AH 2   Ben Ruettiger
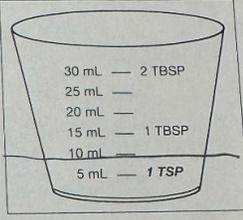
PROFICIENCY TEST 1 — Calculation of Oral Doses

Name: ___Ben Ruettiger___

For liquid answers, draw a line on the medicine cup indicating the amount you would pour.
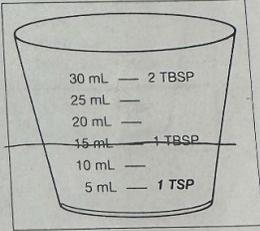Answers are given in Appendix A.

1. Order: KCl elixir 20 mEq po bid
   Supply: liquid labeled 30 mEq/15 mL

   Answer: ___10mL___

   $$\frac{15mL}{30mEq} \Bigg| \frac{20mEq}{} = 10mL$$

   30 mL — 2 TBSP
   25 mL —
   20 mL —
   15 mL — 1 TBSP
   10 mL —
   5 mL — 1 TSP

2. Order: phenytoin susp 150 mg po tid
   Supply: liquid labeled 75 mg/7.5 mL

   Answer: ___15mL___

   $$\frac{7.5mL}{75mg} \Bigg| \frac{150mg}{} =$$

   30 mL — 2 TBSP
   25 mL —
   20 mL —
   15 mL — 1 TBSP
   10 mL —
   5 mL — 1 TSP

3. Order: digoxin elixir 0.125 mg po every day
   Supply: liquid labeled 0.25 mg/10 mL

   Answer: ___5mL___

   $$\frac{10mL}{0.25mg} \Bigg| \frac{0.125mg}{} = 5mL$$

   30 mL — 2 TBSP
   25 mL —
   20 mL —
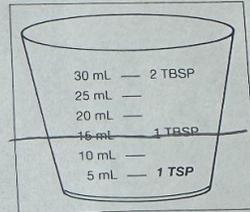   15 mL — 1 TBSP
   10 mL —
   5 mL — 1 TSP
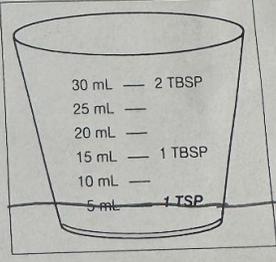
PROFICIENCY TEST 1 ⟩ Calculation of Oral Doses (continued)

Name: Ben Ruettiger
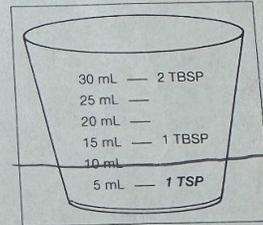
4. Order: phenytoin oral susp 375 mg po tid
   Supply: liquid labeled 125 mg/5 mL

   Answer: 15mL

   $$\frac{5\,mL}{125mg}\left|\frac{375mg}{}\right. = 15mL$$

   ```
   30 mL — 2 TBSP
   25 mL —
   20 mL —
   15 mL     1 TBSP
   10 mL —
   5 mL — 1 TSP
   ```

5. Order: cefaclor 500 mg
   Supply: liquid labeled 250 mg in 5 mL

   Answer: 10 mL

   $$\frac{5\,mL}{250mg}\left|\frac{500mg}{}\right. = 10mL$$

   ```
   30 mL — 2 TBSP
   25 mL —
   20 mL —
   15 mL — 1 TBSP
   10 mL
   5 mL — 1 TSP
   ```

6. Order: digoxin 0.5 mg po every day
   Supply: tablets labeled 0.25 mg

   Answer: 2 tabs

   $$\frac{1\,tab}{0.25mg}\left|\frac{0.5mg}{}\right. = 2\,tabs$$

7. Order: digoxin 100 mcg every day po
   Supply: 0.1-mg capsules

   Answer: 1 cap

   $$\frac{1\,cap}{0.1mg}\left|\frac{0.1\,mcg}{}\right. = 1\,cap$$

8. Order: allopurinol 250 mg po every day
   Supply: scored tablets 100 mg

   Answer: 2.5 tabs

   $$\frac{1\,tab}{100mg}\left|\frac{250mg}{}\right. = 2.5\,tab$$

9. Order: ampicillin 0.5 g po q6h
   Supply: capsules labeled 250 mg

   Answer: 2 caps

   $$\frac{1\,cap}{0.25g}\left|\frac{0.5g}{}\right. = 2\,caps$$

10. Order: levothyroxine 0.5 mg po every day
   Supply: tablets labeled 500 mcg scored

    Answer: 1 tab

   $$\frac{1\,tab}{0.5mg}\left|\frac{0.5mg}{}\right. = 1\,tab$$

AH2

PROFICIENCY TEST 2 ▸ **Calculations of Liquid Injections and Injections From Powders**

Name: Ben Ruettiger

Solve these problems for injections from a liquid. Draw a line on the syringe indicating the amount you would prepare in milliliters. See Appendix A for answers. Round to the nearest tenths place.

1. Order: morphine sulfate 10 mg IV stat
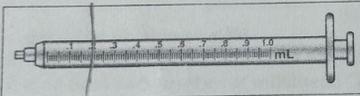   Supply: vial labeled 15 mg/mL (use a 3-mL syringe, round to the nearest tenth)
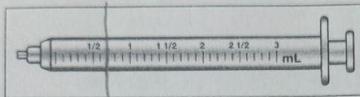
   $$\frac{1mL}{15mg} \cdot \frac{10mg}{} = 0.7\,mL$$

2. Order: phenobarbital 0.1 g IM q6h
   Supply: ampule of liquid labeled 200 mg/3 mL
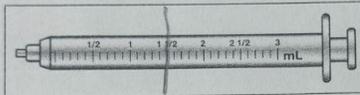
   $$\frac{3mL}{200mg} \cdot \frac{100mg}{} = 1.5\,mL$$

3. Order: vitamin B$_{12}$ 1000 mcg IM every day
   Supply: vial labeled 5000 mcg/mL

   $$\frac{1mL}{5000mcg} \cdot \frac{1000mcg}{} = 0.2\,mL$$

4. Order: prepare 25 mg lidocaine to be used in an IV infusion
   Supply: vial of lidocaine labeled 1% = 10mg/mL
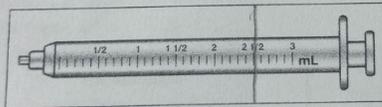
   $$\frac{1mL}{10mg} \cdot \frac{25mg}{} = 2.5\,mL$$

5. Order: scopolamine 0.5 mg subcutaneous stat
   Supply: vial labeled 0.3 mg/mL (use a 3-mL syringe, round to the nearest tenths)
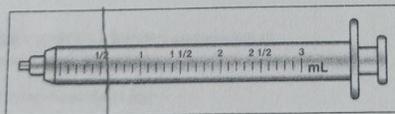
 $$\frac{1mL}{0.5mg} \cdot \frac{0.3mg}{} = 0.6\,mL$$

PROFICIENCY TEST 2   **Calculations of Liquid Injections and Injections From Powders** (*continued*)

6. Order: NPH insulin 10 units and regular insulin 3 units subcutaneous every day at 7 AM
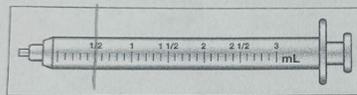   Supply: vials of NPH insulin 100 units/mL and regular insulin 100 units/mL

   NPH $\dfrac{100u}{1mc}\Big| \dfrac{1}{10u} = 10u$ ＝10u   43.3u

   Reg $\dfrac{100u}{mL}\Big| \dfrac{1}{3u} = 33.3u$
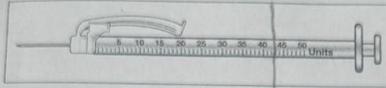
7. Order: prepare sodium bicarbonate 2 mEq (that will be added to IV fluids for infusion)
   Supply: vial labeled sodium bicarbonate 0.5 mEq/mL
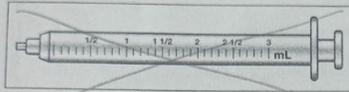
   $\dfrac{1mL}{0.5\,mEq}\Big| 2mEq = 4mL$

8. Order: epinephrine 500 mcg subcutaneous stat
   Supply: ampule of liquid labeled 1:1000

   $\dfrac{1mL}{1mg}\Big| \dfrac{1mg}{1000mcg}\Big| 500mcg = 0.5mL$

9. Order: ticarcillin disodium 1 g IM
   Supply: vial of powder labeled ticarcillin disodium 1 g (Fig. 5-20)

   a. Diluting fluid and number of milliliters: 2mL H₂O
   b. Solution and new stock: 1 gram = 1000mg Tic + Water
   c. Desired dose (and equivalent if necessary): 1g = 1,000mg
   d. Amount to give: 2.6mL
   e. Write on label: ✓
   f. Storage: ✓

   $\dfrac{1mL}{385mg}\Big| 1000mg = \boxed{2.6mL}$

   TICARCILLIN

   DIRECTIONS FOR USE

   1 GRAM, 3 GRAM AND

   6 GRAM STANDARD VIALS

   INTRAMUSCULAR USE: concentration of approximately 385 mg/mL

   For initial reconstitution use:

   Each gram of ticarcillin should be reconstituted with 2 mL of sterile water for injection, sodium chloride injection or 1% lidocaine without epinephrine. Use promptly. Each 2.6 mL of the solution will contain 1 gram of ticarcillin.

   Inject intramuscularly within the body of a relatively large muscle, using usual techniques and precautions.

FIGURE 5-20   Directions for use of ticarcillin disodium.

PROFICIENCY TEST 2   Calculations of Liquid Injections and Injections From Powders (*continued*)

10. Order: ampicillin sodium 300 mg IM q8h
    Supply: vial of 500 mg powder (Fig. 5-21)
    a. Diluting fluid and number of milliliters:
    b. Solution and new supply:
    c. Desired dose (and equivalent if necessary):
    d. Amount to give:
    e. Write on label:
    f. Storage:

    (handwritten) $\frac{1mL}{250mg}$ 300mg = 1.2 mL

INTRAMUSCULAR USE RECONSTITUTION

For dilution of 500 mg, 1 gram, and 2-gram vials, dissolve contents of a vial with the amount of sterile water for injection or bacteriostatic water listed in the table below:

Label Claim	Recommended Amount of Diluent	Withdrawable Volume	Concentration in mg/mL
500 mg	1.8 mL	2 mL	250 mg
1 gram	3.4 mL	4 mL	250 mg
2 gram	6.8 mL	8 mL	250 mg

The above solutions must be used within one hour after reconstitution.

While the 1- and 2-gram vials are primarily for intravenous use, they made be administered intramuscularly when the 250 or 500 mg vials are not available. Reconstitute as directed resulting in a final concentration of 250 mg/mL.

FIGURE 5-21   Reconstitution directions for ampicillin sodium for IM or IV injection.

PROFICIENCY TEST **Basic IV Problems**

Name: _Ben Ruettiger_

There are 14 questions related to IV and IVPB and enteral feeding calculations. Answers are given in Appendix A. Round the infusion rate/drip rate to the nearest whole number.

1. Order: 1000 mL D5NS; run 150 mL/hour IV
   Supply: IV bag of 1000 mL D5NS

   $\frac{1000 mL}{150 mL}$ = *6 hr 36 min*

   a. Approximately how many hours and minutes will the IV run?
   b. How many drops per minute (macrodrip 10 gtt/mL or microdrip 60 gtt/mL)? $\frac{10 gtt}{mL} \cdot \frac{150 mL}{1 hr}$

   = *25 gtt/min*

   c. What size tubing will you use? *Macro*

2. Order: 100 mL LR 12 NOON–6 PM IV
   a. What are the drops per minute (macrodrip 10 gtt/mL or microdrip 60 gtt/mL)?
   b. What size tubing will you use? *Micro*

   $\frac{60 gtt}{mL} \cdot \frac{100 mL}{6 hr} \cdot \frac{hr}{60 min}$ = *17 gtt/min*

3. Order: 150 mL NS IV over 3 hours
   Supply: bag of 250 mL NS for IV and macrotubing, 15 gtt/mL; microtubing, 60 gtt/mL.
   a. What would you do to obtain 150 mL NS? *Burr 100 mL fluid off*
   b. What are the drops per minute? $\frac{150 mL}{180 min} \cdot \frac{15 gtt}{mL}$ = *13 gtt/min*
   c. What size tubing will you use? *Macro*

4. Order: 500 mL D5W IV KVO. Solve for 24 hours. An infusion pump is available. What should be the setting on the infusion pump? $\frac{500 mL}{24 hr}$ = *21 mL/hr*

5. Order: doxycycline 100 mg IVPB daily
   Supply: 125 mL/D5W to infuse over 1 hour. Macrodrip tubing, 10 gtt/mL.
   a. How many drops per minute? $\frac{10 gtt}{mL} \cdot \frac{250 mL}{1 hr} \cdot \frac{hr}{60 min}$ = *42 gtt/min*
   b. What is the rate on an infusion pump? 1 mL

6. Order: aminophylline 500 mg in 250 mL D5W to run over 8 hours IV
   Available: vial of aminophylline labeled 1 g in 10 mL; microdrip tubing

   $\frac{10 mL}{1 g} \cdot \frac{500}{?} \frac{1}{100}$

   a. How much aminophylline is needed? *5 mL aminophylline*
   b. What is the drip rate? $\frac{250 mL}{8 hr}$ = *31 mL/hr*

7. A client is receiving a primary IV at the rate of 125 mL/hour. The doctor orders cefoxitin 1 g in 75 mL D5W q6h to run over 1 hour. Calculate the 24-hour parenteral intake.
   250 mL/8 hr = 31 mL/hr = 3000 mL

8. Order: 1000 mL D5½NS to run at 90 mL/hour; infusion pump available.
   a. What will be the pump setting? *90 mL/hr* $\frac{1000 mL}{90 mL/hr}$ = *11 hr 6 min*
   b. Approximately how many hours and minutes will the IV run?

9. A healthcare provider orders aminophylline 0.5 g in 500 mL. How many mg of aminophylline is in 1 mL? (Hint: Convert g to mg; take fluid and divide by amount of drug.) *30 mg*

10. Order: trimethoprim and sulfamethoxazole 5 mL IVPB q6h
    Supply: vial of 5 mL; one 5-mL vial per 75 mL D5W run over 60 to 90 minutes. The main IV line is connected to an infusion pump. What will you do?
    a. State the type and amount of IV fluid you would use and the time for infusion. *D5W*
    b. How would you program the infusion pump?

    $\frac{75 mL}{90 min} \cdot \frac{60 min}{1 hr}$ = *50 mL/hr*

PROFICIENCY TEST **Basic IV Problems** *(continued)*

11. Prepare ¾ strength Isocal. Total volume is 150 mL. How much Isocal is to be mixed with, how much water? $150 \times \frac{3}{4}$ = 112.5 mL   150 mL – 112 mL = *37.5 mL*

12. Prepare ½ strength Vivonex. Total volume is 500 mL. How much Vivonex is to be mixed with how much water? $500 \times \frac{1}{2}$ = 250 mL   500 mL – 250 mL = *250 mL*

13. Order: cefazolin 2 g in 100 mL D5W IVPB q4h, infuse over 30–60 minutes
    Supply: IVPB dilution of cefazolin. Reconstitute with 50 mL to yield 1 g in 50 mL.
    a. State the amount of IV fluid you would use? *100 mL*
    b. What is the rate on the infusion pump? (Calculate for 30 minutes and 60 minutes.)
    50 mL/hr or 100 mL/hr

14. An IV solution of 1000 mL is to infuse at 100 mL/hour. The infusion starts at 10 AM. When will the infusion be completed?
    2000 or 8 pm

AH2

DIAGNOSIS: *COLON CANCER*   PROTOCOL NAME/NUMBER:

PATIENT'S HEIGHT: *6'2* cm   WEIGHT: *186* Kg or BSA: *2 1* m²

VENOUS ACCESS   DEEP ☐   PERIPHERAL ☒

everyday

DRUG	PROTOCOL DOSAGE	PATIENTS DOSAGE	ROUTE AND DILUENT	FREQUENCY AND / OR DOSAGE	# OF DAYS
1. *MITOMYCIN*	*12 mg/m²*	*24 mg*	*IVP × 1 m*	*9/08*	
2. *5FU*	*1000 mg/m²*	*2000 mg*	*in 1000 mL of NS as a continuous infusion everyday × 4 days on*	*9/08, 9/09, 9/10, 9/11*	
3.					

FIGURE 7-3 Portion of order form for chemotherapy. The healthcare provider writes the client's height and weight and calculates the BSA as 2.1 m². The protocol dosage is the guide used to determine the client's dose. For mitomycin, the protocol is 12 mg/m² × 2 m² = 24 mg. For 5FU, the protocol dose is 1000 mg/m² × 2 m² = 2000 mg.

Ben Ruettiger

SELF-TEST 4   Use of Nomogram

Solve the following problems. Answers appear at the end of this chapter. Use the nomogram in Figure 7-2 to double-check the BSA.

$$\frac{20mg}{1m^2} \Big/ 1.96m^2 = 39.2mg$$

1. Ht, 6'0"; Wt, 165 lb; BSA, 1.96 m²
   Order: doxorubicin 39 mg (20 mg/m²) in D5W 250 mL to infuse over ½ hour

   $$\frac{250mL}{0.5 hr} = 500 mL/hr$$

   a. Is dose correct? *Yes*
   b. How should the pump be set? *500 mL/hr*

2. Ht, 165 cm; Wt, 70 kg; BSA, 1.77 m²
   Order: CCNU 230 mg po (130 mg/m²) once q6 weeks

   $$\frac{130mg}{1m^2} \Big/ 1.77m^2 = 230 mg$$

   a. Is dose correct? *Yes*
   b. CCNU comes in tabs of 100 mg and 10 mg. What is the dose?   *2 tabs of 100 mg*
   3 tabs of 10 mg

3. Ht, 6'2"; Wt, 170 lb; BSA, 2.0 m²
   Order: daunorubicin 80 mg (40 mg/m²) in D5W over 1 hour IV
   Supply: IV bag labeled 80 mg in 80 mL D5W.

   a. Is dose correct?
   b. How should the pump be set?

4. Ht, 6'5"; Wt, 175 lb; BSA, 2.0 m²
   Order: etoposide 400 mg po every day × 3 (200 mg/m²)
   Supply: capsules of 50 mg

   a. Is dose correct?
   b. How many capsules should be administered?

5. Ht, 5'3"; Wt, 120 lb; BSA, 1.6 m²
   Order: paclitaxel 216 mg (135 mg/m²) in D5W 500 mL glass bottle over 3 hours

   a. Is dose correct?
   b. How should the pump be set? (Round to the nearest whole number)