▶ Solution Using Dimensional Analysis

1. Calculate the dosage range first.

(Lower dosage) 3 mcg/kg/min × 56 kg = 168 mcg/min

(Upper dosage) 6 mcg/kg/min × 56 kg = 336 mcg/min

2. Calculate the IV rate in mL/hr for the lower dosage.

$$x\,\frac{mL}{hr} = \frac{\overset{5}{2\cancel{5}0}\ mL}{\underset{1}{5\cancel{0}}\ \cancel{mg}} \times \frac{1\ \cancel{mg}}{1000\ \cancel{mcg}} \times \frac{168\ \cancel{mcg}}{1\ \cancel{min}} \times \frac{60\ \cancel{min}}{1\ hr}$$

x = 50.4 = 50 mL/hr (gtt/min)

3. Calculate the IV rate in mL/hr for the upper dosage.

$$x\,\frac{mL}{hr} = \frac{\overset{5}{2\cancel{5}0}\ mL}{\underset{1}{5\cancel{0}}\ \cancel{mg}} \times \frac{1\ \cancel{mg}}{1000\ \cancel{mcg}} \times \frac{336\ \cancel{mcg}}{1\ \cancel{min}} \times \frac{60\ \cancel{min}}{1\ hr}$$

x = 100.8 = 101 mL/hr (gtt/min)

A dosage range of 3 to 6 mcg/kg/min is equal to a flow rate of 50 to 101 mL/hr (gtt/min).
The client's condition has stabilized, and the IV flow rate is now maintained at 60 mL/hr. What dosage will be infusing per minute?

$$x\,\frac{mcg}{min} = \frac{\overset{4}{10\cancel{0}0}\ mcg}{1\ \cancel{mg}} \times \frac{50\ \cancel{mg}}{\underset{1}{2\cancel{5}0}\ \cancel{mL}} \times \frac{60\ \cancel{mL}}{1\ \cancel{hr}} \times \frac{1\ \cancel{hr}}{60\ min}$$

x = 200 mcg/min

PRACTICE PROBLEMS

1. A client weighing 50 kg is to receive a Dobutrex solution of 250 mg in 500 mL D5W ordered to titrate between 2.5 and 5 mcg/kg/min.

   a. Determine the flow rate setting for a volumetric pump.   _____

   b. If the IV flow rate is being maintained at 25 mL/hr after several titrations, what is the dosage infusing per minute? _____

2. Order: Epinephrine at 30 mL/hr. The solution available is 2 mg of epinephrine in 250 mL D5W. Calculate the following:

   a. mg/hr   _____

   b. mcg/hr   _____

   c. mcg/min   _____

3. Aminophylline 0.25 g is added to 500 mL D5W to infuse at 20 mL/hr. Calculate the following:

   mg/hr   _____

Notes

4. Order: Pitocin at 15 microgtt/min. The solution contains 10 units of Pitocin in 1000 mL D5W.

   Calculate the number of units per hour
   the client is receiving.   _____

5. Order: 3 mcg/kg/min of Nipride.

   Available: 50 mg of Nipride in 250 mL D5W. Client's weight is 60 kg.

   Calculate the flow rate in mL/hr that
   will deliver this dosage.   _____

6. A nitroglycerin drip is infusing at 3 mL/hr. The solution available is 50 mg of nitro-glycerin in 250 mL D5W. Calculate the following:

   a. mcg/hr   _____

   b. mcg/min   _____

                              Answers on pp. 682-683

Critical Thinking Questions

Scenario: Isuprel is ordered for a client at the rate of 3 mcg/min with a solution containing Isuprel 1 mg in 250 mL D5W. The nurse performed the following calculation to determine the rate by pump in mL/hr.
- Calculated the dosage per hour.

$$3 \text{ mcg/min} \times 60 \text{ min} = 180 \text{ mcg/hr}$$

- Converted 180 mcg to milligrams to match the units in the solution strength.

$$180 \text{ mcg} = 0.018 \text{ mg}$$

- Calculated the rate in mL/hr.

$$1 \text{ mg}:250 \text{ mL} = 0.018 \text{ mg}:x \text{ mL}$$

$$x = 250 \times 0.018$$

$$x = 4.5 = 5 \text{ mL/hr}$$

a. What error did the nurse make in her calculation to determine the rate in mL/hr?

_____

b. What could be the potential outcome of the error? _____

c. What should the rate be in mL/hr? _____

d. What preventive measures could have been taken by the nurse? _____

Notes

POINTS TO REMEMBER

- The safest way to administer medications is by an infusion device.

- When calculating dosages to be administered without any type of electronic infusion pump, always use microdrop tubing (60 gtt = 1 mL). This is preferred because the drops are smaller, so more accurate titration is possible.

- Calculate dosages accurately. Double-checking math calculations helps ensure a proper dosage.

- Obtain an accurate weight of your client.

- Before determining the rate in mL/hr or gtt/min, calculate the dosage.

- Use a calculator whenever possible.

- Use an infusion pump for titration of IV drugs in mL/hr.

CHAPTER REVIEW

Calculate the dosages as indicated. Use the labels where provided.

1. Client is receiving Isuprel at 30 mL/hr. The solution available is 2 mg of Isuprel in 250 mL D5W. Calculate the following:

   a. mg/hr   _____

   b. mcg/hr   _____

   c. mcg/min   _____

2. Client is receiving epinephrine at 40 mL/hr. The solution available is 4 mg of epinephrine in 500 mL D5W. Calculate the following:

   a. mg/hr   _____

   b. mcg/hr   _____

   c. mcg/min   _____

3. Infuse dopamine 800 mg in 500 mL D5W at 30 mL/hr. Calculate the dosage in mcg/hr and mcg/min.

   a. mcg/hr   _____

   b. mcg/min   _____

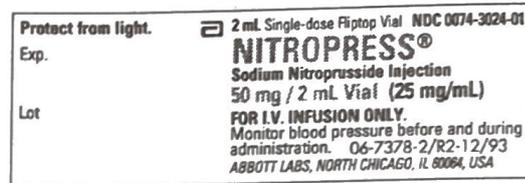   c. Calculate the number of milliliters you will add to the IV for this dosage. _____

   Available:

	NDC 0641-**0112-25**	**POTENT DRUG: MUST DILUTE BEFORE USING**
EXP.	LOT	25 x 5 mL *Single Use* Vials	Each mL contains dopamine hydrochloride 40 mg (equivalent to 32.3 mg dopamine base) and sodium bisulfite 10 mg in Water for Injection. pH 2.5-5.0. Sealed under nitrogen.

DOPAMINE
HCl INJECTION, USP
200 mg/5 mL
(40 mg/mL)
FOR IV INFUSION ONLY

POTENT DRUG: MUST DILUTE BEFORE USING
Each mL contains dopamine hydrochloride 40 mg (equivalent to 32.3 mg dopamine base) and sodium bisulfite 10 mg in Water for Injection. pH 2.5-5.0. Sealed under nitrogen.
USUAL DOSE: See package insert.
Do not use if solution is discolored.
Store at 15° - 30° C (59° - 86° F).
Caution: Federal law prohibits dispensing without prescription.   B-50112c

esi ELKINS-SINN, INC. Cherry Hill, NJ 08003 4000
A subsidiary of A. H. Robins Company

Notes

4. Infuse Nipride at 30 mL/hr. The solution available is 50 mg sodium nitroprusside in D5W 250 mL.

Available:

Protect from light.	⊇ 2 mL Single-dose Fliptop Vial NDC 0074-3024-01
Exp.	**NITROPRESS®** Sodium Nitroprusside Injection 50 mg / 2 mL Vial **(25 mg/mL)**
Lot	FOR I.V. INFUSION ONLY. Monitor blood pressure before and during administration. 06-7378-2/R2-12/93 *ABBOTT LABS, NORTH CHICAGO, IL 60064, USA*

Calculate the following:

a. mcg/hr

_____

b. mcg/min

_____

c. Number of milliliters you will
   add to the IV for this dosage

_____

5. Order: 100 mg Aramine in 250 mL D5W to infuse at 25 mL/hr. Calculate the following:

a. mcg/hr

_____

b. mcg/min

_____

6. Order: Lidocaine 2 g in 250 mL D5W to infuse at 60 mL/hr. Calculate the following:

a. mg/hr

_____

b. mg/min

_____

7. Order: Aminophylline 0.25 g to be added to 250 mL of D5W. The order is to infuse over 6 hr.

Available:

20 ml SINGLE USE VIAL
NDC 0641-2206-41
AMINOPHYLLINE
INJECTION, USP
500 mg **/20** ml
(25 mg/ml)
FOR SLOW INTRAVENOUS USE
NO PRESERVATIVE
SINGLE USE; DESTROY UN-USED CONTENTS
A-2206
Product Code: 2206-41
LOT
EXP.
⊖Si ELKINS-SINN, INC. Cherry Hill, NJ 08003-4099
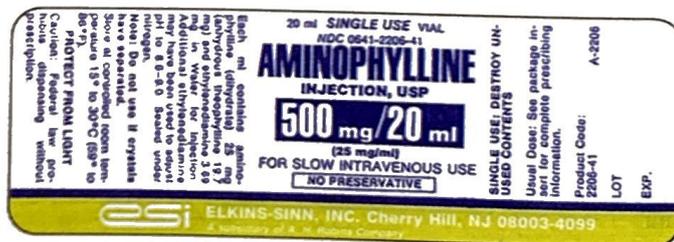
a. Calculate the dosage in mg/hr the
   client will receive.

_____

b. Calculate the number of milliliters
   you will add to the IV for this
   dosage.

_____

8. A client is receiving Pronestyl at 30 mL/hr. The solution available is 2 g Pronestyl in 250 mL D5W. Calculate the following:

    Notes

   a. mg/hr

   _____

   b. mg/min

   _____

9. Order: Pitocin (oxytocin) drip at 45 microgtt/min. The solution available is 20 units of Pitocin in 1000 mL of D5W. Calculate the following:

   a. units/min

   _____

   b. units/hr

   _____

10. Order: 30 units Pitocin (oxytocin) in 1000 mL D5W at 40 mL/hr.

    How many units of Pitocin is the
    client receiving per hour?

    _____ units/hr

11. 30 units of Pitocin is added to 500 mL D5RL for an induction. The client is receiving 45 mL/hr.

    How many units of Pitocin is the client
    receiving per hour?

    _____ units/hr

12. A client is receiving bretylium at 30 microgtt/min. The solution available is 2 g bretylium in 500 mL D5W. Calculate the following:

    a. mg/hr

    _____

    b. mg/min

    _____

13. A client is receiving bretylium at 45 microgtt/min. The solution available is 2 g bretylium in 500 mL D5W. Calculate the following:

    a. mg/hr

    _____

    b. mg/min

    _____

14. A client is receiving nitroglycerin 50 mg in 250 mL D5W. The order is to infuse 500 mcg/min.

    What flow rate in mL/hr would be
    needed to deliver this amount?

    _____

15. Dopamine has been ordered to maintain a client's blood pressure; 400 mg dopamine has been placed in 500 mL D5W to infuse at 35 mL/hr.

    How many milligrams are being
    administered per hour?

    _____

16. Order: A client is receiving Isuprel 2 mg in 250 mL D5W. The order is to infuse at 30 mL/hr. Calculate the following:

    a. mg/hr

    _____

    b. mcg/hr

    _____

    c. mcg/min

    _____

Notes

17. Order: 1 g of aminophylline in 1000 mL D5W to infuse over 10 hr.

    Calculate the dosage in mg/hr the
    client will receive.   _____

18. Ritodrine (Yutopar) 150 mg is placed in 500 mL D5W to infuse at 30 mL/hr.

    Calculate the dosage in mg/hr the
    client is receiving.   _____

19. A client is receiving lidocaine 2 g in 250 mL D5W. The solution is infusing at
    22 mL/hr. Calculate the following:

    a. mg/hr   _____

    b. mg/min   _____

20. Order: Epinephrine 4 mg in 250 mL D5W at 8 mL/hr. Calculate the following:

    mcg/hr   _____

21. Order: Esmolol 2.5 g in 250 mL 0.9% NS at 30 mL/hr. Calculate the following:

    a. mg/hr   _____

    b. mg/min   _____

22. Order: Dobutamine 500 mg in 500 mL D5W to infuse at 30 mL/hr.

    Available:

    NDC 0002-7175-01
    20 mL   VIAL No. 7175
    ℞   *Lilly*
    DOBUTREX®
    SOLUTION
    DOBUTAMINE
    HYDROCHLORIDE INJECTION
    Equiv. to
    250 mg
    Dobutamine per 20 mL
    SINGLE DOSE VIAL
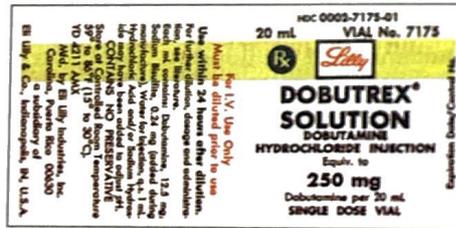
    Calculate the following:

    a. mcg/hr   _____

    b. mcg/min   _____

23. Order: 2 g/hr of 50% magnesium sulfate. The solution available is 25 g of 50%
    magnesium sulfate in 300 mL D5W.

    What flow rate in mL/hr would be needed
    to administer the required dose?   _____

24. Order: Dopamine 400 mg in 500 mL 0.9% NS to infuse at 200 mcg/min. A volu-
    metric pump is being used.

    Calculate the rate in mL/hr.   _____

Notes

25. Order: 3 g/hr magnesium sulfate.

    Available: 25 g of 50% magnesium sulfate in 300 mL D5W.

    What rate in mL/hr would be needed
    to administer the required dose?   _____

26. A client with chest pain has an order for nitroglycerin 50 mg in 250 mL D5W at
    10 mcg/min.

    Calculate the IV rate in gtt/min using
    a microdrop administration set.   _____

27. Order: Nipride 50 mg in 250 mL D5W to infuse at 2 mcg/kg/min. Client's weight
    is 120 lb.

    Calculate the dosage per minute.   _____

28. Order: Dobutrex 250 mg in 500 mL of D5W at 3 mcg/kg/min. The client weighs
    80 kg.

    What dosage in mcg/min should the
    client receive?   _____

29. Order: Infuse 500 mL D5W with 800 mg theophylline at 0.7 mg/kg/hr. The client
    weighs 73.5 kg.

    How many milligrams should this client
    receive per hour?   _____

30. Order: Infuse 1 g of aminophylline in 1000 mL of D5W at 0.7 mg/kg/hr. The client
    weighs 110 lb.

    a. Calculate the dosage in mg/hr.   _____

    b. Calculate the dosage in mg/min.   _____

    c. Reference states no more than
       20 mg/min. Is the order safe?   _____

31. Norepinephrine (Levophed) 2 to 6 mcg/min has been ordered to maintain a
    client's systolic blood pressure at 100 mm Hg. The solution concentration is 2 mg
    in 500 mL D5W.

    Determine the flow rate setting for a
    volumetric pump.   _____

32. Ritodrine (Yutopar) 150 mg is diluted in 500 mL of D5W. The order is to infuse at
    0.15 mg/min.

    Calculate the flow rate to deliver this
    dosage by volumetric pump.   _____

Notes

33. Esmolol is to titrate between 50 and 75 mcg/kg/min. The client weighs 60 kg. The solution strength is 5000 mg of Esmolol in 500 mL D5W.

    a. Determine the flow rate for a volumetric pump.

    _____

    b. The titration rate is at 24 mL/hr. What is the dosage infusing per minute?

    _____

34. Order: Dobutamine 500 mg in 250 mL D5W to infuse at 10 mcg/kg/min. The client weighs 65 kg.

    Calculate the flow rate in mL/hr (gtt/min). _____

35. Aminophylline 0.25 g is added to 250 mL D5W. The order is to infuse over 6 hr.

    Calculate the dosage in mg/hr the client will receive.

    _____

36. A client is receiving lidocaine 1 g in 500 mL D5W at a rate of 20 mL/hr. Calculate the following:

    a. mg/hr

    _____

    b. mg/min

    _____

37. A client is receiving Septra 300 mg in 500 mL D5W (based on trimethoprim) at a rate of 15 gtt/min (15 microgtt/min). The tubing is microdrop (60 gtt/mL). Calculate the following:

    a. mg/min

    _____

    b. mg/hr

    _____

38. Esmolol 1.5 g in 250 mL D5W has been ordered at a rate of 100 mcg/kg/min for a client weighing 102.4 kg. Determine the following:

    a. dosage in mcg/min

    _____

    b. rate in mL/hr

    _____

39. Order: Dopamine 400 mg in 500 mL D5W to infuse at 20 mL/hr. Determine the following:

    a. mg/min

    _____

    b. mcg/min

    _____

40. A client has an order for inamrinone (previously called amrinone) 250 mg in 250 mL 0.9% NS at 3 mcg/kg/min. Client's weight is 59.1 kg. Determine the flow rate in mL/hr.

    _____

41. Inocor 250 mg in 250 mL of 0.9% NS to infuse at a rate of 5 mcg/kg/min is ordered for a client weighing 165 lb. Calculate the following:

    a. mcg/min   _____

    b. mcg/hr   _____

    c. mL/hr   _____

42. Cardizem 125 mg in 100 mL D5W to infuse at 20 mg/hr.

    Available:

    NDC 0068-1790-32

    CARDIZEM® Injectable
    (diltiazem HCl injection)   FOR DIRECT INTRAVENOUS BOLUS
    25 mg (5 mg/mL)   INJECTION AND CONTINUOUS
                                   INTRAVENOUS INFUSION
    Sterile 5-mL Vial

    Determine the following:

    a. How many milliliters will you add to the IV? _____

    b. Determine the rate in mL/hr.   _____

43. 2 g Pronestyl in 500 mL D5W to infuse at 2 mg/min.

    Determine the rate in mL/hr.   _____

<div align="center">Answers on pp. 683-689</div>

<div align="center">

For additional practice problems, refer to the Advanced Calculations section on the enclosed CD-ROM.

</div>

40. 1 L = 1000 mL

40,000 units : 1000 mL = x units: 30 mL

$$\frac{1000x}{1000} = \frac{1,200,000}{1000}$$

x = 1200 units/hr

41. 1 L = 1000 mL

20,000 units : 1000 mL = x units : 80 mL

$$\frac{1000x}{1000} = \frac{1,600,000}{1000}$$

x = 1600 units/hr

42. 1 L = 1000 mL

50,000 units : 1000 mL = x units : 10 mL

$$\frac{1000x}{1000} = \frac{500,000}{1000}$$

x = 500 units/hr

43. 1 L = 1000 mL

20,000 units : 500 mL = x units : 30 mL

$$\frac{500x}{500} = \frac{600,000}{500}$$

x = 1200 units/hr

44. 1 L = 1000 mL

30,000 units : 1000 mL = x units : 25 mL

$$\frac{1000x}{1000} = \frac{750,000}{1000}$$

x = 750 units/hr

45. 100 units/mL is appropriate for flush. Heparin for injection cannot be interchanged with heparin lock soluton. Check order with prescriber.

46. a. First determine units/kg the client should receive.

50 units/kg × 80 kg = 4000 units

b. 1000 mL : 25,000 units = x mL : 4000 units

$$\frac{25,000x}{25,000} = \frac{4,000,000}{25,000}$$

x = 160 mL/hr

Answer: 160 mL/hr

CHAPTER 24

Answers to Practice Problems

1. a. Step 1: Conversion: Equivalent: 1000 mcg = 1 mg

Therefore 250 mg = 250,000 mcg

Step 2: 250,000 mcg : 500 mL = x mcg : 1 mL

$$\frac{500x}{500} = \frac{250,000}{500}; x = 500 \text{ mcg/mL}$$

Concentration of solution is 500 mcg/mL.

47. a. Convert the weight to kilograms.

Conversion factor: 2.2 lb = 1 kg

200 lb ÷ 2.2 = 90.9 kg

b. Calculate the heparin bolus dosage.

80 units/kg × 90.9 kg = 7272 units

Answer: 7272 units

48. a. Convert the weight to kilograms.

Conversion factor: 2.2 lb = 1 kg

125 lb ÷ 2.2 = 56.81 kg = 56.8 kg

Calculate the heparin bolus dosage.

80 units/kg × 56.8 kg = 4544 units

Answer: 4544 units

b. Calculate the infusion rate for the heparin drip.

18 units/kg × 56.8 kg = 1022.4 = 1022 units/hr

c. Calculate the infusion rate in mL/hr.

250 mL : 250,000 units = x mL : 1022 units/hr

$$\frac{250,000x}{250,000} = \frac{255,500}{250,000}$$

x = 1.022 = 1 mL/hr

49. a. Convert the weight to kilograms.

110 lb ÷ 2.2 = 50 kg

b. 18 units kg/hr × 50 kg = 900 units

Answer: 900 units/hr

50. a. Convert the weight to kilograms.

154 lb ÷ 2.2 = 70 kg

Calculate the heparin bolus dosage.

80 units/kg × 70 kg = 5600 units

Answer: 5600 units

b. Calculate the infusion rate for the heparin drip.

14 units/kg × 70 kg = 980 units/hr

Answer: 980 units/hr

c. Calculate the infusion rate in mL/hr.

1000 mL : 20,000 units = x mL : 980 units

$$\frac{20,000x}{20,000} = \frac{980,000}{20,000}$$

x = 4.9 = 5 mL/hr

Step 3: Calculate dosage range.

Lower dosage:

2.5 mcg × 50 kg = 125 mcg/min

Upper dosage:

5 mcg × 50 kg = 250 mcg/min

Step 4: Convert dosage range to mL/min.

Lower dosage:

500 mcg : 1 mL = 125 mcg : x mL

$$\frac{500x}{500} = \frac{125}{500}$$

$$x = 0.25 \text{ mL/min}$$

Upper dosage:

500 mcg : 1 mL = 250 mcg : x mL

$$\frac{500x}{500} = \frac{250}{500}$$

$$x = 0.5 \text{ mL/min}$$

Step 5: Convert mL/min to mL/hr.

Lower dosage: 0.25 mL × 60 min = 15 mL/hr (gtt/min)

Upper dosage: 0.5 mL × 60 min = 30 mL/hr (gtt/min)

A dosage range of 2.5-5 mcg/kg/min is equal to a flow rate of 15-30 mL/hr (gtt/min).

b. Determine dosage infusing per minute at 25 mL/hr:

500 mcg : 1 mL = x mcg : 25 mL

$$x = 12,500 \text{ mcg/hr}$$

12,500 mcg ÷ 60 min = 208.3 mcg/min

2. a. 2 mg : 250 mL = x mg : 30 mL

$$\frac{250x}{250} = \frac{60}{250}$$

$$x = 0.24 \text{ mg/hr}$$

b. Convert milligrams to micrograms. (1000 mcg = 1 mg).

0.24 mg = 240 mcg/hr

c. Convert mcg/hr to mcg/min.

240 mcg/hr ÷ 60 min = 4 mcg/min

3. a. Change grams to milligrams. (Note you were asked to calculate mg/hr.)

0.25 g = 250 mg (1 g = 1000 mg)

Calculate mg/hr.

250 mg : 500 mL = 20 mL : x mL

$$500x = 250 \times 20$$

$$\frac{500x}{500} = \frac{5000}{500}$$

$$x = 10 \text{ mg/hr}$$

4. Note: Calculate units per hour only.

Step 1: 60 gtt : 1 mL = 15 gtt : x mL

$$\frac{60x}{60} = \frac{15}{60}$$

$$x = 0.25 \text{ mL/min}$$

Step 2: 0.25 mL/min × 60 min = 15 mL/hr

Step 3: 10 units : 1000 mL = x units : 15 mL

$$\frac{1000x}{1000} = \frac{150}{1000} ; x = 0.15 \text{ units/hr}$$

5. Step 1: Determine the dosage per minute.

60 kg × 3 mcg/kg = 180 mcg/min

Step 2: Convert to dosage per hour.

180 mcg/min × 60 min = 10,800 mcg/hr

Step 3: Convert to like units. (1000 mcg = 1 mg)

10,800 mcg = 10.8 mg

Calculate flow rate (mL/hr).

50 mg : 250 mL = 10.8 mg : x mL

$$50x = 250 \times 10.8$$

$$\frac{50x}{50} = \frac{2700}{50}$$

$$x = 54 \text{ mL/hr}$$

6. a. 50 mg : 250 mL = x mg : 3 mL

$$\frac{250x}{250} = \frac{150}{250}$$

$$x = 0.6 \text{ mg/hr}$$

Convert to micrograms (1000 mcg = 1 mg).

0.6 mg = 600 mcg/hr

b. Convert mcg/hr to mcg/min.

60 mcg/hr ÷ 60 min = 10 mcg/min

Answers to Chapter Review

1. a. Calculate the dosage per hr.

2 mg : 250 mL = x mg : 30 mL

$$\frac{250x}{250} = \frac{60}{250}$$

$$x = \frac{60}{250}$$

$$x = 0.24 \text{ mg/hr}$$

b. Convert milligrams to micrograms (1000 mcg = 1 mg).

1000 × 0.24 mg/hr = 240 mcg/hr

c. Convert mcg/hr to mcg/min.

240 mcg/hr ÷ 60 min = 4 mcg/min

2. a. Calculate dosage per hr.

    4 mg : 500 mL = x mg : 40 mL

    $$\frac{500x}{500} = \frac{160}{500}$$

    $$x = \frac{160}{500}$$

    $$x = 0.32 \text{ mg/hr}$$

    b. Convert to micrograms (1000 mcg = 1 mg).

    1000 × 0.32 mg/hr = 320 mcg/hr

    c. Convert mcg/hr to mcg/min.

    320 mcg/hr ÷ 60 min = 5.33 = 5.3 mcg/min

3. Step 1: Determine dosage per hour.

    800 mg : 500 mL = x mg : 30 mL

    $$\frac{500x}{500} = \frac{24{,}000}{500}$$

    $$x = \frac{24{,}000}{500}$$

    $$x = 48 \text{ mg/hr}$$

    a. Step 2: Convert milligrams to micrograms (1000 mcg = 1 mg).

    48 mg/hr × 1000 = 48,000 mcg/hr

    b. Step 3: Convert mcg/hr to mcg/min.

    48,000 mcg/hr ÷ 60 min = 800 mcg/min

    c. 200 mg : 5 mL = 800 mg : x mL

    OR

    $$\frac{800 \text{ mg}}{200 \text{ mg}} \times 5 \text{ mL} = x \text{ mL};$$

    $$\frac{800 \text{ mg}}{200 \text{ mg}} = \frac{x \text{ mL}}{5 \text{ mL}}$$

    Answer: 20 mL. The dosage ordered is greater than what is available. Therefore you will need more than 5 mL to administer the dosage.

4. a. Determine dosage per hour.

    50 mg : 250 mL = x mg : 30 mL

    $$\frac{250x}{250} = \frac{1500}{250}$$

    $$x = \frac{1500}{250}$$

    $$x = 6 \text{ mg/hr}$$

    Convert milligrams to micrograms (1000 mcg = 1 mg).

    6 mg/hr × 1000 = 6000 mcg/hr

    b. Convert mcg/hr to mcg/min.

    6000 mcg/hr ÷ 60 min = 100 mcg/min

    c. 50 mg : 2 mL = 50 mL : x mL

    $$\frac{50 \text{ mg}}{50 \text{ mg}} \times 2 \text{ mL} = x \text{ mL};$$

    $$\frac{50 \text{ mg}}{50 \text{ mg}} = \frac{x \text{ mL}}{2 \text{ mL}}$$

    Answer: 2 mL. The dosage ordered is contained in a volume of 2 mL.

Alternate solution: 25 mg : 1 mL = 50 mg : x mL

OR

$$\frac{50 \text{ mg}}{25 \text{ mg}} \times 1 \text{ mL} = x \text{ mL};$$

$$\frac{50 \text{ mg}}{25 \text{ mg}} = \frac{x \text{ mL}}{1 \text{ mL}}$$

5. a. Calculate mg/hr.

    100 mg : 250 mL = x mg : 25 mL

    $$\frac{250x}{250} = \frac{2500}{250}$$

    $$x = \frac{2500}{250}$$

    $$x = 10 \text{ mg/hr}$$

    Convert milligrams to micrograms (1000 mcg = 1 mg).

    10 mg = 10,000 mcg/hr

    b. Convert mcg/hr to mcg/min.

    10,000 mcg/hr ÷ 60 min = 166.66 = 166.7 mcg/min

6. a. Convert metric weight to the same as answer requested. Convert grams to milligrams.

    1 g = 1000 mg; therefore 2 g = 2000 mg

    2000 mg : 250 mL = x mg : 60 mL

    $$\frac{250x}{250} = \frac{120{,}000x}{250}$$

    $$x = \frac{120{,}000}{250}$$

    $$x = 480 \text{ mg/hr}$$

    b. Convert mg/hr to mg/min.

    480 mg/hr ÷ 60 min = 8 mg/min

7. a. Step 1: Convert grams to milligrams (1000 mg = 1 g).

    0.25 g = 250 mg

    Step 2: Calculate mg/hr.

    250 mg : 6 hr = x mg : 1 hr

    $$\frac{6x}{6} = \frac{250}{6}$$

    $$x = \frac{250}{6}$$

    $$x = 41.66 = 41.7 \text{ mg/hr.}$$

    b. 500 mg : 20 mL = 250 mg : x mL

    OR

    $$\frac{250 \text{ mg}}{500 \text{ mg}} \times 20 \text{ mL} = x \text{ mL};$$

    $$\frac{250 \text{ mg}}{500 \text{ mg}} = \frac{x \text{ mL}}{1 \text{ mL}}$$

    Answer: 10 mL. The dosage ordered is less than the available strength; therefore you will need less than 20 mL to administer the dosage.

Alternate solution: 25 mg : 1 mL = 50 mg : x mL

OR

$$\frac{50 \text{ mg}}{25 \text{ mg}} \times 1 \text{ mL} = x \text{ mL};$$

$$\frac{50 \text{ mg}}{25 \text{ mg}} = \frac{x \text{ mL}}{1 \text{ mL}}$$

8. a. Convert grams to milligrams (1000 mg = 1 g).

    $$2 \text{ g} = 2000 \text{ mg}$$

    Calculate mg/hr.

    $$2000 \text{ mg} : 250 \text{ mL} = x \text{ mg} : 30 \text{ mL}$$

    $$\frac{250x}{250} = \frac{60,000}{250}$$

    $$x = \frac{60,000}{250}$$

    $$x = 240 \text{ mg/hr}$$

    b. Convert mg/hr to mg/min.

    $$240 \text{ mg} \div 60 \text{ min} = 4 \text{ mg/min}$$

9. a. Step 1: Calculate gtt/min to mL/min.

    $$60 \text{ gtt} : 1 \text{ mL} = 45 \text{ gtt} : x \text{ mL}$$

    $$\frac{60x}{60} = \frac{45}{60}$$

    $$x = \frac{45}{60}$$

    $$x = 0.75 \text{ mL/min}$$

    Step 2: Calculate units/min.

    $$20 \text{ units} : 1000 \text{ mL} = x \text{ units} : 0.75 \text{ mL}$$

    $$\frac{1000x}{1000} = \frac{15}{1000}$$

    $$x = \frac{15}{1000}$$

    $$x = 0.015 \text{ units/min}$$

    b. Calculate units/hr.

    $$0.015 \text{ units/min} \times 60 \text{ min} = 0.9 \text{ units/hr}$$

10. $$30 \text{ units} : 1000 \text{ mL} = x \text{ units} : 40 \text{ mL}$$

    $$\frac{1000x}{1000} = \frac{1200}{1000}$$

    $$x = \frac{1200}{1000}$$

    $$x = 1.2 \text{ units/hr}$$

11. $$30 \text{ units} : 500 \text{ mL} = x \text{ units} : 45 \text{ mL}$$

    $$\frac{500x}{500} = \frac{1350}{500}$$

    $$x = \frac{1350}{500}$$

    $$x = 2.7 \text{ units/hr}$$

12. a. Change metric measures to same as question.
    1 g = 1000 mg; therefore 2 g = 2000 mg

    Calculate mg/hr.

    $$2000 \text{ mg} : 500 \text{ mL} = x \text{ mg} : 30 \text{ mL}$$

    $$\frac{500x}{500} = \frac{60,000}{500}$$

    $$x = \frac{60,000}{500}$$

    $$x = 120 \text{ mg/hr}$$

    b. Change mg/hr to mg/min.

    $$120 \text{ mg/hr} \div 60 \text{ min} = 2 \text{ mg/min}$$

13. a. Change metric measures to same as question.

    $$2 \text{ g} = 2000 \text{ mg} (1 \text{ g} = 1000 \text{ mg})$$

    Calculate mg/hr.

    $$2000 \text{ mg} : 500 \text{ mL} = x \text{ mg} : 45 \text{ mL}$$

    $$\frac{500x}{500} = \frac{90,000}{500}$$

    $$x = \frac{90,000}{500}$$

    $$x = 180 \text{ mg/hr}$$

    b. Change mg/hr to mg/min

    $$180 \text{ mg/hr} \div 60 \text{ min} = 3 \text{ mg/min}$$

14. Determine dosage per hour.

    $$500 \text{ mcg/min} \times 60 \text{ min} = 30,000 \text{ mcg/hr}$$

    Convert micrograms to milligrams.

    $$1000 \text{ mcg} = 1 \text{ mg}$$

    $$30,000 \text{ mcg/hr} = 30 \text{ mg/hr}$$

    Calculate flow rate in mL/hr.

    $$50 \text{ mg} : 250 \text{ mL} = 30 \text{ mg} : x \text{ mL}$$

    $$\frac{50x}{50} = \frac{7,500}{50}$$

    $$x = 150 \text{ mL/hr}$$

    Set at 150 mL/hr to deliver 30 mg/hr.

15. $$400 \text{ mg} : 500 \text{ mL} = x \text{ mg} : 35 \text{ mL}$$

    $$\frac{500x}{500} = \frac{14,000}{500}$$

    $$x = 28 \text{ mg/hr}$$

16. a. Calculate mg/hr.

    $$2 \text{ mg} : 250 \text{ mL} = x \text{ mg} : 30 \text{ mL}$$

    $$\frac{250x}{250} = \frac{60}{250}$$

    $$x = \frac{60}{250}$$

    $$x = 0.24 \text{ mg/hr}$$

    b. Convert milligrams to micrograms.
    (1000 mcg = 1 mg).

    $$0.24 \text{ mg} \times 1000 = 240 \text{ mcg/hr}$$

    c. Convert mcg/hr to mcg/min.

    $$240 \text{ mcg} \div 60 \text{ min} = 4 \text{ mcg/min}$$

17. Convert metric weight to same as question.

$$1000 \text{ mg} = 1 \text{ g}$$

Calculate mg/hr.

$$1000 \text{ mg} : 10 \text{ hr} = x \text{ mg} : 1 \text{ hr}$$

$$\frac{10x}{10} = \frac{1000}{10}$$

$$x = 100 \text{ mg/hr}$$

18. $150 \text{ mg} : 500 \text{ mL} = x \text{ mg} : 30 \text{ mL}$

$$\frac{500x}{500} = \frac{4500}{500}$$

$$x = \frac{4500}{500}$$

$$x = 9 \text{ mg/hr}$$

19. a. Convert grams to milligrams.

$$2 \text{ g} = 2000 \text{ mg } (1000 \text{ mg} = 1 \text{ g})$$

$$2000 \text{ mg} : 250 \text{ mL} = x \text{ mg} : 22 \text{ mL}$$

$$\frac{250x}{250} = \frac{44{,}000}{250}$$

$$x = \frac{44{,}000}{250}$$

$$x = 176 \text{ mg/hr}$$

b. Change mg/hr to mg/min.

$$176 \text{ mg/hr} \div 60 \text{ min} = 2.93 = 2.9 \text{ mg/min}$$

20. Calculate dosage per hour.

$$4 \text{ mg} : 250 \text{ mL} = x \text{ mg} : 8 \text{ mL}$$

$$\frac{250x}{250} = \frac{32}{250}$$

$$x = \frac{32}{250}$$

$$x = 0.128 \text{ mg/hr}$$

Convert milligrams to micrograms.
(1000 mcg = 1 mg).

$$0.128 \text{ mg} \times 1000 = 128 \text{ mcg/hr}$$

21. Convert g to mg.

$$2.5 \text{ g} = 2500 \text{ mg } (1 \text{ g} = 1000 \text{ mg})$$

a. $250 \text{ mL} : 2500 \text{ mg} = 30 \text{ mL} : x \text{ mg}$

$$\frac{250x}{250} = \frac{75{,}000}{250}$$

$$x = \frac{75{,}000}{250}$$

$$x = 300 \text{ mg/hr}$$

b. Convert mg/hr to mg/min.

$$300 \text{ mg/hr} \div 60 \text{ min} = 5 \text{ mg/min}$$

22. a. Calculate mg/hr.

$$500 \text{ mg} : 500 \text{ mL} = x \text{ mg} : 30 \text{ mL}$$

$$\frac{500x}{500} = \frac{15{,}000}{500}$$

$$x = \frac{15{,}000}{500}$$

$$x = 30 \text{ mg/hr}$$

Convert milligrams to micrograms
(1000 mcg = 1 mg).

$$30 \text{ mg} = 30.000 \text{ mcg/hr}$$

b. Convert mcg/hr to mcg/min.

$$30{,}000 \text{ mcg/hr} \div 60 \text{ min} = 500 \text{ mcg/min}$$

23. $25 \text{ g} : 300 \text{ mL} = 2 \text{ g} : x \text{ mL}$

$$\frac{25x}{25} = \frac{600}{25}$$

$$x = \frac{600}{25}$$

$$x = 24 \text{ mL/hr; would administer 2 g}$$

24. Determine dosage per hour.

$$200 \text{ mcg/min} \times 60 \text{ min} = 12{,}000 \text{ mcg/hr}$$

Convert micrograms to milligrams
(1000 mcg = 1 mg).

$$12{,}000 \text{ mcg} \div 1000 = 12 \text{ mg/hr}$$

Calculate the mL/hr.

$$400 \text{ mg} : 500 \text{ mL} = 12 \text{ mg} : x \text{ mL}$$

$$\frac{400x}{400} = \frac{6000}{400}$$

$$x = 15 \text{ mL/hr}$$

25. $25 \text{ g} : 300 \text{ mL} = 3 \text{ g} : x \text{ mL}$

$$\frac{25x}{25} = \frac{900}{25}$$

$$x = \frac{900}{25}$$

$$x = 36 \text{ mL/hr; would administer 3 g}$$

26. Convert dosage per minute to dosage per hour.

$$10 \text{ mcg/min} \times 60 \text{ min} = 600 \text{ mcg/hr}$$

a. Convert measures to like units of measurement
(mcg to mg) 1000 mcg = 1 mg

$$600 \text{ mcg} = 600 \div 1000 = 0.6 \text{ mg}$$

b. Calculate mL/hr.

$$50 \text{ mg} : 250 \text{ mL} = 0.6 \text{ mg} : x \text{ mL}$$

$$\frac{50x}{50} = \frac{150}{50}$$

$$x = 3 \text{ mL/hr}$$

c. Calculate the flow rate in gtt/min.

$$x \text{ gtt/min} = \frac{3 \text{ mL} \times 60 \text{ gtt/mL}}{60 \text{ min}}$$

$$x = 3 \text{ gtt/min}; 3 \text{ microgtt/min}$$

To deliver 10 mcg/min, the IV is to infuse at 3 gtt/min (3 microgtt/min).

27. Convert weight in pounds to kilograms. (2.2 lb = 1 kg)

$$120 \text{ lb} = 54.54 = 54.5 \text{ kg}$$

Calculate dosage per minute.

$$54.5 \text{ kg} \times 2 \text{ mcg} = 109 \text{ mcg/min}$$

28. No conversion of weight is required.

$$80 \text{ kg} \times 3 \text{ mcg} = 240 \text{ mcg/min}$$

29. No conversion of weight is required.

$$73.5 \text{ kg} \times 0.7 \text{ mg} = 51.45 \text{ mg/hr}$$

30. a. Convert weight in pounds to kilograms. (2.2 lb = 1 kg)

$$110 \text{ lb} \div 2.2 = 50 \text{ kg}$$

Calculate the dosage per hour.

$$50 \text{ kg} \times 0.7 \text{ mg} = 35 \text{ mg/hr}$$

b. Calculate the dosage per minute.

$$35 \text{ mg/hr} \div 60 \text{ min} = 0.58 \text{ mg/min} = 0.6 \text{ mg/min}$$

c. The dosage is safe; it falls within the safe range.

31. Step 1: Convert to like units.

Equivalent: 1000 mcg = 1 mg

Therefore 2 mg = 2000 mcg

Step 2: Calculate the concentration of solution in mcg/mL.

$$2000 \text{ mcg} : 500 \text{ mL} = x \text{ mcg} : 1 \text{ mL}$$

$$\frac{500x}{500} = \frac{2000}{500}$$

$$x = 4 \text{ mcg/mL}$$

Lower dosage: 4 mcg : 1 mL = 2 mcg : x mL

$$\frac{4x}{4} = \frac{2}{4}$$

$$x = 0.5 \text{ mL/min}$$

Upper dosage: 4 mcg : 1 mL = 6 mcg : x mL

$$\frac{4x}{4} = \frac{6}{4}$$

$$x = 1.5 \text{ mL/min}$$

Step 3: Convert mL/min to mL/hr.

Lower dosage: 0.5 mL × 60 min = 30 mL/hr (gtt/min)

Upper dosage: 1.5 mL × 60 min = 90 mL/hr (gtt/min)

A dosage range of 2-6 mcg/min is equal to a flow rate of 30-90 mL/hr (gtt/min).

32. Determine the dosage per hour.

$$0.15 \text{ mg/min} \times 60 \text{ min} = 9 \text{ mg/hr}$$

Calculate the flow rate (mL/hr, gtt/min).

$$150 \text{ mg} : 500 \text{ mL} = 9 \text{ mg} : x \text{ mL}$$

$$\frac{150x}{150} = \frac{4500}{150} = 30 \text{ mL/hr}$$

To infuse 0.15 mg/min, set the flow rate at 30 mL/hr (gtt/min).

33. Step 1: Convert to like units of measurement.

Equivalent: 1000 mcg = 1 mg

Therefore 5000 mg = 5,000,000 mcg

Step 2: Calculate the concentration of solution in mcg/mL.

$$5,000,000 \text{ mcg} : 500 \text{ mL} = x \text{ mcg} : 1 \text{ mL}$$

$$\frac{500x}{500} = \frac{5,000,000}{500}$$

$$x = 10,000 \text{ mcg/mL}$$

The concentration of solution is 10,000 mcg/mL.

Step 3: Calculate the dosage range.

Lower dosage: 50 mcg × 60 kg = 3000 mcg/min

Upper dosage: 75 mcg × 60 kg = 4500 mcg/min

Step 4: Convert the dosage range to mL/min.

Lower dosage: 10,000 mcg : 1 mL = 3000 mcg : x mL

$$\frac{10,000x}{10,000} = \frac{3000}{10,000}$$

$$x = 0.3 \text{ mL/min}$$

Upper dosage: 10,000 mcg : 1 mL = 4500 mcg : x mL

$$\frac{10,000x}{10,000} = \frac{4500}{10,000}$$

$$x = 0.45 \text{ mL/min}$$

Step 5: Convert mL/min to mL/hr.

Lower dosage: 0.3 mL × 60 min = 18 mL/hr (gtt/min)

Upper dosage: 0.45 mL × 60 min = 27 mL/hr (gtt/min)

a. A dosage range of 50-75 mcg is equal to a flow rate of 18-27 mL/hr (gtt/min).

b. Determine the dosage per minute infusing at 24 mL/hr.

$$10,000 \text{ mcg} : 1 \text{ mL} = x \text{ mcg} : 24 \text{ mL}$$

$$x = 10,000 \times 24 = 240,000 \text{ mcg/hr}$$

$$240,000 \text{ mcg/hr} \div 60 \text{ min} = 4000 \text{ mcg/min}$$

34. Calculate the dosage per minute for the client.
$$65 \text{ kg} \times 10 \text{ mcg} = 650 \text{ mcg/min}$$
Determine the dosage per hour.
$$650 \text{ mcg/min} \times 60 \text{ min} = 39,000 \text{ mcg/hr}$$
Convert to like units.
$$1000 \text{ mcg} = 1 \text{ mg}$$
$$39,000 \text{ mcg} = 39 \text{ mg/hr}$$
Calculate mL/hr flow rate:
$$500 \text{ mg} : 250 \text{ mL} = 39 \text{ mg} : x \text{ mL}$$
$$x = 19.5 = 20 \text{ mL/hr}$$
Answer: To deliver a dosage of 10 mcg/kg, set the flow rate at 20 mL/hr (gtt/min).

35. Convert grams to milligrams.
$$1000 \text{ mg} = 1 \text{ g}$$
$$0.25 \text{ g} = 250 \text{ mg}$$
Calculate mg/hr.
$$250 \text{ mg} \div 6 = 41.6 = 42 \text{ mg/hr}$$
Answer: The client is receiving 42 mg of aminophylline per hour.

36. a. Convert grams to milligrams.
$$1 \text{ g} = 1000 \text{ mg}$$
Calculate mg/hr.
$$1000 \text{ mg} : 500 \text{ mL} = x \text{ mg} : 20 \text{ mL}$$
$$\frac{500x}{500} = \frac{20,000}{500}$$
$$x = \frac{20,000}{500}$$
$$x = 40 \text{ mg/hr}$$
b. Convert mg/hr to mg/min.
$$40 \text{ mg/hr} \div 60 \text{ min} = 0.66 \text{ mg/min} = 0.7 \text{ mg}$$
Answer: At the rate of 20 mL/hr, the client is receiving a dosage of 40 mg/hr or 0.7 mg/min.

37. a. Convert gtt/min to mL/min.
$$60 \text{ gtt} : 1 \text{ mL} = 15 \text{ gtt} : x \text{ mL}$$
$$x = 0.25 = 0.3 \text{ mL/min}$$
Determine mg/min.
$$300 \text{ mg} : 500 \text{ mL} = x \text{ mg} : 0.3 \text{ mL}$$
$$x = 0.18 = 0.2 \text{ mg/min}$$
b. Calculate mg/hr.
$$0.2 \text{ mg/min} \times 60 \text{ min} = 12 \text{ mg/hr}$$
Answer: At 15 gtt/min, the client is receiving a dosage of 0.2 mg/min and 12 mg/hr.

38. a. 10,240 mcg/min
b. 102 mL/hr
Calculate the dosage per minute.
$$100 \text{ mcg/kg/min} \times 102.4 \text{ kg} = 10,240 \text{ mcg/min}$$

Convert mcg/min to mg/min.
$$10,240 \text{ mcg} \div 1000 = 10.24 = 10.2 \text{ mg/min}$$
Convert mg/min to mg/hr.
$$10.2 \text{ mg/min} \times 60 \text{ min} = 612 \text{ mg/hr}$$
Calculate flow rate.
$$1 \text{ g} = 1000 \text{ mg}; 1.5 \text{ g} = 1,500 \text{ mg}$$
$$1500 \text{ mg} : 250 \text{ mL} = 612 \text{ mg} : x \text{ mL}$$
$$1500 x = 250 \times 612$$
$$\frac{1500x}{1500} = \frac{153,000}{1500}$$
$$x = 102 \text{ mL/hr}$$
OR
$$\frac{1500 \text{ mg}}{250 \text{ mL}} = \frac{612 \text{ mg}}{x \text{ mL}}$$

39. a. 0.27 mg/min
b. 270 mcg/min
Calculate mg/hr infusing.
$$500 \text{ mL} : 400 \text{ mg} = 20 \text{ mL} : x \text{ mg}$$
OR
$$\frac{500 \text{ mL}}{400 \text{ mg}} = \frac{20 \text{ mL}}{x \text{ mg}}$$
$$500x = 400 \times 20$$
$$\frac{500x}{500} = \frac{8,000}{500}$$
$$x = 16 \text{ mg/hr}$$
Calculate the mg/min infusing.
$$16 \text{ mg/hr} \div 60 \text{ min} = 0.266 = 0.27 \text{ mg/min}$$
$$0.27 \text{ mg} = 270 \text{ mcg/min}$$

40. 11 mL/hr
Calculate dosage per minute.
$$3 \text{ mcg/kg/min} \times 59.1 \text{ kg} = 177.3 \text{ mcg/min}$$
Convert mcg/min to mcg/hr.
$$177.3 \text{ mcg/min} \times 60 \text{ min} = 10,638 \text{ mcg/hr}$$
Convert mcg/hr to mg/hr.
$$10,638 \text{ mcg/hr} = 10.63 = 10.6 \text{ mg/hr}$$
Calculate the flow rate.
$$250 \text{ mg} : 250 \text{ mL} = 10.6 \text{ mg} : x \text{ mL}$$
OR
$$\frac{250 \text{ mg}}{250 \text{ mL}} = \frac{10.6 \text{ mg}}{x \text{ mL}}$$
$$250x = 250 \times 10.6$$
$$\frac{250x}{250} = \frac{2650}{250}$$
$$x = 10.6 = 11 \text{ mL/hr}$$

41. a. 375 mcg/min
    b. 22,500 mcg/hr
    c. 23 mL/hr

    Convert client's weight to kilograms
    (2.2 lb = 1 kg).

    $$165 \text{ lb} \div 2.2 = 75 \text{ kg}$$

    Calculate dosage per minute.

    $$5 \text{ mcg/kg/min} \times 75 \text{ kg} = 375 \text{ mcg/min}$$

    Convert mcg/min to mcg/hr.

    $$375 \text{ mcg/min} \times 60 \text{ min} = 22,500 \text{ mcg/hr}$$

    Convert mcg/hr to mg/hr.

    $$22,500 \text{ mcg/hr} = 22.5 \text{ mg/hr}$$

    Calculate flow rate.

    $$250 \text{ mg} : 250 \text{ mL} = 22.5 \text{ mg} : x \text{ mL}$$

    OR

    $$\frac{250 \text{ mg}}{250 \text{ mL}} = \frac{22.5 \text{ mg}}{x \text{ mL}}$$
    $$250x = 250 \times 22.5$$
    $$\frac{250x}{250} = \frac{5625}{250}$$
    $$x = 22.5 = 23 \text{ mL/hr}$$

42. a. 5 mg : 1 mL = 125 mg : x mL

    OR

    $$\frac{125 \text{ mg}}{5 \text{ mg}} \times 1 \text{ mL} = x \text{ mL}; \quad \frac{125 \text{ mg}}{5 \text{ mg}} = \frac{x \text{ mL}}{1 \text{ mL}}$$

    Answer: 2.5 mL. The dosage ordered is more than the available strength. Therefore you will need more than 5 mL to administer the dosage.

    b. 125 mg : 100 mL = 20 mg : x mL

    $$125x = 100 \times 20$$
    $$\frac{125x}{125} = \frac{2000}{125}$$
    $$x = 16 \text{ mL/hr}$$

43. Calculate the dosage per hour.

    $$2 \text{ mg/min} \times 60 \text{ min} = 120 \text{ mg/hr}$$

    Convert grams to milligrams.

    $$1000 \text{ mg} = 1 \text{ g}; 2 \text{ g} = 2000 \text{ mg}$$

    Calculate mL/hr.

    $$2000 \text{ mg} : 500 \text{ mL} = 120 \text{ mg} : x \text{ mL}$$

    $$2000x = 500 \times 120$$
    $$\frac{2000x}{2000} = \frac{60,000}{2,000}$$
    $$x = 30 \text{ mL/hr}$$

ANSWERS TO COMPREHENSIVE POST-TEST

*N*ote Calculations may be performed using formula method, ratio and proportion, or dimensional analysis.

1. 200 mg : 5 mL = 300 mg : x mL

   OR

   $$\frac{300 \text{ mg}}{200 \text{ mg}} \times 5 \text{ mL} = x \text{ mL}; \quad \frac{300 \text{ mg}}{200 \text{ mg}} = \frac{x \text{ mL}}{5 \text{ mL}}$$
   Answer: 7.5 mL

2. Conversion is required.
   Equivalent: 1000 mg = 1 g
   500 mg : 1 tab = 1000 mg : x tab

   OR

   $$\frac{1000 \text{ mg}}{500 \text{ mg}} \times 1 \text{ tab} = x \text{ tab}; \quad \frac{1000 \text{ mg}}{500 \text{ mg}} = \frac{x \text{ tab}}{1 \text{ tab}}$$
   Answer: 2 tabs

3. 0.1 mg : 1 cap = 0.2 mg : x cap

   OR

   $$\frac{0.2 \text{ mg}}{0.1 \text{ mg}} \times 1 \text{ cap} = x \text{ cap}; \quad \frac{0.2 \text{ mg}}{0.1 \text{ mg}} = \frac{x \text{ cap}}{1 \text{ cap}}$$
   Answer: 2 caps

4. a. Tablets B Septra DS.

   b. The prescriber's order indicates DS, which means double strength; therefore the client should be given the tabs that are labeled DS.

5. 0.1 mg : 1 mL = 1 mg : x mL

   OR

   $$\frac{1 \text{ mg}}{0.1 \text{ mg}} \times 1 \text{ mL} = x \text{ mL}; \quad \frac{1 \text{ mg}}{0.1 \text{ mg}} = \frac{x \text{ mL}}{1 \text{ mL}}$$
   Answer: 10 mL