bar{iii}$ , III
5	=	v, $\bar{v}$ , V
10	=	x, $\bar{x}$ , X

**In an effort to prevent errors in interpretation, a line is sometimes drawn over the symbol in medicine.**

If a smaller value symbol precedes a larger value symbol, you subtract the value of the smaller symbol from the larger symbol.

Ex: IX = 9 OR ix = 9

If a smaller value symbol follows a larger value symbol, you add the value of the smaller symbol to the larger symbol.

Ex: XV = 15 OR xv = 15

**Tablets can be scored ( cut in precise halves) and if so can be given as 1.5tabs, 2.5 tablets, 3.5 tabs., etc.**

### Dosage and Solution Practice Problems

#### Apothecary System

1. 10cm = \_\_\_\_\_ mm.

2. 1 gr. = \_\_\_\_\_ mg.

Metric System

3. 800 mcg. = \_\_\_\_\_ mg.

4. 4 mg. = \_\_\_\_\_ g.

5. 0.065 g. = \_\_\_\_\_ mg.

6. 1500 g. = \_\_\_\_\_ kg.

7. 0.1L = \_\_\_\_\_ mL.

8. 675 mL = \_\_\_\_\_ L.

Metric to Apothecary

9. 3 mL. = cc. \_\_\_\_\_

10. 120mL = fl. oz. \_\_\_\_\_

11. 300mL = fl. oz. \_\_\_\_\_

12. 750mL = pt. \_\_\_\_\_

13. 2.5L = qt. \_\_\_\_\_

14. 45mg = gr. \_\_\_\_\_

15. 2kg. = lb. \_\_\_\_\_

16. 0.6g. = gr. \_\_\_\_\_

17. 30mg. = gr. \_\_\_\_\_

Apothecary to Metric

18. 2oz. = \_\_\_\_\_ mL.

19. gr.  $\overline{X}$  = \_\_\_\_\_ mg.

20. gr. 1/100 = \_\_\_\_\_ mg.

21. fl. oz.  $\frac{1}{4}$  = \_\_\_\_\_ mL.

22. fl. oz.  $\frac{\text{viii}}{\text{viii}}$  = \_\_\_\_\_ mL.

23. qt. 1 = \_\_\_\_\_ mL.

24. fl.oz . XII = \_\_\_\_\_ g.

### Conversion to Household

25. 4 tbs. = \_\_\_\_\_ fl. oz.

26. 5 mL. = \_\_\_\_\_ tsp.

27. fl. oz.  $\frac{\text{ii}}{\text{ii}}$  = \_\_\_\_\_ tsp.

28. 20 gtts. = \_\_\_\_\_ tsp.

### Dosage Problems

29. Order reads: Give prednisone 0.04 g. q.a.m. (every morning)

- On hand: 5 mg. tablets  
How many tablets would you give?
30. Order reads: Hydrodiuril gr.  $\frac{1}{10}$  (every day)  
On hand: 50 mg. tablets  
How many tablets would you give?
31. Order reads: Give gr. 1/300 of Levothyroxin now.  
On hand: 100 mcg. tablets  
How many tablets would you give?
32. Order reads: Thoraxine elixir 325 mg. Po (by mouth) q.i.d. (4 x a day).  
On hand: 100 mg./mL.  
How many mls. (or cc's) would you give?
33. On hand: Ferrous Sulfate (FeSO<sub>4</sub>) gr II / fl. oz.  
Order reads: FeSO<sub>4</sub> gr V.  
How many mLs. (or cc's) would you give?
34. On hand: Phenergan 25 mg/mL.  
Order reads: Give Phenergan gr.  $\frac{3}{4}$  I.M. (intramuscularly)  
now.  
How many mLs would you give?
35. On hand: Benadryl 50 mg/mL  
Order reads: Benadryl 30 mg I.M. now.  
How many mLs would you give?
36. On hand: Demerol 75 mg/cc  
Order reads: Demerol 50 mg. I.M. now.  
How many mLs would you give?

Answers Sheet to Dosage and Solution Problems

- |            |             |
|------------|-------------|
| 1. 100 mm. | 20. 0.6 mg. |
| 2. 60 mg   | 21. 7.5 mL  |



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|-----------------------------------|------------------------------------|
| 3. 0.8 mg.                        | 22. 240 mL.                        |
| 4. 0.004 g.                       | 23. 1000 or 960 mL.                |
| 5. 65 mg                          | 24. 360 g.                         |
| 6. 1.5 kg.                        | 25. fl. oz. $\overline{\text{II}}$ |
| 7. 100 mL.                        | 26. tsp. 1                         |
| 8. 0.675 L.                       | 27. 12 tsp.                        |
| 9. 3 cc                           | 28. tsp. 1/3                       |
| 10. 4 oz.                         | 29. 8 tablets                      |
| 11. fl. oz. $\overline{\text{X}}$ | 30. 2 tablets                      |
| 12. pt. $\overline{\text{I}ss}$   | 31. 2 tablets                      |
| 13. qt. $\overline{\text{II}ss}$  | 32. 3.25 mL.                       |
| 14. 3/4 gr                        | 33. 75 cc                          |
| 15. lb. 4.4                       | 34. 1.8 cc                         |
| 16. gr. $\overline{\text{IX}}$    | 35. 0.6 cc                         |
| 17. gr. $\overline{ss}$           | 36. 0.67 cc or 0.7 cc              |
| 18. 60 mL.                        |                                    |
| 19. 600 mg.                       |                                    |

### ABBREVIATIONS FOR MEDICATIONS

#### Routes of Administration

p.o.	by mouth
p.r.	by rectum
I.V.	intravenous
I.M.	intramuscular
ID	intra-dermal

#### Measurement

c.	= cup
cc	= a cubic centimeter
cm.	= centimeter
dr.	= dram
fl.	= fluid

top.	Topical
sl, SL	sublingual
SC, s.c.	subcutaneously
OD	right eye
OS	left eye
OU	both eyes

g,Gm	= gram
gr.	= grain
gtt.	= drop
kg.	= kilogram
L.	= Liter
m.	= meter
mEq.	= milliequivalent
mg.	= milligram
mL	= milliliter
m/M	= minim
mcg.	= microgram
oz.	= ounce
pt.	= pint
qt.	= quart
ss.	= one-half
t./tsp.	= teaspoon
T./tbs.	= tablespoon
℥	=oz.

### Types of Medication

tab	= tablet
cap	= capsule
gtts.	= drops
liq.	= liquid
sol.	= solution
elix.	= elixir
ext.	= extract
sup. or supp.	= suppository
tr./tinct.	= tincture
susp.	= suspension
amp.	= ampule
comp.	= compound

### Times for Medication Administration

a.c. – before meals	q.h.s. – every night at bedtime
asap – as soon as possible	q.i.d. – four times a day
b.i.d. – twice a day	q.sh. – every shift
h. – hour	stat – at once
h.s. – hour of sleep	t.i.d – three times a day
p.c. – after meals	
p.r.n. – as necessary	
q. – every	
q. a.m. – every morning	
q.h. – every hour	
q2h – every 2 hours	
q4h – every 4 hours	
every day	
every other day	

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