Med Math Review

PN Students: Use this resource guide to support your yearlong Med Math learning. It is a great introduction to the subject of dimensional analysis, and an excellent review of your knowledge base.

NUR201/220 Students: Use this resource guide as a refresher of Med Math and dimensional analysis. Use it as a supplement your classroom learning as you progress throughout NUR201/220, and prepare for NUR230.

Remember to make a tutoring appointment if you need assistance. Individually or in a small group setting, we want to help you succeed.

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PN Abbreviations and Equivalents

Abbreviations:

lb = pound	oz = ounce
gr = grain	gtt = drop
tbs (T) = tablespoon	mg = milligram
mL = milliliter	pt = pint
g = gram	dr = dram
L = liter	kg = kilogram
tsp (t) = teaspoon	qt = quart
mcg = microgram	

Approximate Equivalents:

1 gr = 60 mg

15 gr = 1 g = 1000 mg

1000 mcg = 1 mg

1 kg = 2.2 lb

1 mL = 15 minims

4 mL = 1 dr

5 mL = 1 tsp (t)

30 mL = 1 oz = 2 tbs (T) = 6 tsp (t) = 8 dr

500 mL = 1 pt = 16 oz

1000 mL = 1 L = 1 qt = 32 oz

Approximate Equivalents:

Metric		Apothecaries		Household
Dry				
60 mg	=	1 gr		
1 g	=	15 gr		
15 g	=	4 dr	=	1 tbs (3 tsp)
30 g	=	1 oz (8 dr)	=	1 oz (2 tbs)
		16 oz	=	1 lb
1 kg			=	2.2 lb
Liquid				
1 mL	=	15 - 16 minims	=	15 gtt
4 mL	=	1 dr		
5 mL	=	75 minims	=	1 tsp
15 mL	=	4 dr	=	1 tbs (3 tsp)
30 mL	=	1 oz (8 dr)	=	1 oz (2 tbs)
500 mL	=	16 oz (1 pt)	=	16 oz (1 pt or 2 cups)
1000 mL	=	32 oz (1 qt)	=	32 oz (1 qt)
Length				
2.5 cm			=	1 in
1 m			=	39.4 in

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Metric System

Worksheet #1

Change the following units of the metric system into the indicated equivalents:

1. 0.001 Gm= mg.
2. 1000 ml.= L.
3. 300 mg. = Gm.
4. 0.03 Gm.= mg.
5. 5 cc = ml.
6. 500 mg. = Gm.
7. 20 ml. = cc.
8. 1,000 mg= Gm.
9. 1,000 cc = L.
10. 15 mg.= Gm.
11. 0.002 L = ml.
12. 8 mg.= Gm.
13. 0.01 Gm. = mg
14. 500 ml. = L.
15. 0.005 Gm = mg.
16. 250 mg. = Gm.

Change the following milligrams to Grams:

1. 2,000 mg. = Gm.
2. 16 mg. = Gm.
3. 500 mg. = Gm.
4. 10,000 mg.= Gm.
5. 75 mg. = Gm.
6. 50 mg. = Gm.
7. 1.5 mg. = Gm.

Apothecaries and Household Systems

Worksheet #2

Change the following units of the apothecaries system into the indicated equivalents.

8 fl dr = _____ fl oz. 1m = _____ gtt

16 oz = pt. 60 m = fl dr

2 pt = qt.

Change the following units of the household system into the indicated equivalents.

1 T. = t. 1 pt. = oz.

1 qt. = pt. 1 oz. = T.

1 pt. = c 1 c = oz

1 gal = qt.

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Metric Apothecaries and Household Systems

Worksheet #3

Approximate Equivalents - Need to Memorize

1. 1 gr = mg
2. 1 t = ml
3. 1 kg = lb
4. 1 in = cm
5. 1 pt = ml
6. 1 GM = gr
7. 1 T = ml
8. 1 oz = T
9. 1 oz = ml
10. 1 pt = oz

DRUG CALCULATIONS REVIEW

Approximate Equivalents

1 gr = 60 mg
15 gr = 1 g = 1000 mg
1000 mcg = 1 mg = 0.001 g
1 kg = 2.2 lb
1 mL = 1 cc
4 mL = 1 dr
5 mL = 1 tsp
30 mL = 1 oz = 2 tbsp = 6 tsp
500 mL = 1 pt = 16 oz
1000 mL = 1L = 1 qt = 32 oz

What is Dimensional Analysis?

Dimensional analysis, also known as label factor method or unit-conversion method, is a computation method where one particular unit of measurement is converted to another unit of measurement by use of a conversion factor or factors.

Steps in Dimensional Analysis

1. Determining the starting factor and answer unit.
2. Formulating a conversion equation consisting of a sequence of labeled factors, in which successive units can be canceled until the desired answer unit is reached.
3. Solving the conversion equation by use of cancellation and simple arithmetic.

Starting factor x Conversion factor = Answer unit

Calculation of Medications Administered by the Oral Route (po)

Example - Order: Halcion 0.25 mg pt
Label: Halcion (triazolam) 0.125 mg/tab

Starting Factor = 0.25 mg
Answer Unit = tab
Equivalent: 0.125 mg = 1 tab

$$0.25 \text{ mg} \times \frac{1 \text{ tab}}{0.125 \text{ mg}} = 2 \text{ tabs}$$

Calculations of Medications Administered by the Oral Route (po) Based on Body Weight

Medication orders may be written in amounts for individual doses or for total daily (24 hr) dosage, in which case the total calculated dosage must be divided by the specified number of doses to be given. Our goal is to convert a particular quantity of weight to a corresponding quantity of medication.

Example – Order: Thiabendazole Suspension 25 mg/kg/24 hr po to an adult weighing 148 lb
Label: Thiabendazole Suspension 500 mg/5mL
How many mL should be administered?

Starting Factor = 148 lb
Answer Unit = mL
Equivalents: 2.2 lb = 1 kg
25 mg = 1 kg
500 mg = 5 mL

$$148 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{25 \text{ mg}}{1 \text{ kg}} \times \frac{5 \text{ mL}}{500 \text{ mg}} = 16.8 \text{ mL} = 17 \text{ ml}$$

Example – Order: Chloromycetin 50 mg/kg/day in four divided doses po to an adult Weighing 80 kg
Label: Chloromycetin (chloramphenicol) 250 mg/cap
How many capsules should be administered per dose?

Starting Factor = 80 kg
Answer Unit = cap
Equivalents: 50 mg = 1 kg
1 cap = 250 mg

$$80 \text{ kg} \times \frac{50 \text{ mg}}{1 \text{ kg}} \times \frac{1 \text{ cap}}{250 \text{ mg}} = \frac{16 \text{ caps}}{4 \text{ doses}} = 4 \text{ cap/dose}$$

General Info

One minute becomes the labeled value that must be converted to an equivalent value: number of drops.

Starting factor = one minute
Answer unit = drops

It is essential in calculating flow rate to know the drop factor. This is the number of drops required to make 1 mL. The rate of flow should be rounded to the nearest whole number.

Calculation of IV Flow Rate when Total Infusion Time is Specified

Example - Order: 1000 mL of D5W to infuse over a period of 5 hours
Drop Factor: 10 gtt/mL

Starting Factor = 1 min
Answer unit = gtt
Equivalents: 1000 mL = 5 hr
10 gtt = 1 mL
60 min = 1 hr

$$1 \text{ min} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{1000 \text{ mL}}{5 \text{ hr}} \times \frac{10 \text{ gtt}}{1 \text{ mL}} = 33.3 = 33 \text{ gtt/min}$$

Calculation of IV Flow Rate when an Infusion Rate is Specified

Example 1 - Order: 1500 mL of 0. 9%Sodium Chloride (NS) to infuse at a rate of 90 mL/hr
Drop Factor: 20 gtt/mL

Starting Factor = 1 min
Answer unit = gtts
Equivalents: 90 mL = 1 hr
20 gtt = 1 mL
60 min = 1 hr

$$1 \text{ min} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{90 \text{ mL}}{1 \text{ hr}} \times \frac{20 \text{ gtt}}{1 \text{ mL}} = 30 \text{ gtt/min}$$

Example 2 - Order: 1000 mL of D5 ½ NS to infuse at a rate of 100 mL/hr
Drop Factor: 60 gtt/mL

Starting Factor = 1 min
Answer Unit = gtt
Equivalents: 100 mL = 1 hr
60 gtt = 1 mL
60 min = 1 hr

$$1 \text{ min} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{100 \text{ mL}}{1 \text{ hr}} \times \frac{60 \text{ gtt}}{1 \text{ mL}} = 100 \text{ gtt/min}$$

NOTE: When using an infusion set having a drop factor of 60 gtt/mL, the flow rate per minute <u>always</u> will be the same as the number of mL per hour

Calculation of Infusion Time

When calculating infusion time, carry answers to hundredths and round to tenths. Convert to hour and minutes.

Example - Order: 1500 mL D5W IV
Drop Factor: 15 gtt/mL
Flow Rate: 40 gtt/min
How many hours will it take for the IV to infuse?

Starting Factor = 1500 mL (quantity that will be converted to time)
Answer Unit = hours
Equivalents: 15 gtt = 1 mL
40 gtt = 1 min
60 min = 1 hr

$$1500 \text{ mL} \times \frac{15 \text{ gtt}}{1 \text{ mL}} \times \frac{1 \text{ min}}{40 \text{ gtt}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 9.4 = 9 \text{ hr } 24 \text{ min}$$

NOTE: Convert the decimal to minutes by multiplying by 60

MANHATTAN AREA TECHNICAL COLLEGE
Medication Math NUR 102

Worksheet #1

1. D.O.: Vibramycin 100 mg p.o.
   Label: Vibramycin 50 mg/capsule

2. D.O.: Keflex 1 Gm p.o.
   Label: Keflex 250 mg/capsule

3. D.O.: Coumadin gr 1/6 p.o.
   Label: Coumadin 5 mg/tablet

4. D.O.: Phenergan Syrup 25 mg p.o.
   Label: Phenergan 6.25 mg/5 ml

5. D.O.: Mycostatin 1,000,000 u p.o.
   Label: Mycostatin 500,000 u/tab

6. D.O.: Digoxin Elixir 0.12 mg p.o.
   Label: Digoxin Elixir 0.05 mg/ml

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Worksheet #2

1. D.O.: Pavabid 400 mg po
   Label: Pavabid 0.2 gm/tablet

2. D.O.: Motrin 0.8 Gm po
   Label: Motrin 400 mg/caplet

3. D.O.: Furosemide 0.08 gm po
   Label: Furosemide 20 mg/tablet

4. D.O.: Tylenol Suspension 75 mg po
   Label: Tylenol Suspension 120 mg/tsp
   How many mL?

5. D.O.: Tenormin 500 mg po
   Label: Tenormin 0.25 g/tab

6. D.O.: Dilantin 300 mg po
   Label: Dilantin 125 mg/t

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Medication Math NUR 102

Worksheet #3

1. D.O.: Morphine Sulfate gr 1/6 I.M.
   Label: Morphine Sulfate 15mg/ml

2. D.O.: Vitamin K 15mg I.M.
   Label: Vitamin K 25mg/2.5ml

3. D.O.: Streptomycin 0.5 GM I.M.
   Label: Streptomycin 5 Gm in dry form
   Reconstitution: Add 9.0 ml of sterile water to yield 400mg/ml

4. D.O.: Penicillin G Benzathine 350,000u I.M.
   Label: Penicillin G Benzathine 1,000,000u/vial in dry form
   Reconstitution: Add 3.6ml of sterile diluent to yield 250,000u/ml

5. D.O.: Coumadin gr 1/6 p.o.
   Label: Coumadin 10mg/tablet

6. D.O.: Aspirin gr x p.o.
   Label: Aspirin 0.3 Gm/tablet

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Worksheet #4

1. D.O.: Demerol 45mg I.M.
   Label: Demerol 50mg/ml tubex

2. D.O.: Atropine Sulfate gr 1/100 I.M.
   Label: Atropine Sulfate 0.6mg/ml

3. D.O.: Ampicillin 125mg I.M.
   Label: Ampicillin 500mg - multiple dose vial
   Reconstitution: Add 1.8 ml of sterile diluent to yield 250mg/ml

4. D.O.: Penicillin G Sodium 350,000u I.M.
   Label: Penicillin G Sodium 1,000,000 u/vial in dry form
   Reconstitution: Add 4.6ml of sterile diluent to yield 200,000 u/ml

5. D.O.: Kantrex Injection 15mg/kg/day I.M. in 4 divided doses to an adult weighing 180 lb.
   Label: Kantrex Injection 1 Gm/3ml

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Worksheet #5

1. D.O.: Aldomet 250 mg p.o.
   Label: Aldomet 1 Gm/tab (scored)

2. D.O.: Morphine Sulfate gr 1/8 IM
   Label: Morphine Sulfate 30 mg/ml

3. D.O.: Fentanyl Citrate Injection 0.05mg IM
   Label: Fentanyl Citrate Injection 100mcg/2ml

4. D.O.: Prostaphlin 150 mg IM
   Label: Prostaphlin 0.5 Gm/vial in dry form
   Reconstitution:Add 2.7 ml sterile water to yield 250mg/1.5ml

5. D.O.: Kantrex 15mg/Kg/day in 2 divided doses IM
   Label: Kantrex 75mg/2ml
   Weight: 22 lbs.

6. D.O.: Vibramycin 2 mg/lb in 2 divided doses p.o.
   Label: Vibramycin Syrup 50mg/5ml
   Weight: 40 Kg

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Worksheet #6 Peds

1. D.O.: Amoxicillin 30mg/kg in 3 divided doses p.o.
   Label: Amoxil 250mg/tsp.
   Weight: 25 lbs.

2. D.O.: Gentamycin Sulfate 18mg/kg in 4 divided doses IM
   Label: Gentamycin Sulfate 40mg/ml
   Weight: 10 kg

3. D.O. Tylenol 5mg/kg/dose p.o.
   Label: Tylenol 120mg/t.
   Weight: 28 lb.

4. D.O.: Benadryl 5mg/kg in 3 divided doses p.o.
   Label: Benadryl 12.5mg/t
   Weight: 30 kg

5. D.O.: Erythromycin 10mg/kg/dose p.o.
   Label: Erythromycin 200mg/5cc
   Weight: 22 lbs

6. D.O. Cleocin 8mg/kg in 4 divided doses p.o.
   Label: Cleocin 75mg/t.
   Weight: 44 lbs

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Worksheet #7 Peds

1. D.O.: Ampicllin Oral Susp 50 mg / kg in 4 divided doses p.o.
   Label: Ampicillin Oral Susp 250 mg / tsp.
   Weight: 25 lbs.

2. D.O.: Gantrisin Pediatric Susp 150 mg / kg in 4 divided doses p.o.
   Label: Gantrisin Pediatric Susp 0.5 gm / tsp
   Weight: 10 kg

3. D.O. Tylenol 5 mg / kg / dose p.o.
   Label: Tylenol 120 mg / t.
   Weight: 15 lb.

4. D.O.: Benadryl 5 mg / kg in 3 divided doses p.o.
   Label: Benadryl 12.5 mg/ 5 ml
   Weight: 18 lb.

5. D.O.: Biaxin Oral Susp 15 mg / kg / day in 2 divided doses p.o.
   Label: Biaxin Oral Susp 125 mg / tsp
   Weight: 22 lbs

6. D.O. Cleocin 8 mg / kg in 4 divided doses p.o.
   Label: Cleocin 75 mg / 5 ml
   Weight: 28 lbs

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Practice Quiz #1

1. Doctor's Order: Demerol 20 mg p.o.
   Drug Label: Demerol 50 mg/ml

   How many ml's should be administered?

2. Doctor's Order: Ampicillin 375 mg p.o.
   Drug Label: Ampicillin 500 mg / tsp

   How many ml's should be administered?

   Doctor's Order: Coumadin gr 1/3 p.o.
   Drug Label: Coumadin 10 mg/tablet

   How many tablets should be administered?

4. Doctor's Order: Aspirin gr v p.o.
   Drug Label: Aspirin 0.3 Gm/tab

   How many tablets should be administered?

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Practice Quiz #2

1. Doctor's Order: Penicillin 50mg/kg/day in 4 divided doses
   Drug Label: Penicillin Suspension 250mg/ml
   Child's Weight: 55 lbs

   How much will you give?

2. Doctor's Order: Keflin 500mg IM
   Drug Label: Keflin 1 Gm
   Reconstitution: Add 5ml sterile diluent to yield 0.5Gm/2.2 ml

   How much will you give?

3. Doctor's Order: Morphine Sulfate gr 1/8 IM
   Drug Label: Morphine 15mg/ml

   How much will you give?

4. Doctor's Order: Humatrope 0.06 mg/kg/day IM
   Drug Label: Humatrope 5mg/4ml
   Child's Weight: 12.2 kg

   How much will you give?

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Worksheet #1

1. Doctor's order: 1500 ml of D 5 W @ 150 ml/hr
   Drop factor: 10 gtt/ml

   How many gtts/minutes should this IV infuse?

2. Doctor's order: 1000 ml D 5 1/2 NS @ 75 ml/hr
   Drop factor: 15 gtt/ml

   How many gtts/minutes should this IV infuse?

3. Doctor's order: 2500 ml D 5 W to infuse over 12 hours
   Drop factor: 10 gtt/ml

   a. What should the initial flow rate be?

   b. After the IV has been running for 8 hours, there are still 1000 ml left to infuse. What should the adjusted flow rate be to complete infusion on schedule?

4. Doctor's order: 3000 ml D 5 RL in 24 hours
   Drop factor: 10 gtt/ml

   a. What should the initial flow rate be?

   b. After 20 hours, 375 ml remain. What should the adjusted flow rate be?

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Worksheet #2

1. IV order: 1,000 ml of D5W over 6 hrs.
   Drop factor: 15 gtt / ml

   How many gtts should be administered per minute?

2. IV order: 500 ml of D 5 RL
   Drop factor: 60 gtt / ml
   Flow rate: 30 ml / hr

   How many gtts should be administered per minute?

3. IV order: 1000 ml LR to be followed by 2,000 ml D 5 W to run in 24 hrs.
   Drop factor: 10 gtt / ml

   How many gtt should be administered per minute?

4. IV order: 2,500 ml of D 5 1/4 NS to infuse for 24 hrs.
   Drop factor: 15 gtt / ml

   How many gtts should be administered per minute?

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Medication Math NUR 102

Worksheet #3

1. Doctor's order: 500 ml Ringers IV Q 4 H
   Drop factor: 10 gtt/ml

   a. How many gtts/min should IV infuse?

   b. After 3 hours, 180 ml remain. What should the adjusted flow rate be?

2. Doctor's order: 1000 ml D 5 W to infuse at 125 ml/hr.
   Drop factor: 15 gtt/ml

   How many gtts/min should IV infuse?

3. Doctor's order: 1000 ml 0.9% NS IV over 20 hrs.
   Drop factor: 60 gtt/ml

   How many gtts/min should IV infuse?

4. Doctor's order: 750 ml D5W IV over 4 hrs.
   Drop factor: 10 gtt/ml

   How many gtts/min should IV infuse?

MANHATTAN AREA TECHNICAL COLLEGE
Medication Math NUR 102

Worksheet #4

1. Doctor's Order: 1000 ml of D 5 RL Q 8 H
   Drop factor: 10 gtt/ml

   How many gtts/min should this IV infuse?

2. Doctor's Order: 3000 ml of D 5 W Q 24 H
   Drop factor: 15 gtt/ml

   How many gtts/min should this IV infuse?

3. Doctor's Order: 1500 ml of D 5 W over 16 H
   Drop factor: 10 gtt/ml

   How many gtts/min should this IV infuse?

4. Doctor's Order: 2000 ml of D 5 RL in 24 hrs.
   Drop factor: 15 gtt/ml

   a. What should the initial flow rate be?

   b. After 10 hours, 1000 ml remain. What should the adjusted flow rate be?

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Medication Math NUR 102

Worksheet #5

1. Doctor's Order: 1000 ml of D 5 W in 8 hrs.
   Drop factor: 10 gtt/ml

   a. What should the initial flow rate be?

   b. After 6 hours, 200 ml remain. What should the adjusted flow rate be?

2. IV Order: 1500 ml of D 5 RL in 18 hr
   Drop factor: 10 gtt/ml

   How many gtts/min should this IV infuse?

3. IV Order: 2500 ml of D 5 RL in 24 hr
   Drop factor: 15 gtt/ml

   How many gtts/min should this IV infuse?

4. IV Order: 500 ml of D 5 W in 10 hrs.
   Drop factor: 60 gtt/ml

   a. What should the initial flow rate be?

   b. After 6 hours, 270 ml remain. What should the adjusted flow rate be?

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Medication Math NUR 102

Worksheet #6

1. Doctor's Order: 500 ml Ringers IV Q4H
   Drop Factor: 10 gtt/ml

   a. How many gtts/min. should IV infuse?

   b. After 3 hours, 300 ml remain. What should the adjusted flow rate be?

2. Doctor's order: Erythromycin 250 mg in 100 ml D_5W to infuse in 20 min.
   Drop factor: 15 gtt/ml

   How many gtts/min should IV infuse?

3. Doctor's order: 1000 ml 0.9% NS IV Q 20 H
   Drop factor: 60 gtt/ml

   How many gtts/min should IV infuse?

4. Doctor's order: 50 ml of Serum Albumin to infuse in 1 hr
   Drop factor: 15 gtt/ml

   How many gtts/min should IV infuse?

Med Math Review

Answer Key

MANHATTAN AREA TECHNICAL COLLEGE
Medication Math NUR 102

Worksheet #1

1. D.O.: Vibramycin 100 mg p.o.
   Label: Vibramycin 50 mg/capsule

$100\text{mg} \times \frac{1\text{ cap}}{50\text{mg}}$ 2 capsules

2. D.O.: Keflex 1 Gm p.o.
   Label: Keflex 250 mg/capsule

$1\text{Gm} \times \frac{1000\text{mg}}{1\text{Gm}} \times \frac{1\text{ cap}}{250\text{mg}}$ 4 capsules

3. D.O.: Coumadin gr 1/6 p.o.
   Label: Coumadin 5 mg/tablet

$\text{gr } \frac{1}{6} \times \frac{60\text{mg}}{1\text{gr}} \times \frac{1\text{tab}}{5\text{mg}}$ 2 tabs

4. D.O.: Phenergan Syrup 25 mg p.o.
   Label: Phenergan 6.25 mg/tsp

$25\text{mg} \times \frac{1\text{t}}{6.25\text{mg}} \times \frac{5\text{ml}}{1\text{t}} = 20\text{ mL}$

5. D.O.: Mycostatin 1,000,000 u p.o.
   Label: Mycostatin 500,000 u/tab

$1{,}000{,}000\text{u} \times \frac{1\text{ tab}}{500{,}000\text{u}}$ 2 tabs

6. D.O.: Digoxin Elixir 0.12 mg p.o.
   Label: Digoxin Elixir 0.05 mg/ml

$0.12\text{ mg} \times \frac{1\text{ml}}{0.05\text{mg}} = 2.4\text{ml}$

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Medication Math NUR 102

Worksheet #2

1. D.O.: Pavabid 400 mg po
   Label: Pavabid 0.2 gm/tablet

$400\,mg \times \frac{1\,Gm}{1000\,mg} \times \frac{1\,tab}{0.2\,Gm}$ 2 tabs

2. D.O.: Motrin 0.8 Gm po
   Label: Motrin 400 mg/caplet

$0.8\,Gm \times \frac{1000\,mg}{1\,Gm} \times \frac{1\,cap}{400\,mg} = 2$ caplets

3. D.O.: Furosemide 0.08 gm po
   Label: Furosemide 20 mg/tablet

$0.08\,Gm \times \frac{1000\,mg}{1\,Gm} \times \frac{1\,tab}{20\,mg}$ 4 tabs

4. D.O.: Tylenol Suspension 75 mg po
   Label: Tylenol Suspension 120 mg/tsp

$75\,mg \times \frac{1\,t}{120\,mg} \times \frac{5\,ml}{1\,t}$ 3.13 ml

5. D.O.: Tenormin 500 mg po
   Label: Tenormin 0.25 g/tab

$500\,mg \times \frac{1\,Gm}{1000\,mg} \times \frac{1\,tab}{0.25\,Gm}$ - 2 tabs

6. D.O.: Dilantin 300 mg po
   Label: Dilantin 125 mg/t

$300\,mg \times \frac{1\,t}{125\,mg} \times \frac{5\,ml}{1\,t}$ 12 ml

MANHATTAN AREA TECHNICAL COLLEGE
PRACTICAL NURSING
Medication Math - Term I

Worksheet #3

1. D.O.: Morphine Sulfate gr 1/6 I.M.
   Label: Morphine Sulfate 15mg/ml

$gr\ \frac{1}{6} \times \frac{60mg}{gr\ 1} \times \frac{1ml}{15mg} - 0.67ml$

2. D.O.: Vitamin K 15mg I.M.
   Label: Vitamin K 25mg/2.5ml

$15mg \times \frac{2.5ml}{25mg} = 1.5ml$

3. D.O.: Streptomycin 0.5 GM I.M.
   Label: Streptomycin 5 Gm in dry form
   Reconstitution: Add 9.0 ml of sterile water to yield 400mg/ml

$0.5Gm \times \frac{1000mg}{1Gm} \times \frac{1ml}{400mg} - 1.25 = 1.3ml$

4. D.O.: Penicillin G Benzathine 350,000u I.M.
   Label: Penicillin G Benzathine 1,000,000u/vial in dry form
   Reconstitution: Add 3.6ml of sterile diluent to yield 250,000u/ml

$350,000u \times \frac{1ml}{250,000u}$ 1.4ml

5. D.O.: Coumadin gr 1/6 p.o.
   Label: Coumadin 10mg/tablet

$gr\ \frac{1}{6} \times \frac{60mg}{gr\ 1} \times \frac{1\ tab}{10mg}$ 1 tab

6. D.O.: Aspirin gr x p.o.
   Label: Aspirin 0.3 Gm/tablet

$gr\ 10 \times \frac{60mg}{gr\ 1} \times \frac{1Gm}{1000mg} \times \frac{1\ tab}{0.3Gm} = 2\ tabs$

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PRACTICAL NURSING

Medication Math - Term I

Worksheet #4

1. D.O.: Demerol 45mg I.M.
   Label: Demerol 50mg/ml tubex

$45mg \times \frac{1ml}{50mg}$ 0.9 mL

2. D.O.: Atropine Sulfate gr 1/100 I.M.
   Label: Atropine Sulfate 0.6mg/ml

$gr\ \frac{1}{100} \times \frac{60mg}{1gr} \times \frac{1ml}{0.6mg}$ 1ml

3. D.O.: Ampicillin 125mg I.M.
   Label: Ampicillin 500mg - multiple dose vial
   Reconstitution: Add 1.8 ml of sterile diluent to yield 250mg/ml

$125mg \times \frac{1ml}{250mg}$ – 0.5mL

4. D.O.: Penicillin G Sodium 350,000u I.M.
   Label: Penicillin G Sodium 1,000,000 u/vial in dry form
   Reconstitution: Add 4.6ml of sterile diluent to yield 200,000 u/ml

$350,000u \times \frac{1ml}{200,000u}$ = 1.75 = 1.8mL

5. D.O.: Kantrex Injection 15mg/kg/day I.M. in 4 divided doses to an adult weighing 180 lb.
   Label: Kantrex Injection 1 Gm/3ml

$180lb \times \frac{1Kg}{2.2lb} \times \frac{15mg}{1Kg} \times \frac{1Gm}{1000mg} \times \frac{3ml}{1Gm}$ = 0.925 = 0.93mL

MANHATTAN AREA TECHNICAL COLLEGE
PRACTICAL NURSING

Medication Math Term I

Worksheet #5

1. D.O.: Aldomet 250 mg p.o.
   Label: Aldomet 1 Gm/tab (scored)

$250mg \times \frac{1Gm}{1000mg} \times \frac{1tab}{1Gm}$ 0.25gr 1/4 tab

2. D.O.: Morphine Sulfate gr 1/8 IM
   Label: Morphine Sulfate 30 mg/ml

$gr\ 1/8 \times \frac{60mg}{1gr} \times \frac{1ml}{30mg}$ 0.25 ml

3. D.O.: Fentanyl Citrate Injection 0.05mg IM
   Label: Fentanyl Citrate Injection 100mcg/2ml

$0.05mg \times \frac{100mcg}{1mg} \times \frac{2ml}{100mcg}$ 1ml

4. D.O.: Prostaphlin 150 mg IM
   Label: Prostaphlin 0.5 Gm/vial in dry form
   Reconstitution: Add 2.7 ml sterile water to yield 250mg/1.5ml

$150mg \times \frac{1.5ml}{250mg}$ 0.9 ml

5. D.O.: Kantrex 15mg/Kg/day in 2 divided doses IM
   Label: Kantrex 75mg/2ml
   Weight: 22 lbs.

$1dose \times \frac{22lb}{2doses} \times \frac{1kg}{2.2lb} \times \frac{15mg}{1kg} \times \frac{2ml}{75mg} = 2ml$

6. D.O.: Vibramycin 2 mg/lb in 2 divided doses p.o.
   Label: Vibramycin Syrup 50mg/5ml
   Weight: 40 Kg

$1dose \times \frac{40kg}{2doses} \times \frac{2.2lb}{1kg} \times \frac{2mg}{1lb} \times \frac{5ml}{50mg} = 8.8ml$

MANHATTAN AREA TECHNICAL COLLEGE
PRACTICAL NURSING
Medication Math - Term I

Worksheet #6 Peds

1. D.O.: Amoxicillin 30mg/kg in 3 divided doses p.o.
   Label: Amoxil 250mg/tsp.
   Weight: 25lbs.

$$\frac{1\text{ dose}}{3\text{ doses}} \times 25\text{lb} \times \frac{1\text{kg}}{2.2\text{lb}} \times \frac{30\text{mg}}{1\text{kg}} \times \frac{1\text{t}}{250\text{mg}} \times \frac{5\text{ml}}{1\text{t}} = 2.3\text{m}$$

2. D.O.: Gentamycin Sulfate 18mg/kg in 4 divided doses IM
   Label: Gentamycin Sulfate 40mg/ml
   Weight: 10kg

$$\frac{1\text{ dose}}{4\text{ doses}} \times 10\text{kg} \times \frac{18\text{mg}}{1\text{kg}} \times \frac{1\text{ml}}{40\text{mg}} = 1.13 = 1.1\text{ml}$$

3. D.O. Tylenol 5mg/kg/dose p.o.
   Label: Tylenol 120mg/t.
   Weight: 28lb.

$$28\text{lb} \times \frac{1\text{kg}}{2.2\text{lb}} \times \frac{5\text{mg}}{1\text{kg}} \times \frac{1\text{t}}{120\text{mg}} \times \frac{5\text{ml}}{1\text{t}} = 2.7\text{ml}$$

4. D.O.: Benadryl 5mg/kg in 3 divided doses p.o.
   Label: Benadryl 12.5mg/t
   Weight: 30kg

$$\frac{1\text{ dose}}{3\text{ doses}} \times 30\text{kg} \times \frac{5\text{mg}}{1\text{kg}} \times \frac{1\text{t}}{12.5\text{mg}} \times \frac{5\text{ml}}{1\text{t}} = 20\text{ml}$$

5. D.O.: Erythromycin 10mg/kg/dose p.o.
   Label: Erythromycin 200mg/5cc
   Weight: 22lbs

$$22\text{lb} \times \frac{1\text{kg}}{2.2\text{lb}} \times \frac{10\text{mg}}{1\text{kg}} \times \frac{5\text{ml}}{200\text{mg}} \quad 2.5\text{ml}$$

6. D.O. Cleocin 8mg/kg in 4 divided doses p.o.
   Label: Cleocin 75mg/t.
   Weight: 44lbs

$$\frac{1\text{ dose}}{4\text{ doses}} \times 44\text{lbs} \times \frac{1\text{kg}}{2.2\text{lb}} \times \frac{8\text{mg}}{1\text{kg}} \times \frac{1\text{t}}{75\text{mg}} \times \frac{5\text{ml}}{1\text{t}} = 2.7\text{ml}$$

MANHATTAN AREA TECHNICAL COLLEGE
PRACTICAL NURSING
Medication Math - Term I

Worksheet #7 Peds

1. D.O.: Ampiclin Oral Susp 50 mg / kg in 4 divided doses p.o.
   Label: Ampicillin Oral Susp 250 mg / tsp.
   Weight: 25 lbs.

$$1\,\text{dose} \times \frac{25\,\text{lb}}{4\,\text{doses}} \times \frac{1\,\text{kg}}{2.2\,\text{lb}} \times \frac{50\,\text{mg}}{1\,\text{kg}} \times \frac{1\,\text{t}}{250\,\text{mg}} \times \frac{5\,\text{ml}}{1\,\text{t}} = 2.8\,\text{ml}$$

2. D.O.: Gantrisin Pediatric Susp 150 mg / kg in 4 divided doses p.o.
   Label: Gantrisin Pediatric Susp 0.5 gm / tsp
   Weight: 10 kg

$$1\,\text{dose} \times \frac{10\,\text{kg}}{4\,\text{doses}} \times \frac{150\,\text{mg}}{1\,\text{kg}} \times \frac{1\,\text{gm}}{1000\,\text{mg}} \times \frac{1\,\text{t}}{0.5\,\text{gm}} \times \frac{5\,\text{ml}}{1\,\text{t}} = 3.8\,\text{ml}$$

3. D.O. Tylenol 5 mg / kg / dose p.o.
   Label: Tylenol 120 mg / t.
   Weight: 15 lb.

$$1\,\text{dose} \times \frac{15\,\text{lb}}{1\,\text{dose}} \times \frac{1\,\text{kg}}{2.2\,\text{lb}} \times \frac{5\,\text{mg}}{1\,\text{kg}} \times \frac{1\,\text{t}}{120\,\text{mg}} \times \frac{5\,\text{ml}}{1\,\text{t}} = 1.4\,\text{ml}$$

4. D.O.: Benadryl 5 mg / kg in 3 divided doses p.o.
   Label: Benadryl 12.5 mg/ 5 ml
   Weight: 18 lb.

$$1\,\text{dose} \times \frac{18\,\text{lb}}{3\,\text{doses}} \times \frac{1\,\text{kg}}{2.2\,\text{lb}} \times \frac{5\,\text{mg}}{1\,\text{kg}} \times \frac{5\,\text{ml}}{12.5\,\text{mg}} = 5.5\,\text{ml}$$

5. D.O.: Biaxin Oral Susp 15 mg / kg / day in 2 divided doses p.o.
   Label: Biaxin Oral Susp 125 mg / tsp
   Weight: 22 lbs

$$1\,\text{dose} \times \frac{22\,\text{lb}}{2\,\text{doses}} \times \frac{1\,\text{kg}}{2.2\,\text{lb}} \times \frac{15\,\text{mg}}{1\,\text{kg}} \times \frac{1\,\text{t}}{125\,\text{mg}} \times \frac{5\,\text{ml}}{1\,\text{t}} = 3\,\text{mL}$$

6. D.O. Cleocin 8 mg / kg in 4 divided doses p.o.
   Label: Cleocin 75 mg / 5 ml
   Weight: 28 lbs

$$1\,\text{dose} \times \frac{28\,\text{lb}}{4\,\text{doses}} \times \frac{1\,\text{kg}}{2.2\,\text{lb}} \times \frac{8\,\text{mg}}{1\,\text{kg}} \times \frac{5\,\text{ml}}{75\,\text{mg}} = 1.7\,\text{mL}$$

MANHATTAN AREA TECHNICAL COLLEGE
Medication Math NUR 102

Worksheet #1

1. Doctor's order: 1500 ml of D 5 W @ 150 ml/hr
   Drop factor: 10 gtt/ml

   How many gtts/minutes should this IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{150\,ml}{1\,hr} \times \frac{10\,gtt}{1\,mL} = 25\,gtt/min$

2. Doctor's order: 1000 ml D 5 1/2 NS @ 75 ml/hr
   Drop factor: 15 gtt/ml

   How many gtts/minutes should this IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{75\,ml}{1\,hr} \times \frac{15\,gtt}{1\,mL}$ 19 gtt/min

3. Doctor's order: 2500 ml D 5 W to infuse over 12 hours
   Drop factor: 10 gtt/ml

   a. What should the initial flow rate be?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{2500\,ml}{12\,hr} \times \frac{10\,gtt}{1\,ml} = 35\,gtt/min$

   b. After the IV has been running for 8 hours, there are still 1000 ml left to infuse. What should the adjusted flow rate be to complete infusion on schedule?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{1000\,ml}{4\,hr} \times \frac{10\,gtt}{1\,mL} = 42\,gtt/min$

4. Doctor's order: 3000 ml D 5 RL in 24 hours
   Drop factor: 10 gtt/ml

   a. What should the initial flow rate be?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{3000\,ml}{24\,hr} \times \frac{10\,gtt}{1\,ml} = 21\,gtt/min$

   b. After 20 hours, 375 ml remain. What should the adjusted flow rate be?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{375\,ml}{4\,hr} \times \frac{10\,gtt}{1\,mL} = 16\,gtt/min$

MANHATTAN AREA TECHNICAL COLLEGE
Medication Math NUR 102

Worksheet #2

1. IV order: 1,000 ml of D5W over 6 hrs.
   Drop factor: 15 gtt / ml

   How many gtts should be administered per minute?

$$\frac{1\text{ min}}{} \times \frac{1\text{ hr}}{60\text{ min}} \times \frac{1000\text{ ml}}{6\text{ hr}} \times \frac{15\text{ gtt}}{1\text{ ml}} = 42\text{ gtt/min}$$

2. IV order: 500 ml of D 5 RL
   Drop factor: 60 gtt / ml
   Flow rate: 30 ml / hr

   How many gtts should be administered per minute?

$$\frac{1\text{ min}}{} \times \frac{1\text{ hr}}{60\text{ min}} \times \frac{30\text{ ml}}{1\text{ hr}} \times \frac{60\text{ gtt}}{1\text{ ml}} = 30\text{ gtt/min}$$

3. IV order: 1000 ml LR to be followed by 2,000 ml D 5 W to run in 24 hrs.
   Drop factor: 10 gtt / ml

   How many gtt should be administered per minute?

$$\frac{1\text{ min}}{} \times \frac{1\text{ hr}}{60\text{ min}} \times \frac{3000\text{ ml}}{24\text{ hr}} \times \frac{10\text{ gtt}}{1\text{ ml}} = 21\text{ gtt/min}$$

4. IV order: 2,500 ml of D 5 1/4 NS to infuse for 24 hrs.
   Drop factor: 15 gtt / ml

   How many gtts should be administered per minute?

$$\frac{1\text{ min}}{} \times \frac{1\text{ hr}}{60\text{ min}} \times \frac{2500\text{ ml}}{24\text{ hr}} \times \frac{15\text{ gtt}}{1\text{ ml}} = 26\text{ gtt/min}$$

MANHATTAN AREA TECHNICAL COLLEGE
Medication Math NUR 102

Worksheet #3

1. Doctor's order: 500 ml Ringers IV Q 4 H
   Drop factor: 10 gtt/ml

   a. How many gtts/min should IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{500\,ml}{4\,hr} \times \frac{10\,gtt}{1\,mL} = 21\,gtt/min$

   b. After 3 hours, 180 ml remain. What should the adjusted flow rate be?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{180\,ml}{1\,hr} \times \frac{10\,gtt}{1\,mL} = 30\,gtt/min$

2. Doctor's order: 1000 ml D 5 W to infuse at 125 ml/hr.
   Drop factor: 15 gtt/ml

   How many gtts/min should IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{125\,ml}{1\,hr} \times \frac{15\,gtt}{1\,mL}$ 31 gtt/min

3. Doctor's order: 1000 ml 0.9% NS IV over 20 hrs.
   Drop factor: 60 gtt/ml

   How many gtts/min should IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{1000\,ml}{20\,hr} \times \frac{60\,gtt}{1\,ml} = 50\,gtt/min$

4. Doctor's order: 750 ml D5W IV over 4 hrs.
   Drop factor: 10 gtt/ml

   How many gtts/min should IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{750\,ml}{4\,hr} \times \frac{10\,gtt}{1\,ml} = 31\,gtt/min$

MANHATTAN AREA TECHNICAL COLLEGE
Medication Math NUR 102

Worksheet #4

1. Doctor's Order: 1000 ml of D 5 RL Q 8 H
   Drop factor: 10 gtt/ml

   How many gtts/min should this IV infuse?

   $$1\,\text{min} \times \frac{1\,\text{hr}}{60\,\text{min}} \times \frac{1000\,\text{ml}}{8\,\text{hr}} \times \frac{10\,\text{gtt}}{1\,\text{ml}} = 21\,\text{gtt/min}$$

2. Doctor's Order: 3000 ml of D 5 W Q 24 H
   Drop factor: 15 gtt/ml

   How many gtts/min should this IV infuse?

   $$1\,\text{min} \times \frac{1\,\text{hr}}{60\,\text{min}} \times \frac{3000\,\text{ml}}{24\,\text{hr}} \times \frac{15\,\text{gtt}}{1\,\text{ml}} = 31\,\text{gtt/min}$$

3. Doctor's Order: 1500 ml of D 5 W over 16 H
   Drop factor: 10 gtt/ml

   How many gtts/min should this IV infuse?

   $$1\,\text{min} \times \frac{1\,\text{hr}}{60\,\text{min}} \times \frac{1500\,\text{ml}}{16\,\text{hr}} \times \frac{10\,\text{gtt}}{1\,\text{ml}} = 16\,\text{gtt/min}$$

4. Doctor's Order: 2000 ml of D 5 RL in 24 hrs.
   Drop factor: 15 gtt/ml

   a. What should the initial flow rate be?

   $$1\,\text{min} \times \frac{1\,\text{hr}}{60\,\text{min}} \times \frac{2000\,\text{ml}}{24\,\text{hr}} \times \frac{15\,\text{gtt}}{1\,\text{ml}} = 21\,\text{gtt/min}$$

   b. After 10 hours, 1000 ml remain. What should the adjusted flow rate be?

   $$1\,\text{min} \times \frac{1\,\text{hr}}{60\,\text{min}} \times \frac{1000\,\text{ml}}{14\,\text{hr}} \times \frac{15\,\text{gtt}}{1\,\text{ml}} = 18\,\text{gtt/min}$$

MANHATTAN AREA TECHNICAL COLLEGE
Medication Math NUR 102

Worksheet #5

1. Doctor's Order: 1000 ml of D 5 W in 8 hrs.
   Drop factor: 10 gtt/ml

   a. What should the initial flow rate be?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{1000\,ml}{8\,hr} \times \frac{10\,gtt}{1\,ml} = 21\,gtt/min$

   b. After 6 hours, 200 ml remain. What should the adjusted flow rate be?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{200\,ml}{2\,hr} \times \frac{10\,gtt}{1\,ml} = 17\,gtt/min$

2. IV Order: 1500 ml of D 5 RL in 18 hr
   Drop factor: 10 gtt/ml

   How many gtts/min should this IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{1500\,ml}{18\,hr} \times \frac{10\,gtt}{1\,ml} = 14\,gtt/min$

3. IV Order: 2500 ml of D 5 RL in 24 hr
   Drop factor: 15 gtt/ml

   How many gtts/min should this IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{2500\,ml}{24\,hr} \times \frac{15\,gtt}{1\,ml} = 26\,gtt/min$

4. IV Order: 500 ml of D 5 W in 10 hrs.
   Drop factor: 60 gtt/ml

   a. What should the initial flow rate be?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{500\,ml}{10\,hr} \times \frac{60\,gtt}{1\,ml} = 50\,gtt/min$

   b. After 6 hours, 270 ml remain. What should the adjusted flow rate be?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{270\,ml}{4\,hr} \times \frac{60\,gtt}{1\,ml} = 68\,gtt/min$

MANHATTAN AREA TECHNICAL COLLEGE
Medication Math NUR 102

Worksheet #6

1. Doctor's Order: 500 ml Ringers IV Q4H
   Drop Factor: 10 gtt/ml

   a. How many gtts/min. should IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{500\,ml}{4\,hr} \times \frac{10\,gtt}{1\,ml} = 21\,gtt/min$

   b. After 3 hours, 300 ml remain. What should the adjusted flow rate be?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{300\,ml}{1\,hr} \times \frac{10\,gtt}{1\,ml} = 50\,gtt/min$

2. Doctor's order: Erythromycin 250 mg in 100 ml D_5W to infuse in 20 min.
   Drop factor: 15 gtt/ml

   How many gtts/min should IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{100\,ml}{1/3\,hr} \times \frac{15\,gtt}{1\,ml} = 75\,gtt/min$

   or

   $\frac{60\,min}{1\,hr} \times \frac{100\,ml}{20\,min}$

3. Doctor's order: 1000 ml 0.9% NS IV Q 20 H
   Drop factor: 60 gtt/ml

   How many gtts/min should IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{1000\,ml}{20\,hr} \times \frac{60\,gtt}{1\,ml} = 50\,gtt/min$

4. Doctor's order: 50 ml of Serum Albumin to infuse in 1 hr
   Drop factor: 15 gtt/ml

   How many gtts/min should IV infuse?

   $1\,min \times \frac{1\,hr}{60\,min} \times \frac{50\,ml}{1\,hr} \times \frac{15\,gtt}{1\,ml} = 13\,gtt/min$