

Student Workbook Calculating Dosages Online

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Contents

| Module | Page |
|--|------|
| Basic Math Review | 1 |
| Methods of Calculation | 8 |
| Systems of Measurement | 14 |
| Intake and Output | 21 |
| Reading Medication Labels | 31 |
| Oral Medications | 41 |
| Syringes and Needles | 51 |
| Parenteral Medications | 61 |
| Reconstitution of Powdered Medications | 72 |
| IV Calculations | 85 |
| Pediatric Calculations | 103 |
| Titration of IV Medications | 115 |
| Answers | 121 |

Module: BASIC MATH REVIEW

FRACTIONS

KEY POINTS:

- Check the denominators before adding and subtracting fractions. If they are different, find the lowest common denominator, then solve the problem.
- For multiplication of fractions, just multiply the numerators and the denominators.
- For division of fractions, remember to invert the second fraction. Then, multiply the numerators and the denominators.
- Change all mixed numbers to improper fractions before working out the problem.
- Simplify all fractions to the equivalent fraction.

Working With Addition of Fractions

Add the following fractions and mixed numbers.

1. $\frac{2}{5} + \frac{1}{5} =$ _____

2. $\frac{2}{21} + \frac{18}{42} =$ _____

3. $\frac{2}{5} + \frac{2}{3} =$ _____

4. $4 \frac{4}{8} + \frac{3}{4} =$ _____

5. $2 \frac{3}{4} + \frac{1}{5} + 2 \frac{1}{2} =$ _____

6. $3 \frac{1}{8} + 4 \frac{5}{6} + 7 \frac{1}{4} =$ _____

7. $8 \frac{2}{9} + 2 \frac{1}{5} + 3 \frac{2}{3} =$ _____

8. $6 \frac{7}{15} + 3 \frac{4}{5} + 4 \frac{5}{6} =$ _____

9. $3 \frac{1}{10} + 5 \frac{2}{5} + 9 \frac{1}{8} =$ _____

10. $11 \frac{1}{8} + 7 \frac{3}{4} + 2 \frac{7}{8} =$ _____

Working With Subtraction of Fractions

Subtract the following fractions and mixed numbers.

1. $\frac{5}{6} - \frac{1}{3} =$ _____

2. $\frac{8}{10} - \frac{1}{2} =$ _____

3. $\frac{7}{8} - \frac{2}{3} =$ _____

4. $4 \frac{1}{4} - 1 \frac{3}{8} =$ _____

5. $10 \frac{1}{2} - 3 \frac{1}{5} =$ _____

6. $8 \frac{1}{6} - 5 \frac{2}{3} =$ _____

7. $11 \frac{2}{5} - 6 \frac{7}{8} =$ _____

8. $20 \frac{1}{8} - 9 \frac{2}{3} =$ _____

9. $15 \frac{2}{7} - 4 \frac{5}{6} =$ _____

10. $10 \frac{1}{2} - 3 \frac{2}{5} =$ _____

Working With Multiplication of Fractions

Multiply the following fractions and mixed numbers.

1. $\frac{6}{8} \times \frac{2}{5} =$ _____
2. $\frac{10}{9} \times \frac{1}{2} =$ _____
3. $\frac{5}{12} \times 1 \frac{1}{5} =$ _____
4. $3 \frac{1}{8} \times \frac{3}{10} =$ _____
5. $5 \frac{1}{2} \times 3 \frac{3}{5} =$ _____
6. $3 \frac{1}{3} \times 4 \frac{3}{7} =$ _____
7. $2 \frac{5}{6} \times 1 \frac{1}{8} =$ _____
8. $4 \frac{5}{7} \times 2 \frac{2}{5} =$ _____
9. $6 \frac{1}{8} \times 3 \frac{2}{3} =$ _____
10. $1 \frac{1}{9} \times 2 \frac{11}{12} =$ _____

Working With Division of Fractions

Divide the following fractions and mixed numbers.

1. $\frac{7}{10} \div \frac{1}{2} =$ _____
2. $\frac{1}{150} \div \frac{1}{3} =$ _____
3. $\frac{6}{8} \div \frac{3}{5} =$ _____
4. $4 \frac{5}{7} \div \frac{1}{2} =$ _____
5. $3 \frac{1}{2} \div 3 \frac{3}{4} =$ _____

6. $2 \frac{2}{5} \div 5 \frac{4}{5} =$ _____
7. $4 \frac{1}{8} \div 7 \frac{1}{2} =$ _____
8. $6 \frac{2}{9} \div 3 \frac{1}{3} =$ _____
9. $4 \frac{5}{7} \div \frac{1}{7} =$ _____
10. $5 \frac{1}{2} \div 8 \frac{3}{4} =$ _____

DECIMALS

KEY POINTS:

- When adding and subtracting decimals, make sure that the decimal points are lined up directly under each other.
- For multiplication of decimals, count the total number of decimal places in the numbers to be multiplied. Then, count the same number of decimal places in the answer and place the decimal point.
- When dividing decimals, if there is a decimal point in the divisor, move the decimal point to make the divisor a whole number. Then, move the decimal point in the dividend the same number of decimal places. Place the decimal point in the answer in the same place as in the dividend.

Working With Addition of Decimals

Add the following decimals.

1. $3.7 + 5998 + 0.0032 + 72.91 =$ _____
2. $78.2 + 55 + 9.005 =$ _____
3. $1.75 + 0.234 + 0.004 =$ _____
4. $0.17 + 7 + 1954 + 0.0013 =$ _____

5. $2.29 + 5.01 + 45 + 4.67 = \underline{\hspace{2cm}}$
6. $53.1 + 8.2 + 9.5 = \underline{\hspace{2cm}}$
7. $11.6 + 10 + 0.02 = \underline{\hspace{2cm}}$
8. $2.17 + 7.1 + 50 + 0.25 = \underline{\hspace{2cm}}$
9. $20.4 + 0.1 + 37 + 8.21 = \underline{\hspace{2cm}}$
10. $3.09 + 6.70 + 5 + 14.2 = \underline{\hspace{2cm}}$
11. $31.4 + 2.1 + 1.09 + 1.4 = \underline{\hspace{2cm}}$
12. $0.07 + 4.25 + 19 + 4.8 = \underline{\hspace{2cm}}$

Working With Subtraction of Decimals
Subtract the following decimals.

1. $321.02 - 0.0045 = \underline{\hspace{2cm}}$
2. $1.031 - 0.98 = \underline{\hspace{2cm}}$
3. $9012.4 - 0.067 = \underline{\hspace{2cm}}$
4. $7050.3 - 1.037 = \underline{\hspace{2cm}}$
5. $8 - 0.023 = \underline{\hspace{2cm}}$
6. $605.1 - 4.05 = \underline{\hspace{2cm}}$
7. $425.2 - 1.503 = \underline{\hspace{2cm}}$
8. $67.09 - 0.29 = \underline{\hspace{2cm}}$
9. $9167.3 - 463.5 = \underline{\hspace{2cm}}$
10. $876 - 22.9 = \underline{\hspace{2cm}}$
11. $1256.3 - 702.4 = \underline{\hspace{2cm}}$
12. $950 - 10.8 = \underline{\hspace{2cm}}$

Working With Multiplication of Decimals

Multiply the following decimals.

1. $301.12 \times 0.25 = \underline{\hspace{2cm}}$
2. $2.021 \times 0.8 = \underline{\hspace{2cm}}$
3. $502.6 \times 0.67 = \underline{\hspace{2cm}}$
4. $75.3 \times 1.037 = \underline{\hspace{2cm}}$
5. $5.1 \times 0.02 = \underline{\hspace{2cm}}$
6. $201.01 \times 0.15 = \underline{\hspace{2cm}}$
7. $61.48 \times 0.06 = \underline{\hspace{2cm}}$
8. $30.6 \times 0.24 = \underline{\hspace{2cm}}$
9. $150 \times 2.134 = \underline{\hspace{2cm}}$
10. $8.25 \times 0.03 = \underline{\hspace{2cm}}$
11. $65.02 \times 1.04 = \underline{\hspace{2cm}}$
12. $10.3 \times 4.9 = \underline{\hspace{2cm}}$

Working With Division of Decimals

Divide the following decimals.

1. $0.9 \div 0.02 = \underline{\hspace{2cm}}$
2. $16.80 \div 0.15 = \underline{\hspace{2cm}}$
3. $382.32 \div 54 = \underline{\hspace{2cm}}$
4. $75.85 \div 3.7 = \underline{\hspace{2cm}}$
5. $0.0015 \div 0.03 = \underline{\hspace{2cm}}$
6. $100.3 \div 0.25 = \underline{\hspace{2cm}}$

7. $250.12 \div 5.2 = \underline{\hspace{2cm}}$
8. $1000.8 \div 12 = \underline{\hspace{2cm}}$
9. $70.05 \div 1.5 = \underline{\hspace{2cm}}$
10. $0.0226 \div 0.4 = \underline{\hspace{2cm}}$
11. $618.2 \div 12.5 = \underline{\hspace{2cm}}$
12. $0.542 \div 0.5 = \underline{\hspace{2cm}}$

Module: METHODS OF CALCULATION

SELECT A METHOD OF CALCULATION

Linear Ratio and Proportion:

$$5 \text{ mg} : 1 \text{ tab} :: 10 \text{ mg} : x \text{ tab}$$

Fractional Ratio and Proportion:

$$\frac{5 \text{ mg}}{1 \text{ tab}} = \frac{10 \text{ mg}}{x \text{ tab}}$$

Dimensional Analysis:

$$\frac{10 \text{ mg}}{1} \times \frac{1 \text{ tab}}{5 \text{ mg}} = x \text{ tab}$$

Formula:

$$\frac{10 \text{ mg}}{5 \text{ mg}} \times 1 \text{ tab} = x \text{ tab}$$

KEY POINTS:

- Learn the method of your choice; study the setup.
- To arrive at the correct answer, the units of measurement must be set up so that they cancel.

Working With a Method of Calculation

Solve the following problems using the method of your choice.

1. The order is for 50 mg. The pharmacy sends 25 mg tablets. How many tablets will the nurse give?

2. The order is for 75 mg. The pharmacy sends 50 mg scored tablets. How many tablets will the nurse give?

3. The order is for 1 mcg. The pharmacy sends 0.5 mcg pills. How many pills will the nurse give?

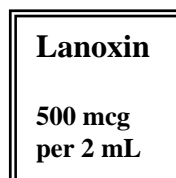
4. The order is for 0.5 g. The pharmacy sends 1 g scored tablets. How many tablets will the nurse give?

5. The order is for 1.2 gram. The pharmacy sends 0.4 gram caplets. How many caplets will the nurse give?

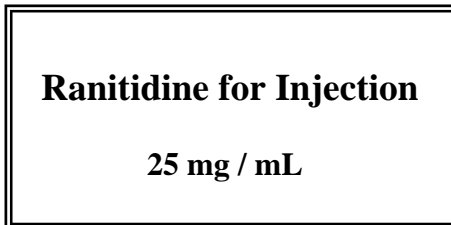
6. The order is for 7 mg. The pharmacy sends an elixir labeled 2 mg / mL. How many mL will the nurse give?

7. The order is for 90 mg of a drug. The pharmacy sends 30 mg / 2 mL. How many mL will the nurse give?

8. The doctor orders Lanoxin 125 mcg daily. The nurse finds the following in the patient's medication drawer. How many mL of Lanoxin will the nurse administer?

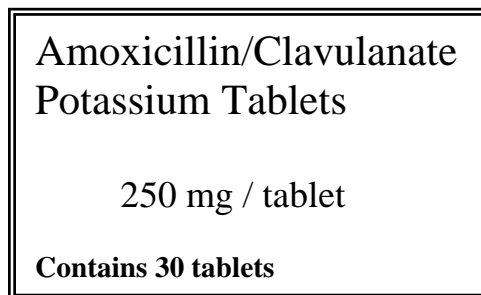


9. The order is for IV ranitidine 75 mg q.8h. The pharmacy sends the following vial of ranitidine. How many mL will the nurse give per dose?



10. The order is for 100 mg. The pharmacy sends an oral suspension labeled 12.5 mg / 2 mL. How many mL will the nurse give?

11. The order is for amoxicillin/clavulanate 250 mg t.i.d. The pharmacy sends the following medication. How many days will the bottle last?



12. The order is for 125 mg b.i.d. The pharmacy sends a 200 mL bottle labeled 12.5 mg / mL. How many days will the bottle last?

13. The order is for 0.015 gram of medication IM stat. The pharmacy sends a vial of the medication labeled 0.01 gram per 1.5 mL. How many mL will the nurse administer?

14. The physician orders 21 mg p.o. t.i.d. The nurse has a 100 mL bottle labeled 6 mg / mL. How many mL will the patient receive per dose?

15. The patient is to receive 60 mcg p.o. q.AM. The nurse has a bottle labeled 4 mcg / 2 mL. How many mL will the patient receive each day?

16. The physician orders heparin sodium 6000 units subcut q.12h. The pharmacy sends the following vial of heparin. How many mL will the patient receive per dose?

| |
|---|
| Heparin Sodium 10,000 units / mL |
|---|

17. The doctor orders 0.4 mg of a drug b.i.d. The pharmacy sends a bottle labeled 0.4 mg per pill. The bottle contains 30 pills. How many days will this bottle last?

18. The patient has an order for amoxicillin oral suspension 500 mg q.8h. The medication drawer contains the following bottle of amoxicillin. How many mL will the patient receive per dose?

| | |
|--|------------------------------|
| <p>Amoxicillin Oral Suspension</p> <table border="1"><tr><td><p>125 mg in 5 mL</p></td></tr></table> <p>For oral use only. Shake well before use.</p> | <p>125 mg in 5 mL</p> |
| <p>125 mg in 5 mL</p> | |

19a. The doctor orders 0.4 mg of a medication b.i.d. The pharmacy sends a vial labeled 1 mg / mL. How many mL will the patient receive?

b. If the vial contains 2 mL, how many doses are available in the vial?

- 20a. The order is for heparin 8000 units subcut now. The pharmacy sends the following dose of heparin. Calculate the number of mL the patient will receive.**

| |
|---|
| <p>Heparin Sodium</p> <p>10,000 units / mL</p> <p>Multidose vial containing 4 mL</p> |
|---|

- b. How many doses will the nurse be able to give from the above vial?**

- c. If the order is changed to heparin 6500 units subcut daily, how many mL will the patient receive per dose?**

- d. How many doses of 6500 units subcut daily will the nurse be able to give from the multidose vial?**

Module: SYSTEMS OF MEASUREMENT

METRIC SYSTEM: UNITS OF MEASUREMENT

Kilo Hecto Deka BASIC Deci Centi Milli Micro
UNIT

KEY POINTS:

- Memorize the metric units of measurement, metric abbreviations, and the metric line.

Working With the Metric System

Fill in the blanks with the correct answer.

1. 3.500 L = _____ mL
2. 0.7 L = _____ mL
3. 1000 mg = _____ gram
4. 100 mcg = _____ mg
5. 10 mg = _____ mcg
6. 2 mg = _____ mcg
7. 35.6 mg = _____ gram
8. 7.45 mL = _____ L
9. 0.07 cm = _____ dm
10. 10 km = _____ m
11. 100 cm = _____ mm
12. 1.65 kg = _____ g

13. 1500 mL = _____ L

14. 2.5 g = _____ mg

15. The patient receives vancomycin 750 mg IV b.i.d. How many g does the patient receive per dose?

16. The patient has an order for 0.5 g of ampicillin. How many mg will the nurse administer?

17. The patient receives levothyroxine 75 mcg p.o. q.AM. How many mg does the patient receive?

18. The doctor's order is for digoxin elixir 0.45 mg p.o. now. This dose is equivalent to ____ mcg.

19. The weight of a medication is 1.2 kg. This is equivalent to __ g.

20. A wound measures 4 cm in length. This is equivalent to _____ mm.

21. The patient has an order for Versed 7 mg IV. The pharmacy sends a vial of Versed labeled 5 mg / mL. How many mL will the nurse administer?

22. The drug order is for lactulose 1000 mg p.o. b.i.d. for the patient. The pharmacy sends a container labeled lactulose 1 g / 10 mL. How many mL will the nurse administer per dose?

23. The doctor orders Solu-Medrol 125 mg IV q.12h. for the patient. The pharmacy sends Solu-Medrol 0.25 g / mL. How many mL will the nurse administer per dose?

24. The physician writes an order for Benadryl 50 mg orally q.6h. as needed for the patient. The nurse has a bottle of Benadryl labeled 12.5 mg / 5 mL. How many mL will the nurse administer per dose?

25. The nurse is preparing to administer 750 mg of vitamin C to the patient at 9:00 AM. In the patient's medication drawer, the nurse finds vitamin C tablets labeled 0.5 g / tablet. How many tablets will the nurse administer to the patient at 9:00 AM?

26. The order is for lorazepam 0.5 mg IM now. The nurse has a vial of lorazepam labeled 2 mg / mL. How many mL will the nurse administer to the patient?

**HOUSEHOLD SYSTEM:
UNITS OF MEASUREMENT**

| UNIT | EQUIVALENT MEASUREMENT | ABBREVIATION |
|----------------|------------------------|--------------|
| 1 glass | 8 ounces | -- |
| 1 cup | 8 ounces | -- |
| 1 teacup | 6 ounces | -- |
| 1 tablespoon | 3 teaspoons | T, Tbs |
| 1 teaspoon | 5 mL | t, tsp |
| 1 drop (drops) | -- | gt (gtt) |
| 2.2 pounds | 1 kilogram | lb |

KEY POINTS:

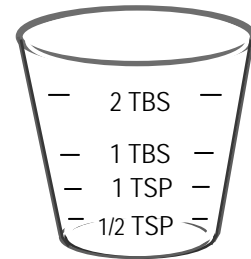
- Memorize the units of measurement, equivalent measurements, and symbols used in the household system.

Working With the Household System

Fill in the blanks with the correct answer.

1. Two Tbs = _____ tsp
2. One ounce = _____ T
3. One-half ounce = _____ tsp
4. Two glasses of juice = _____ oz
5. One cup = _____ oz
6. 2 kg = _____ lb

7. Three tsp of an antacid = _____ T
Fill in the medicine cup below.



8. The nurse administers 2 tsp of cough syrup to the patient. How many mL will the nurse administer?

Fill in the medicine cup below.



9. The patient drinks 3 glasses of water. How many ounces did the patient drink?

10. The nurse gives the patient a cup of broth. How many ounces is this?

**CONVERSIONS BETWEEN SYSTEMS:
UNITS OF MEASUREMENT**

| UNIT | EQUIVALENT MEASUREMENTS | |
|------------------|--------------------------------|--------------------------|
| 1 inch | = | 2.54 cm |
| 1 oz | = | 30 mL = 2 T |
| 1 tsp | = | 5 mL |
| 1 T | = | 15 mL = 3 tsp |
| 1 glass | = | 8 ounces = 240 mL |
| 1 cup | = | 8 ounces = 240 mL |
| 1 teacup | = | 6 ounces = 180 mL |
| 16 minims | = | 1 mL |
| 2.2 lb | = | 1 kilogram |

KEY POINTS:

- Memorize the equivalent measurements for the metric and household systems of measurement.

Working With Conversions Between Systems

Fill in the blanks with the correct answer.

- | | |
|----------------------|---------------------|
| 1. 1/2 oz = ___ mL | 10. 32 min = ___ mL |
| 2. 1 mcg = ___ mg | 11. 20 mL = ___ t |
| 3. 2 T = ___ oz | 12. 3 T = ___ t |
| 4. 0.03 mg = ___ mcg | 13. 2 cups = ___ mL |
| 5. 1.75 g = ___ mg | 14. 1 inch = ___ cm |
| 6. 0.5 g = ___ mg | 15. 1 cm = ___ mm |
| 7. 45 mL = ___ oz | 16. 75 kg = ___ lb |
| 8. 25 mL = ___ tsp | 17. 198 lb = ___ kg |
| 9. 85 mg = ___ g | 18. 3 dL = ___ L |

19. The doctor orders thyroxine 0.05 mg p.o. for the patient. Thyroxine is available in 25 mcg tablets. How many tablets will the nurse give?

20. The patient drinks two 6 oz cups of coffee for breakfast. How many mL did the patient drink?

21. A patient weighs 84 kg. How many pounds does the patient weigh?

**22. Order: cephalexin 500 mg
Available: cephalexin 0.25 gram per tablet**

How many tablets will the nurse give?

23. The physician orders Roxanol 30 mg p.o. q.3h. p.r.n. for pain for the patient. Roxanol is available in a bottle labeled 10 mg / 5 mL. How many tsp will the nurse administer?

24. The nurse has an order to administer 600 mcg of a drug subcut to the patient. The pharmacy sends an ampule labeled 2 mg / mL. How many mL will the nurse administer?

25. The nurse has an order to administer 75 mg of meperidine hydrochloride IM now. In the narcotic drawer, the nurse finds an ampule of meperidine hydrochloride labeled 100 mg / mL. How many mL will the nurse administer?

Module: INTAKE AND OUTPUT

INTAKE AND OUTPUT: EQUIVALENT MEASUREMENTS

| | | |
|-----------------|----------|--------|
| 1 glass | 8 ounces | 240 mL |
| 1 cup | 8 ounces | 240 mL |
| 1 teacup | 6 ounces | 180 mL |
| 1 styrofoam cup | 6 ounces | 180 mL |
| 1 popsicle | 3 ounces | 90 mL |

ice cubes (melt to 1/2 the original volume)

| | |
|-----------------------|-------|
| 1 ounce (oz) | 30 mL |
| 1 tablespoon (T, Tbs) | 15 mL |
| 1 teaspoon (t, tsp) | 5 mL |

KEY POINTS:

- Intake and output (I & O) are calculated in mL.
- The size of food containers varies, so it is important for the nurse to become familiar with the specific containers used in each clinical setting.
- Parenteral intake is calculated as a part of the total intake.

Working With Intake and Output

Add the following intakes and outputs.

1. The patient is on strict I & O. For breakfast, the patient took 1 cup of coffee, a 4 ounce glass of juice, and 240 mL of milk. For lunch, the patient had a Styrofoam cup of tea and 6 ounces of broth. The patient voided 260 mL at 1000 and 180 mL at 1400. Calculate the patient's I & O.

I _____
O _____

2. The patient is NPO for breakfast. For lunch, the patient was allowed to take 120 mL of water. The patient vomited 180 mL at 1300 and voided 100 mL at 1330. At 1400, the patient took 2 T of gelatin and 1/2 glass of apple juice. Calculate the patient's I & O.

I _____
O _____

3. The patient has an NG tube connected to low wall suction. At 0930, the MD wrote an order to clamp the NG tube. The nurse emptied 280 mL of NG drainage. At 1100, the patient vomited 325 mL of bile-colored drainage. The NG tube was reconnected to suction and drained an additional 475 mL by the end of the shift. The patient's wound drainage tube collected 60 mL of serosanguineous fluid. The patient's indwelling urinary catheter drained 270 mL of dark amber urine. Calculate the patient's output.

O _____

4. A patient who had prostate surgery yesterday has an indwelling urinary catheter with a continuous bladder irrigation. He is NPO for breakfast and is started on a clear liquid diet for lunch. He took 6 ounces of broth and 4 ounces of cranberry juice. By the end of the shift, the nurse calculates that 2000 mL of bladder irrigant has infused. The total amount emptied from the urinary bag was 2270 mL. Calculate the I & O.

I _____
O _____

5. The patient has an IV of D5W infusing at 125 mL / hr. For breakfast, the patient took 1 glass of juice and a cup of coffee. For lunch, the patient took 6 ounces of soup and a 12 ounce can of soda. The patient voided 220 mL at 1000 and 375 mL at 1400. Calculate the patient's 8 hr total I & O.

I _____
O _____

6. At 0700, the patient is NPO and has a primary IV of 1 L of D5NS q.10h. infusing continuously. The patient receives gentamicin 80 mg IVPB in 100 mL NS at 0900 - 1700 - 0100, and metronidazole 500 mg in 100 mL NS at 0800. Calculate the patient's total parenteral intake starting at 0700 and ending at 1500.

I _____

7. At 0700, the nurse started an IV of 1 L LR and set the infusion pump at 83 mL / hr. The patient was put on strict I & O. The patient was started on famotidine 20 mg IVPB in 50 mL NS, at 0800 and 2000. For breakfast, the patient took 1 cup of coffee and a 6 ounce bowl of cream of wheat. He was NPO except for ice chips for the rest of the shift. The patient took 6 ounces of ice chips and voided 425 mL. Calculate the patient's total I & O starting at 0700 and ending at 1500.

I _____
O _____

8. At 1500, the patient had an IV of 1 L of D5W infusing at 125 mL / hr. For dinner, the patient took 1 glass of juice and an 8 ounce can of nutritional supplement. The IV infiltrated at 1800 and was restarted at 2000. The patient received KCl 20 mEq IVPB in 100 mL D5W at 1700. The patient voided twice for the entire shift (315 mL and 290 mL). Calculate the patient's total I & O starting at 1500 and ending at 2300.

I _____
O _____

9. At 2300, the patient had an IV of 1 L of 0.45% NS infusing at 50 mL / hr. The patient had coffee-ground emesis measuring 480 mL at 0100. The MD ordered 2 units of PRBCs over 3 hours, followed by an IV of 0.9% NS, to infuse at 150 mL / hr. The nurse discontinued the current IV and started the first unit of PRBC (250 mL) at 0200 and the second unit (270 mL) at 0330. The IV of 0.9% NS was started at 0500. Calculate the patient's total I & O starting at 2300 and ending at 0700.

I _____
O _____

10. At 1500, the patient had 900 mL left in the IV bag. The IV was infusing at 75 mL / hr. At 1900, the IV infiltrated and was restarted 1 hour later. The physician increased the IV rate to 125 mL / hr at 2000. Calculate the patient's total parenteral intake starting at 1500 and ending at 2300.

I _____

11. At 0700, the MD ordered 1 L of D5/0.45% NS to infuse at 75 mL / hr for the first 3 hours, and then at 125 mL continuously. For breakfast, the patient took 1 cup of coffee, 8 ounces of milk, and 6 ounces of orange juice. The patient voided 50 mL at 0900 and 75 mL at 1000. At 1100, the nurse inserted a Foley catheter per MD order and obtained 425 mL of urine. For lunch, the patient only took 5 ounces of broth. The nurse emptied the Foley catheter at 1500 and obtained 250 mL. Calculate the patient's total I & O starting at 0700 and ending at 1500.

I _____
O _____

12. At 0900, the nurse begins the care of a patient who has just been transferred from the post anesthesia care unit. The patient has a new liter of D5/0.9% NS infusing at 125 mL / hr. The patient has an indwelling urinary catheter with continuous bladder irrigation of NS infusing at 75 mL per hour, to keep the catheter free of clots. At 1500, the nurse empties 1575 mL from the urinary catheter. Calculate the patient's total I & O starting at 0900 and ending at 1500.

I _____
O _____

13. At 2300, the patient had 850 mL left in the IV bag. The IV was infusing at 50 mL / hr. At 0200, the IV infiltrated and was restarted 2 hours later. The physician increased the IV rate to 75 mL / hr at 0400. Calculate the patient's total parenteral intake starting at 2300 and ending at 0700.

I _____

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With Intake and Output

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

SITUATION:
 The evening shift nurse learns during the hand-off change of shift report that the assigned patient is NPO, has a primary IV that has infused continuously all shift at 75 mL / hr, and received KCl 20 mEq in 100 mL NS at 0900 and 1300. In reviewing the patient's documented intake and output from the day shift, the evening nurse is most correct to:

Intake and Output

| | Oral | IV | Urine | Emesis | Other |
|----------|------|------------|-------------------|--------|-------|
| 7 - 3 | NPO | 600 100 | 250 100 225 | | |
| Total mL | 0 | 700 | 575 | | |
| 3 - 11 | | | | | |

a. question the recorded 100 mL urine output.

c. question the administration of the IVPBs.

b. recalculate the primary IV intake.

d. plan to administer an IVPB of KCl.

Rationale / Discussion:

NASOGASTRIC TUBE FEEDING PROBLEMS

KEY POINTS:

- Preparing diluted tube feedings requires calculating the number of mL of water to add to the formula to make the ordered strength.
- Information needed to solve the problem includes the amount of formula in the can and the ordered strength.

Working With Nasogastric Tube Feeding Problems

1. The doctor orders a $\frac{3}{4}$ strength formula tube feeding for the patient. The formula comes in cans containing 240 mL. How much water will the nurse add to the can of formula to make the ordered $\frac{3}{4}$ strength diluted tube feeding?

2. The patient receives a $\frac{1}{3}$ strength formula tube feeding. The formula can contains 233 mL. How much water will the nurse add to the can to make the $\frac{1}{3}$ strength diluted tube feeding?

3. The order is to prepare a $\frac{2}{3}$ strength tube feeding of Nepro for a patient with a percutaneous endoscopic gastrostomy (PEG) tube. How much water will the nurse add to the 237 mL can of Nepro to make a $\frac{2}{3}$ strength tube feeding?

4. The physician orders 200 mL of a 1/4 strength tube feeding q.6h. for a patient with an NG tube. The formula can contains 250 mL. How much water will the nurse add to make the 1/4 strength tube feeding?

5. A patient who has been receiving full strength Jevity Plus PEG tube feedings develops diarrhea. The physician orders a diluted tube feeding of 1/2 strength Jevity Plus for the patient. How much water will the nurse add to the 237 mL can of Jevity Plus to make a 1/2 strength tube feeding?

6. The physician orders a 1/4 strength tube feeding of Osmolite at 40 mL / hr for a patient with an NG tube. The Osmolite can contains 237 mL. How much water will the nurse add to make a 1/4 strength tube feeding?

7. A patient has an order for 1/2 strength Pulmocare tube feedings, at 50 mL / hr through a PEG tube. The nurse prepares the dilute formula and has a total volume of 475 mL. According to hospital policy, only 4 hours of tube feeding formula can be hung at a time, to minimize bacterial growth. How many mL of the prepared 1/2 strength formula will the nurse use?

8. The physician orders a 250 mL bolus NG tube feeding of $\frac{3}{4}$ strength q.8h. The formula can contains 237 mL. How much water will the nurse add to make the $\frac{3}{4}$ strength tube feeding?

9. The physician orders a diluted tube feeding of $\frac{1}{3}$ strength Jevity Plus for the patient. How much water will the nurse add to the 250 mL can of Jevity Plus to make a $\frac{1}{3}$ strength tube feeding?

10. The physician orders a $\frac{2}{3}$ strength tube feeding of Suplena at 25 mL / hr for a patient with an NG tube. The Suplena can contains 240 mL. How much water will the nurse add to make a $\frac{2}{3}$ strength tube feeding?

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Nasogastric Tube Feedings

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

SITUATION:

The nurse adds 80 mL of water to 200 mL Jevity formula. The formula tube feeding is started to 0900 at the ordered rate. The patient has a primary IV of NS 0.9% infusing at 80 mL for the 8 hr shift. The nurse emptied 575 mL of urine at 1500, the end of the shift. Which nursing action requires follow up?

| Date | Physician's Orders |
|------|--|
| 2/12 | Start NG tube feeding of Jevity 2/3 strength at 50 mL per hour. Patient B ID ***** |

| Intake and Output | | | | | |
|-------------------|------|-----|-------|--------|-------|
| | Oral | IV | Urine | Emesis | Foley |
| 7 - 3 | NG | | | | |
| Total mL | 300 | 640 | | | 575 |
| 3 - 11 | | | | | |

a. The documented NG tube intake should be 400 mL.

c. The IV intake is incorrect for the ordered rate.

b. The amount of water added to dilute the formula.

d. The formula strength should be questioned.

Rationale / Discussion:

Module: READING MEDICATION LABELS

READING MEDICATION LABELS

KEY POINTS:

- The essential information found on medication labels includes the following:
 - trade name
 - dosage strength
 - route of administration
 - instructions for mixing
 - generic name
 - form of the drug
 - expiration date
 - recommended dose
- The useful information found on medication labels includes the following:
 - total quantity
 - storage information
 - controlled substance symbol
 - manufacturer's name
 - lot number

Working With Reading Medication Labels

Use the medication labels to fill in the answers.

1.

Store below 30°C (86°F).
Dispense in a tight, light-resistant container.
Protect from moisture.
Each Tiltab® tablet contains carvedilol, 25 mg.
Dosage: See accompanying prescribing information.
Important: Use safety closures when dispensing this product unless otherwise directed by physician or requested by purchaser.

Manufactured for GlaxoSmithKline
Research Triangle Park, NC 27709
Manufactured by
Patheon Puerto Rico, Inc.
Manati, PR 00674, USA
1000000059856
Made in Ireland.

Rev. 9/08

25mg
NDC 0007-4142-20

COREG®
CARVEDILOL TABLETS

100 TILTAB® Tablets

gsk GlaxoSmithKline Rx only

a. Trade name _____

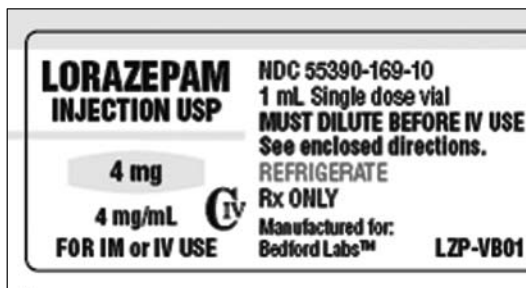
b. Generic name _____

c. Dosage strength _____

d. Form of the drug _____


e. Route of administration _____

2.



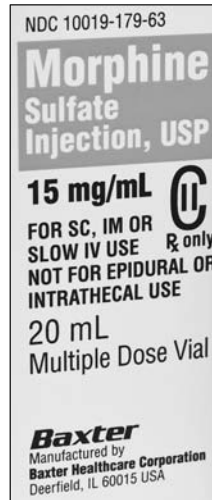
- a. Generic name _____
- b. Dosage strength _____
- c. Form of the drug _____
- d. Routes of administration _____
- e. Controlled substance? yes ____ no ____
- f. Multidose _____ Single-dose _____
- g. Ordered: 2.8 mg IV.
The nurse will give _____

3.

| | |
|--|--|
| <p>FOR ORAL USE ONLY.</p> <p>STORAGE <i>Before Reconstitution:</i> Store below 86°F (30°C). <i>After Reconstitution:</i> Store suspension between 41°F (5°C) and 86°F (30°C). Protect from freezing.</p> <p>SHAKE WELL BEFORE EACH USE.</p> <p>DISCARD UNUSED PORTION AFTER 2 WEEKS.</p> <p>MIXING DIRECTIONS Tap bottle lightly to loosen powder. Add 24 mL of distilled water or Purified Water (USP) to the bottle. Shake well.</p> <p>DOSAGE AND USE See accompanying prescribing information. This package contains 350 mg fluconazole in a natural orange-flavored mixture.*</p> | <p>NDC 0049-3440-19</p> <p>35 mL when reconstituted</p> <p>DIFLUCAN® (Fluconazole for Oral Suspension)</p> <p>ORANGE FLAVORED</p> <p>10 mg/mL when reconstituted</p> <p> Roerig Division of Pfizer Inc, NY, NY 10017</p> |
|--|--|

- a. Trade name _____
- b. Generic name _____
- c. Instructions for mixing _____

4.



a. Generic name _____

b. Dosage strength _____

c. Total quantity _____

d. Routes of administration _____

e. Controlled substance? yes _____ no _____

f. Single-dose vial? yes _____ no _____

g. Ordered: Morphine sulfate 12 mg IV.

The nurse will give _____

5.

AUGMENTIN®
250 mg/5 mL

250 mg/5 mL
NDC 0029-6090-22

Directions for mixing: Tap bottle until all powder flows freely. Add approximately 2/3 of total water for reconstitution **(total = 130 mL)**; shake vigorously to wet powder. Add remaining water; again shake vigorously. Dosage: See accompanying prescribing information.

AUGMENTIN®
**AMOXICILLIN/
CLAVULANATE
POTASSIUM**
FOR ORAL SUSPENSION

When reconstituted, each 5 mL contains:
AMOXICILLIN, 250 MG,
as the trihydrate
CLAVULANIC ACID, 62.5 MG,
as clavulanate potassium

150 mL
(when reconstituted)

Keep tightly closed. Shake well before using. Must be refrigerated. Discard after 10 days.

esk GlaxoSmithKline Rx only

Ordered: Augmentin 375 mg p.o. B.I.D.

The nurse will give _____

6.

HALOPERIDOL
INJECTION USP
(For Immediate Release)

FOR IM USE ONLY

50 mg/10 mL

5 mg/mL
Rx ONLY

NDC 55390-147-01
10 mL Sterile Multiple Dose Vial
USUAL DOSAGE: See package insert.
Each mL contains 5 mg haloperidol (as the lactate) with 1.8 mg methylparaben, 0.2 mg propylparaben, and lactic acid for pH adjustment between 3.0 to 3.8.
Store at 20° to 25°C (68° to 77°F).
[See USP Controlled Room Temperature.]
Protect from light. Do not freeze.
Manufactured for:
Bedford Laboratories™
Bedford, OH 44146

HLVA03

a. Generic name _____

b. Dosage strength _____

c. Routes of administration _____

d. Controlled substance? yes _____ no _____

e. Single-dose vial? yes _____ no _____

f. Ordered: Haloperidol 2.5 mg IM.

The nurse will give _____

7.

The image shows a medication label for Corvert. On the left, it lists 'LOT / EXP' and the number '816416405'. The top left contains storage instructions: 'Store at controlled room temperature 20° to 25°C (68° to 77°F) [see USP]'. Below that is the 'DOSAGE AND USE' section, which says 'See accompanying prescribing information.' and 'Each mL contains ibutilide fumarate, 0.1 mg. Also contains sodium chloride, 8.90 mg; sodium acetate trihydrate, 0.189 mg; water for injection. When necessary, pH was adjusted with sodium hydroxide and/or hydrochloric acid.' The Pfizer logo and 'Pharmacia & Upjohn Co' are at the bottom left. On the right, it says '10 mL Single-Dose Vial' and 'NDC 0009-3794-01 Rx only'. The product name 'Corvert®' is in a large box, followed by 'ibutilide fumarate injection'. Below that, it says 'For IV use only' and '1 mg/10 mL (0.1 mg/mL)' in a dark box.

a. Trade name _____

b. Dosage strength _____

c. Route of administration _____

d. Storage information _____

8.

The image shows a medication label for ENALAPRILAT INJECTION. The top part says 'ENALAPRILAT INJECTION' in large letters. Below that, it says 'FOR IV USE ONLY' and '1.25 mg/mL (Anhydrous equivalent)'. On the right side, it lists 'NDC 55390-010-10', '1 mL Single dose vial', 'Usual Dosage: See package insert.', 'Store below 30°C (86°F).', 'Rx ONLY', and 'Manufactured for: Bedford Labs™ Bedford, OH 44146 ENL-V02'.

a. Dosage strength _____

b. Routes of administration _____

c. Controlled substance? yes _____ no _____

d. Ordered: Enalaprilat 0.625 mg IV.

The nurse will give _____

9.



a. Dosage strength _____

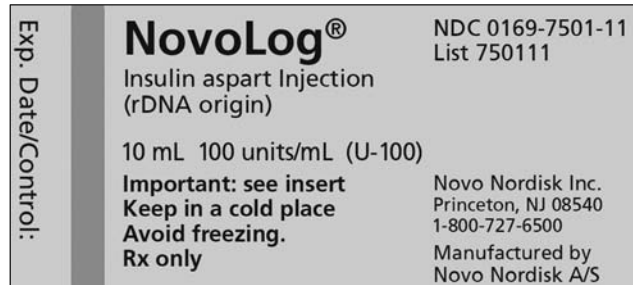
10.



a. Trade name _____

b. Units per mL _____

11.



a. Trade name _____

b. Ordered: Novolog 6 units subcut now.

The nurse will give _____

12.

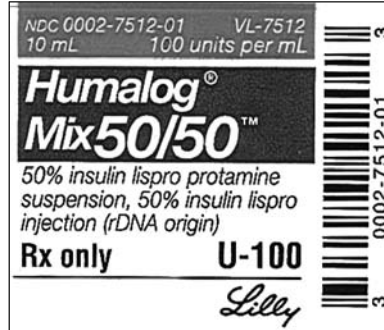


a. Trade name _____

b. Ordered: Novolin 70/30, 22 units subcut now.

The nurse will give _____

13.



a. Trade name _____

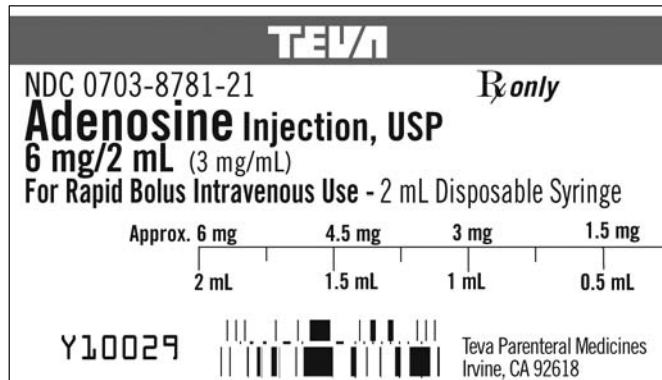
b. Ordered: Humalog 50/50, 17 units subcut q.AM.
The nurse will give _____

14. Check the information that is found on the medication label.



- | | |
|--|---|
| <input type="checkbox"/> Trade name | <input type="checkbox"/> Generic name |
| <input type="checkbox"/> Dosage strength | <input type="checkbox"/> Form of the drug |
| <input type="checkbox"/> Route of administration | <input type="checkbox"/> Controlled substance |
| <input type="checkbox"/> Storage information | <input type="checkbox"/> Total amount |

15. Check the information that is found on the medication label.



- | | |
|--|---|
| <input type="checkbox"/> Trade name | <input type="checkbox"/> Generic name |
| <input type="checkbox"/> Dosage strength | <input type="checkbox"/> Form of the drug |
| <input type="checkbox"/> Route of administration | <input type="checkbox"/> Controlled substance |
| <input type="checkbox"/> Storage information | <input type="checkbox"/> Total amount |

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Reading Medication Labels

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

SITUATION:

The nurse has an order to administer morphine 3 mg IV stat. The nurse selects the following vial. In preparing to administer the ordered dose, it is most important for the nurse to:



a. give 1.5 mL of the drug using two vials.

c. research the appropriate route of administration.

b. call the pharmacist to double check the order.

d. not administer this drug.

Rationale / Discussion:

Module: ORAL MEDICATIONS

ORAL MEDICATIONS

KEY POINTS:

- In setting up oral medication problems, be sure that the units in the medication order and the available drug match.
- Use a conversion table to convert unlike units of measurement.
- When you arrive at the answer, ask yourself if the answer is realistic. Nurses generally administer only 1 - 2 tablets, and less than 30 mL of medication, per dose.

Working With Oral Medications

Solve the following problems using the method of your choice.

1. The physician prescribed 0.8 mg of folic acid q.AM. The pharmacy sends 0.4 mg tablets. How many tablets will the nurse give?

2. Lanoxin 0.125 mg is ordered stat. The pharmacy sends 0.25 mg tablets of Lanoxin. How many tablets will the nurse administer?

3. Levothyroxine 0.1 mg is ordered daily. The pharmacy sends 50 mcg tablets. How many tablets will the nurse give?

4. The doctor orders Ceftin tablets 0.5 g p.o. for a patient. How many tablets will the nurse give?
-

| | |
|--|---|
| See package insert for Dosage and Administration. Store between 15° and 30°C (59° and 86°F). Replace cap securely after each opening. GlaxoSmithKline Research Triangle Park, NC 27709 Made in England 4142817 Rev. 2/02 | NDC 0173-0387-00 Ceftin® Tablets (cefuroxime axetil tablets) 250 mg 20 Tablets Rx only |
| |  |


5. The order is for Dilantin 0.1 g p.o. daily. How many tablets will the nurse give to the patient?
-

| | |
|--|--|
| Store at a room temperature below 30°C (86°F). DOSAGE AND USE Pediatric patients, 5 mg/kg daily in two or three equally divided doses initially, with subsequent dosage individualized to a maximum of 300 mg daily. See package insert for full prescribing information. NOT FOR ONCE-A-DAY DOSING Chewable, flavored for pediatric patients. Dilantin infatabs can be either chewed thoroughly before being swallowed or swallowed whole. Store so that pediatric patients cannot eat these flavored tablets as candy. Dispense in a tight container as defined in the USP. Each tablet contains 50 mg phenytoin, USP. Manufactured by: Pfizer Pharmaceuticals Ltd. Vega Baja, PR 00694 | 6505-00-687-9486 NDC 0071-0007-24 100 Tablets Rx only INFATABS® Dilantin® (Phenytoin Tablets, USP) 50 mg Distributed by  Parke-Davis Division of Pfizer Inc, NY, NY 10017 |
|--|--|

6. Aluminum hydroxide suspension 15 mL is ordered q.i.d. The pharmacy sends a bottle of aluminum hydroxide labeled 320 mg / 5 mL. How many mg is the patient receiving per dose?
-

7. The patient receives furosemide 80 mg p.o. b.i.d. The pharmacy sends furosemide oral solution labeled 10 mg / mL. How many mL will the nurse give per dose?

8. The nurse is instructing a patient to take Diflucan 100 mg oral suspension at home. How many tsp will the nurse instruct the patient to take per dose?

| | |
|--|--|
| <p>FOR ORAL USE ONLY.</p> <p>STORAGE <i>Before Reconstitution:</i> Store below 86°F (30°C). <i>After Reconstitution:</i> Store suspension between 41°F (5°C) and 86°F (30°C). Protect from freezing.</p> <p>SHAKE WELL BEFORE EACH USE.</p> <p>DISCARD UNUSED PORTION AFTER 2 WEEKS.</p> <p>MIXING DIRECTIONS Tap bottle lightly to loosen powder. Add 24 mL of distilled water or Purified Water (USP) to the bottle. Shake well.</p> <p>DOSAGE AND USE See accompanying prescribing information. This package contains 350 mg fluconazole in a natural orange-flavored mixture.*</p> | <p style="text-align: right;">NDC 0049-3440-19</p> <p>35 mL when reconstituted</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"><p>DIFLUCAN[®] (Fluconazole for Oral Suspension)</p></div> <p style="text-align: center;">ORANGE FLAVORED</p> <div style="background-color: #cccccc; padding: 5px; text-align: center;"><p>10 mg/mL</p></div> <p style="text-align: center;">when reconstituted</p> <div style="display: flex; align-items: center; justify-content: center;"><div style="margin-left: 10px;"><p>Roerig Division of Pfizer Inc, NY, NY 10017</p></div></div> |
|--|--|

9. Diphenhydramine hydrochloride elixir 50 mg p.o. p.r.n. is ordered for itching. Diphenhydramine hydrochloride elixir 12.5 mg / 5 mL is available. How many mL will the nurse give?

10. The order is for atropine 400 mcg tab i p.o. 30 minutes before surgery. The pharmacy sends atropine 0.4 mg tablets. How many tablets will the nurse give?

11. The nurse practitioner orders nystatin 200,000 units p.o. q.i.d. swish and swallow. The pharmacy sends nystatin 100,000 units / 5 mL. How many mL will the nurse give?

12. Nitroglycerin extended-release tablets 5 mg is ordered q.12h. p.o. The pharmacy sends nitroglycerin tablets labeled 2.5 mg / tablet. How many tablets will the nurse give?

13. Augmentin oral suspension 250 mg q.6h. is ordered for a patient upon discharge. The pharmacy sends the following bottle. How many days will this bottle last?

AUGMENTIN®
250 mg/5 mL

250 mg/5 mL
NDC 0029-6090-22

Directions for mixing: Tap bottle until all powder flows freely. Add approximately 2/3 of total water for reconstitution (total = 130 mL); shake vigorously to wet powder. Add remaining water; again shake vigorously. Dosage: See accompanying prescribing information.

AUGMENTIN®
AMOXICILLIN/
CLAVULANATE
POTASSIUM
FOR ORAL SUSPENSION

When reconstituted, each 5 mL contains:
AMOXICILLIN, 250 MG,
as the trihydrate
CLAVULANIC ACID, 62.5 MG,
as clavulanate potassium

150 mL
(when reconstituted)

Keep tightly closed.
Shake well before using.
Must be refrigerated.
Discard after 10 days.

esk GlaxoSmithKline Rx only

14. The doctor orders enalapril 0.0025 gram p.o. daily. Enalapril is available in 5 mg scored tablets. How many tablets will the nurse give?

15. The order is for cyanocobalamin 1 mg p.o. daily. The pharmacy sends cyanocobalamin 1000 mcg tablets. How many tablets will the nurse give?

16. The patient is to receive 20 mEq of KCl p.o. q.AM. The pharmacy sends a bottle labeled 30 mEq / 15 mL. How many mL will the nurse administer?

17. Erythromycin oral suspension 500 mg q.6h. is ordered for a patient. Erythromycin is available in 200 mg / 5 mL. How many mL will the nurse administer?

18. Carvedilol 12.5 mg p.o. b.i.d. is ordered for the patient. In the patient's medication drawer, the nurse finds the following unit dose tablets. The nurse is most correct to administer:

Carvedilol
3.125 mg

(4 tablets available)

Carvedilol
6.25 mg

(2 tablets available)

19. Morphine sulfate oral solution, 120 mg q.4h. around the clock, is ordered for a patient in hospice care. Morphine sulfate is available in 100 mg / 5 mL. How many mg of morphine sulfate will the patient receive per day?

20. Ceclor oral suspension 375 mg q.8h. is ordered for a patient on discharge. The patient has a prescription for Ceclor 125 mg / 5 mL oral suspension. How many tablespoons will the nurse instruct the patient to take per dose?

21. Mirapex 1500 mg is ordered t.i.d. for a patient. The nurse has Mirapex 0.5 g tablets. How many tablets will the nurse administer for the morning dose?

22. The patient has an order for levetiracetam oral solution 3 g daily. The patient has a bottle of levetiracetam oral solution 100 mg / mL. How many mL will the nurse administer to the patient?

23. The doctor orders furosemide 40 mg oral solution p.o. q.AM. Furosemide 8 mg / mL oral solution is available. The nurse has a medicine cup with ounce measurements. How many teaspoons will the nurse administer to the patient?

24. The nurse is preparing to administer the 0900 medications to a patient. In the medication drawer, the nurse finds the following unit dose tablets: digoxin 0.25 mg scored tablets, Captopril 12.5 mg tablets, furosemide 10 mg tablets, Cipro 500 mg tablets. How many tablets of each of the medications will the nurse administer at 0900?

| | |
|-------------------------------|--------------|
| Digoxin 0.125 mg p.o. q.AM | 0900 |
| Captopril 12.5 mg p.o. q.12h. | 0900 2100 |
| Furosemide 20 mg p.o. | 0900 1700 |
| Cipro 0.5 g p.o. q.12h. | 0800 2000 |

25. Calcitriol capsule 1 mcg p.o. q.AM is ordered for the patient. How many capsules will the nurse administer?



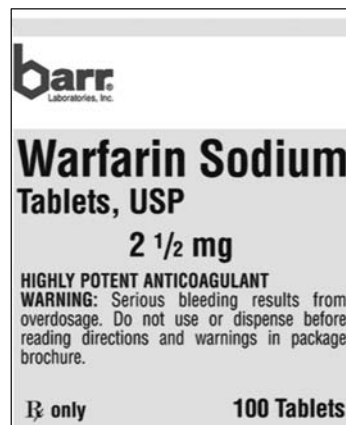
26. Cimetidine 450 mg at bedtime is ordered for the patient. The nurse has available the following bottle. How many mL will the nurse administer?



27. The patient has an order for aspirin 1 g p.o. q.6h. p.r.n. for headache. How many caplet(s) will the nurse administer?
-



28. Warfarin 5 mg p.o. is ordered for the patient this morning. How many tablet(s) will the nurse administer?
-



29. The order is for cefprozil 0.25 g b.i.d.

NDC 0093-1075-78
CEFPROZIL
for Oral Suspension USP
125 mg/5mL*

*Each 5 mL, when constituted according to directions, contains 125 mg anhydrous cefprozil.

Rx only



75 mL (when mixed)

TEVA

How much water will be added to prepare the suspension?

a. _____

How many tsp will the nurse administer?

b. _____

To the Pharmacist: Prepare suspension at time of dispensing. Add to the bottle a total of **59 mL** water. For ease in preparation, add the water in two portions. **Shake well after each addition.** This provides 75 mL of suspension. Each 5 mL contains cefprozil equivalent to 125 mg anhydrous cefprozil.

Usual Dosage: See package insert for full prescribing information. Store powder at 20° to 25°C (68° to 77°F) [See USP Controlled Room Temperature] prior to constitution.

30. The order is for fluconazole 100 mg p.o. now.

NDC 0093-5414-95
FLUCONAZOLE
for Oral Suspension
10 mg/mL when reconstituted

Each bottle contains: 350 mg fluconazole in a natural orange-flavored mixture. When reconstituted as directed, **each teaspoonful (5 mL) contains 50 mg of fluconazole.**

ORANGE FLAVORED

Rx only



35 mL (when reconstituted)

TEVA

How much water will be added to prepare the suspension?

a. _____

How many tsp will the nurse administer?

b. _____

To the Pharmacist:

1. Mixing Directions:

Tap bottle lightly to loosen powder. Add **26 mL** of distilled water or Purified Water (USP) to the bottle. Shake well.

2. Store reconstituted suspension between 25°C (77°F) and 2°C (36°F). Protect from freezing.

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With Oral Medications

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

| | | | | | | | |
|--|-----------------------------|-----------------------------|-------------------|---------------------|------------------------|-------------|--|
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; padding: 5px;">Hydralazine 25 mg p.o.</td> <td style="width: 40%; padding: 5px;">0900 - 1300 1800 2200</td> </tr> <tr> <td style="padding: 5px;">K-Dur 16 mEq p.o.</td> <td style="padding: 5px;">0900 - 1300 2100</td> </tr> <tr> <td style="padding: 5px;">Propranolol 60 mg p.o.</td> <td style="padding: 5px;">0900 - 1700</td> </tr> </table> | Hydralazine 25 mg p.o. | 0900 - 1300 1800 2200 | K-Dur 16 mEq p.o. | 0900 - 1300 2100 | Propranolol 60 mg p.o. | 0900 - 1700 | <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px; text-align: center;">K-Dur 8 mEq</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px; text-align: center;">K-Dur 8 mEq</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px; text-align: center;">Propranolol 60 mg ER</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">Hydralazine 25 mg</div> |
| Hydralazine 25 mg p.o. | 0900 - 1300 1800 2200 | | | | | | |
| K-Dur 16 mEq p.o. | 0900 - 1300 2100 | | | | | | |
| Propranolol 60 mg p.o. | 0900 - 1700 | | | | | | |

SITUATION:
The nurse is preparing the 0900 medications and finds the patient's unit dose medications in the medication drawer. Which action(s) by the nurse are most appropriate (select all that apply)?

a. Give all the 0900 medications.

d. Give the hydralazine and the K-Dur at 0900.

b. Call the pharmacist regarding the propranolol.

e. Give the hydralazine and propranolol at 0900.

c. Call the pharmacist regarding the K-Dur.

Rationale / Discussion:

Module: SYRINGES AND NEEDLES

SYRINGES

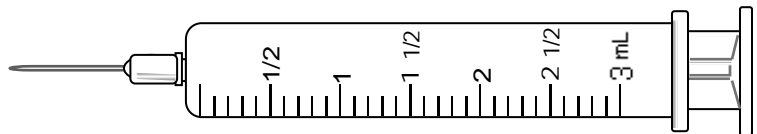
KEY POINTS:

- The most commonly used syringe, the 3 mL syringe, is calibrated to measure 0.1 mL accurately. Most 3 mL syringes have both minim and mL scales.
- The TB syringe measures volumes of 1 mL or less and is calibrated to measure 0.01 mL accurately. The TB syringe has minim and mL scales.
- Larger volume syringes are calibrated in 0.2 mL or 1 mL increments.
- Insulin is measured in units and is drawn up in an insulin syringe. The standard insulin syringe is calibrated by 2 unit increments. Low dosage insulin syringes are calibrated in 1 unit increments.

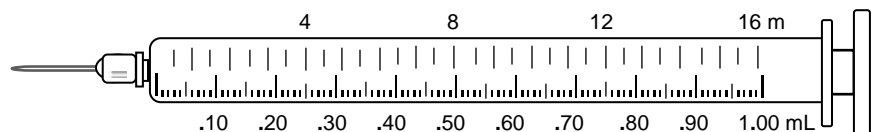
Working With Syringes

Shade in the syringe with the indicated amount of medication.

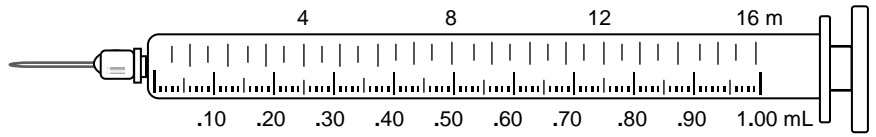
1. 0.3 mL



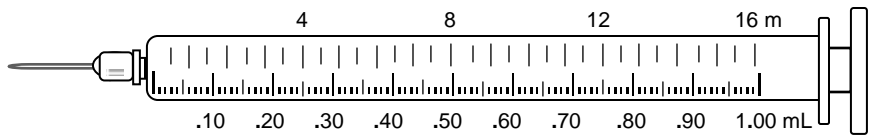
2. 0.66 mL



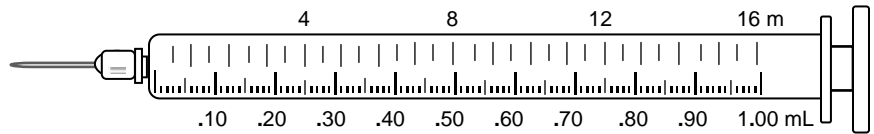
3. 0.09 mL



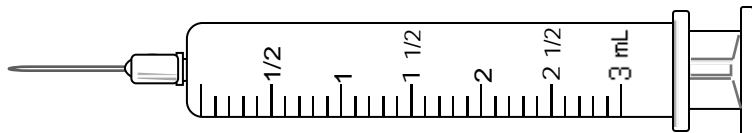
4. 7.5 minims



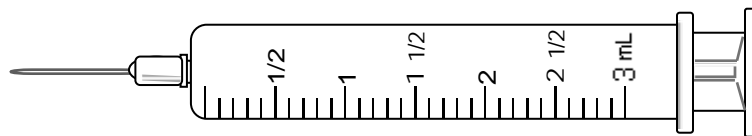
5. 15 minims



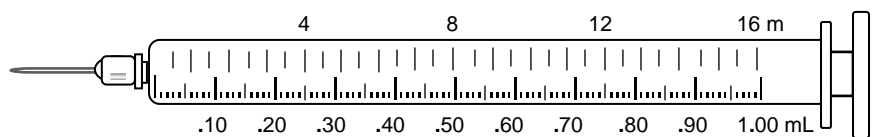
6. 1.2 mL



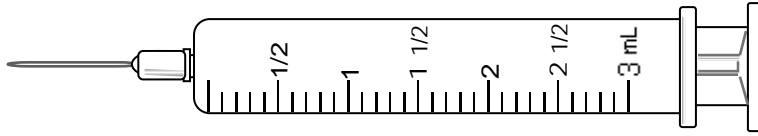
7. 2.7 mL



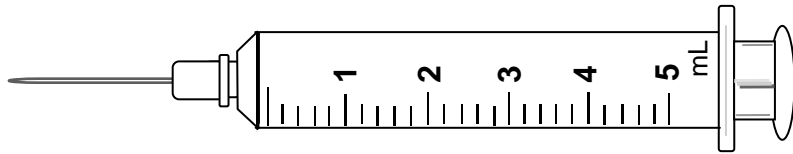
8. 0.37 mL



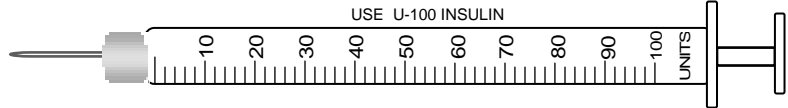
9. 1.9 mL



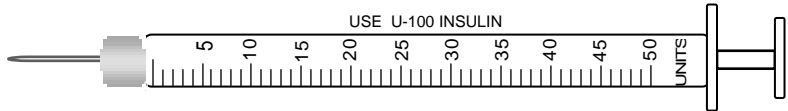
10. 4.6 mL



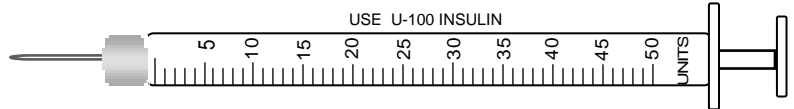
11. 38 units of insulin



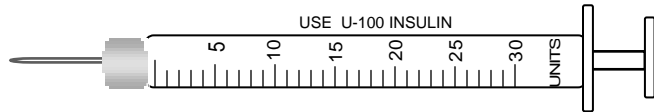
12. 27 units of insulin



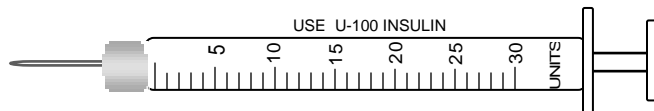
13. 7 units of insulin



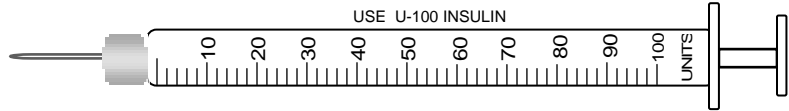
14. 7 units of insulin



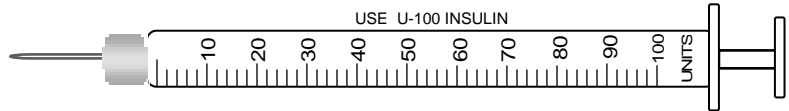
15. 16 units of insulin



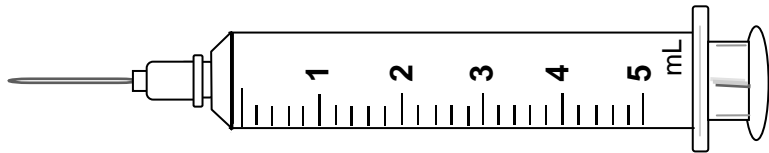
16. 56 units of insulin



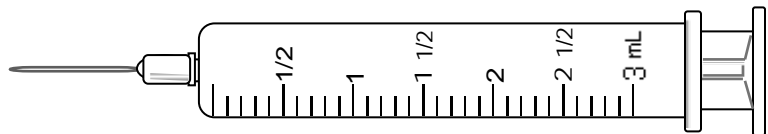
17. 72 units of insulin



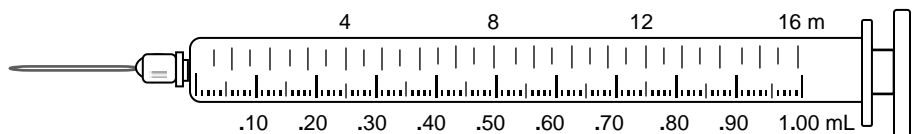
18. 3.8 mL



19. The nurse receives a vial of Enalaprilat from the pharmacy. The order is to administer 0.625 mg of Enalaprilat IV. Shade in the mL that will be administered to the patient.



20. The nurse has an order to administer Glycopyrrolate 150 mcg IV. Available is Glycopyrrolate 0.4 mg / 2 mL. Shade in the amount of Glycopyrrolate that will be administered to the patient.



Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Syringes

- Read each situation, and then make a clinical judgment. Provide a rationale for your decision or action.

SITUATION:

After calculating the ordered dose of a medication, the nurse determines that the patient is to receive 5 mL of the medication IM. The nurse selects a 5 mL syringe to administer the ordered dose. The nurse:

- a. has correctly determined the most appropriate syringe to measure and administer this dose accurately.
- b. needs to contact the physician and request a higher dosage strength of the medication.
- c. needs to contact the pharmacist to ensure that the ordered dose has been correctly calculated.
- d. should divide the medication into two injections, using two 3 mL syringes.

Rationale / Discussion:

NEEDLES

KEY POINTS:

- Needles are identified by two numbers: length and gauge.
- Needle length is measured in inches.
- Needle gauge refers to the diameter. The larger the number of the gauge, the smaller the diameter of the needle.
- Needles are packaged in standard sizes with syringes for IM, ID, subcut, and IV use.

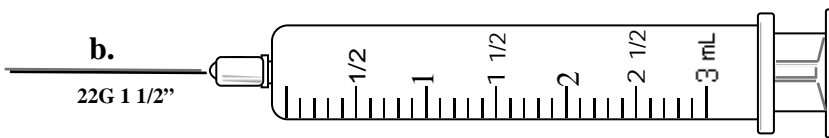
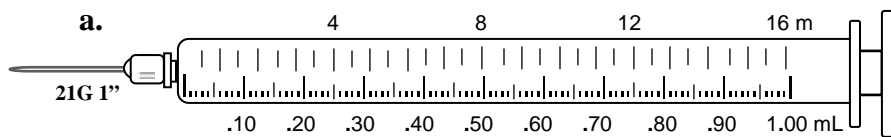
Working With Needles

Choose the correct needle size for the following injections.

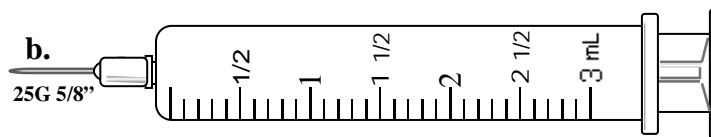
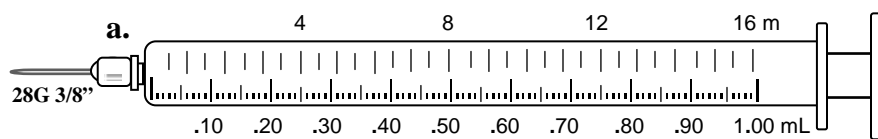
1. A subcut injection of insulin _____
2. An IM injection _____
3. A TB skin test _____
4. An IM injection for an obese person _____
5. A subcut injection into the upper arm _____
6. Drawing up viscous medication from a vial _____

Choose the correct syringe and needle for the following injections. Fill in the syringe.

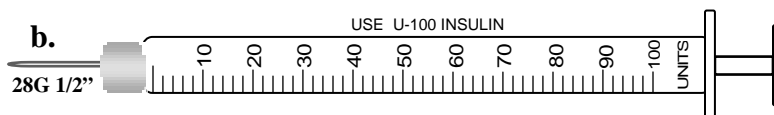
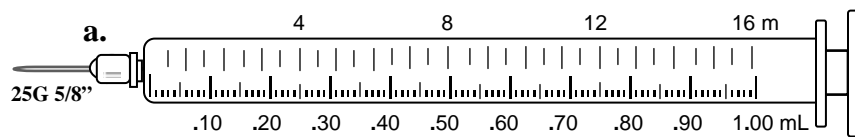
1. Meperidine 75 mg (1 mL) IM



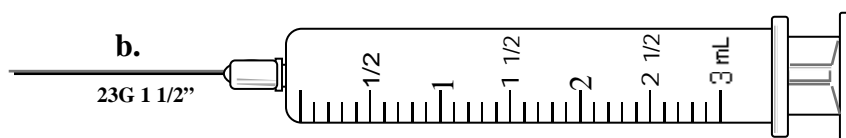
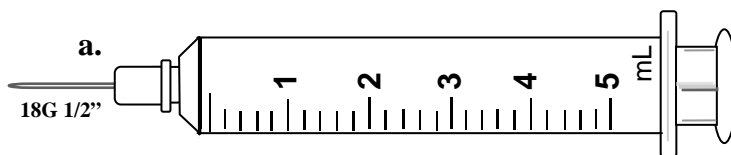
2. Filgrastim 300 mcg (1 mL) subcut



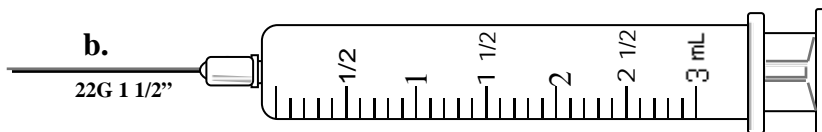
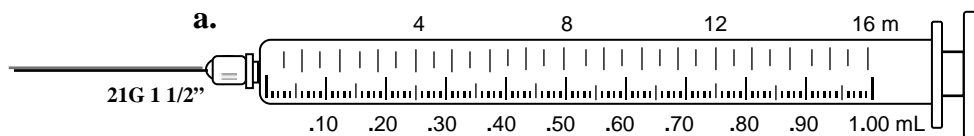
3. Heparin 5000 units (0.67 mL) subcut



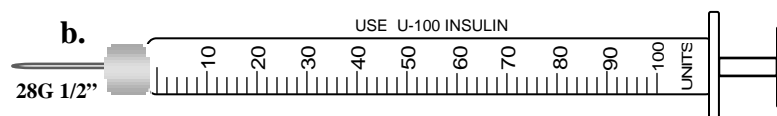
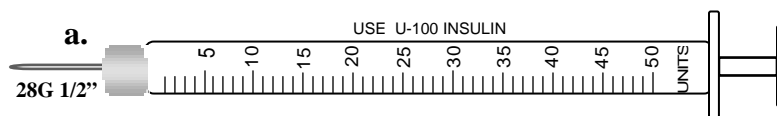
4. Hepatitis A vaccine 1 mL IM



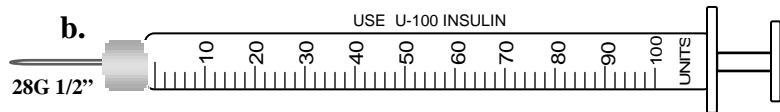
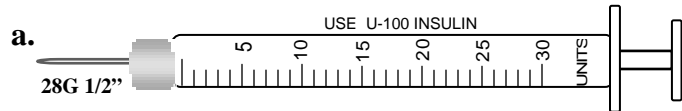
5. Ketorolac 60 mg (2 mL) IM



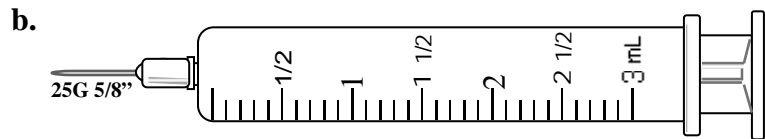
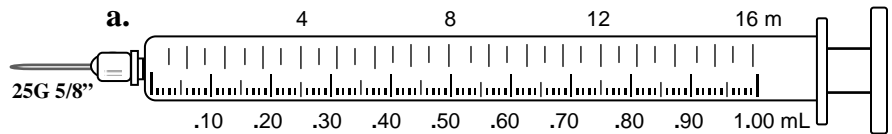
6. Humulin Regular insulin 17 units subcut



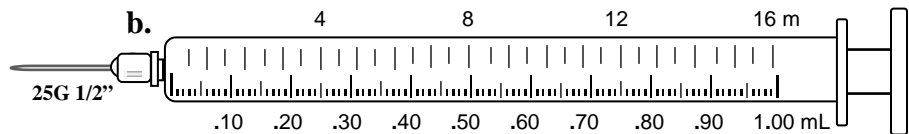
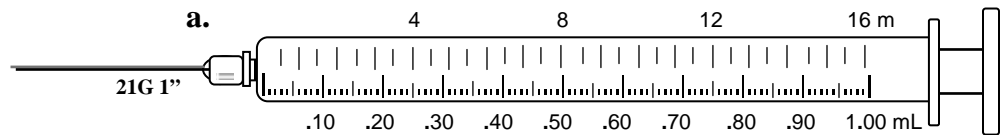
7. Humulin Regular insulin 6 units and Humulin NPH insulin 13 units subcut



8. Heparin 1000 units (0.1 mL) subcut



9. Morphine sulfate 10 mg (16 minims) subcut



Module: PARENTERAL MEDICATIONS

PARENTERAL MEDICATIONS

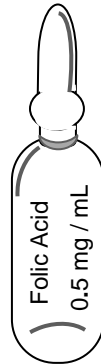
KEY POINTS:

- In setting up parenteral medication problems, be sure that the units in the medication order and the available drug are the same.
- Use a conversion table to convert unlike units of measurement.
- When you arrive at the answer, ask yourself if the answer is realistic. Nurses generally administer 3 mL or less of a parenteral medication.
- With insulin, just draw up the total units ordered.

Working With Parenteral Medications

Use the method of your choice to solve the problems.

1. The physician prescribed 0.1 mg of folic acid IM. The pharmacy sends the following ampule. How many mL will the nurse give?

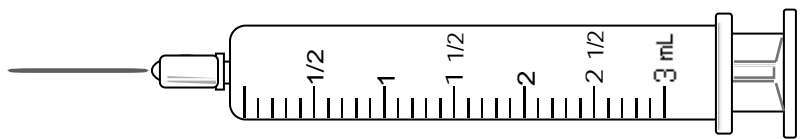


2. Meperidine HCl 75 mg is ordered stat. Meperidine HCl 50 mg / mL is available. How many mL will the nurse administer?

3. Heparin sodium 5000 units subcut q.12h. is ordered for a patient. The pharmacy sends a vial labeled heparin sodium 20,000 units / mL. How many mL will the nurse give?

4. Procaine penicillin G 1.2 million units IM is ordered for a patient. The pharmacy sends procaine penicillin G 600,000 units / mL. How many mL will the nurse give?

Fill in the syringe.

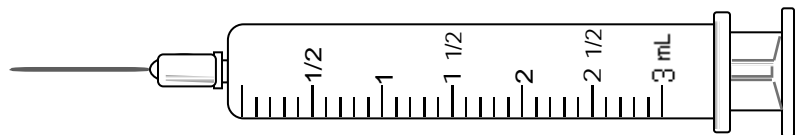


5. The preoperative order is morphine sulfate 9 mg with glycopyrrolate 0.08 mg IM stat. Morphine sulfate 15 mg / mL and glycopyrrolate 200 mcg / mL are available in the medication drawer. Calculate the preoperative medications.

Morphine sulfate: _____

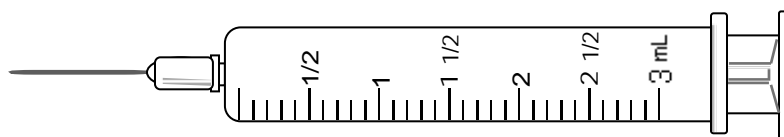
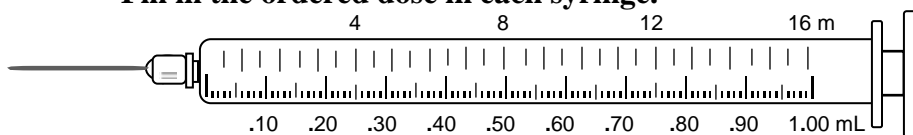
Glycopyrrolate: _____

Fill in the syringe with the total amount.

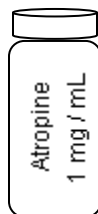


6. Hydromorphone 1 mg subcut q.3h. p.r.n. for pain is ordered for a patient. Hydromorphone 10 mg / mL is available in the narcotic drawer. How many mL will the nurse give?

Fill in the ordered dose in each syringe.

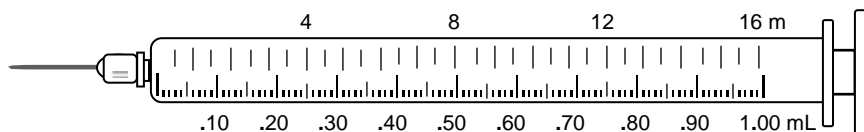


7. The order is for atropine 400 mcg subcut now. The pharmacy sends the following multidose vial. How many mL will the nurse give?



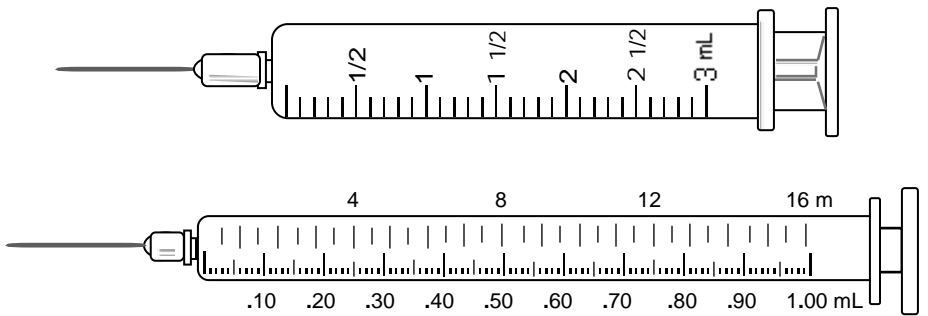
8. The physician orders morphine sulfate 0.015 gram. Morphine sulfate is available in 15 mg / mL How many minims will the nurse give?

Fill in the syringe.



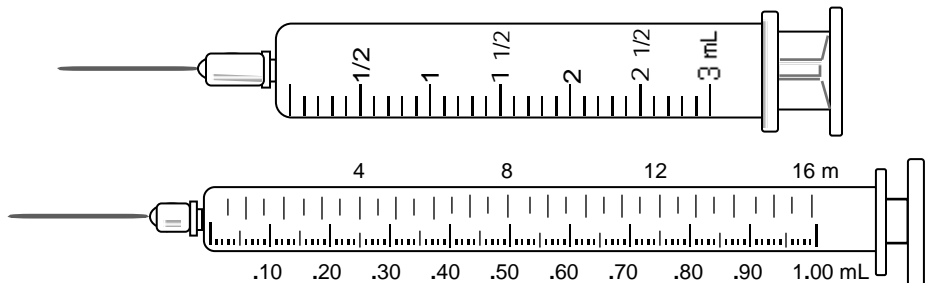
9. Epoetin 12,000 units subcut 3 x / week is ordered. The pharmacy sends a vial of epoetin labeled 20,000 units / mL. How many mL will the nurse give?

Fill in the ordered dose in each syringe.



10. The doctor orders ampicillin 250 mg. The pharmacy sends a vial of ampicillin labeled 1 g / mL. How many mL will the nurse give?

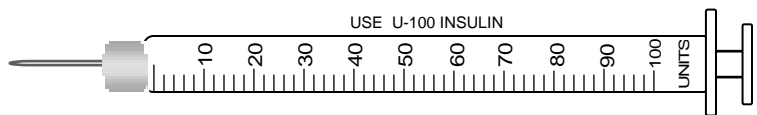
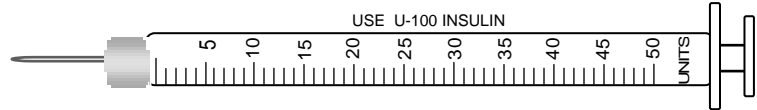
Fill in the ordered dose in the most appropriate syringe.



11. The physician orders phenytoin 125 mg IM. The nurse prepares to draw up the medication from a vial labeled phenytoin 50 mg / mL. How many mL will the nurse give?

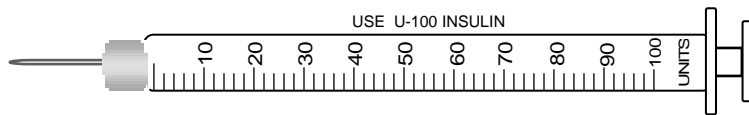
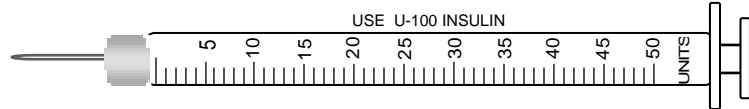
12. Humulin NPH insulin 23 units q.AM is ordered for a patient. How much insulin will the nurse give?

Fill in the most appropriate syringe.



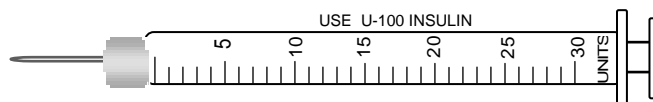
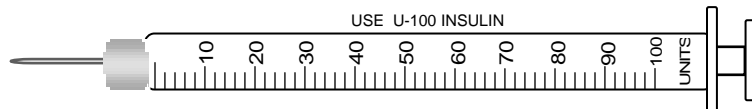
13. Humulin N insulin 35 units and Humulin R insulin 7 units q.AM are ordered for a patient. How much insulin will the nurse give?

Fill in the most appropriate syringe.



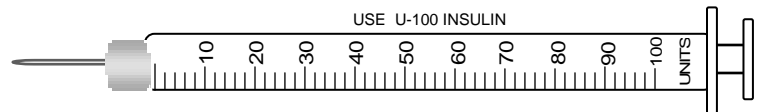
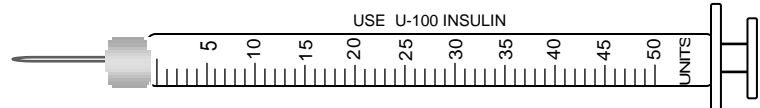
14. Humulin 70/30 insulin 21 units q.AM is ordered for the patient. How much insulin will the nurse give?

Fill in the most appropriate syringe.



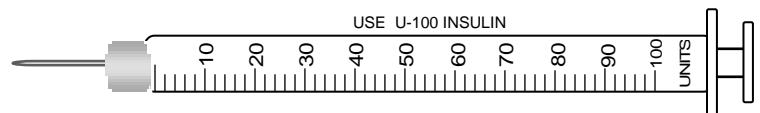
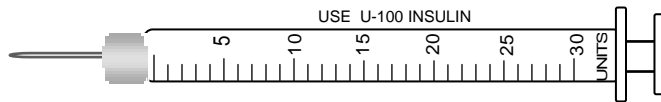
15. **Humulin 50/50 insulin 19 units q.AM** is ordered for the patient. How much insulin will the nurse give?

Fill in the most appropriate syringe.



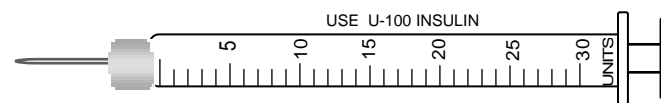
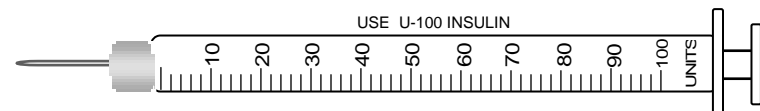
16. **Humulin R insulin 2 units** is ordered for the patient. How much insulin will the nurse give?

Fill in the most appropriate syringe.

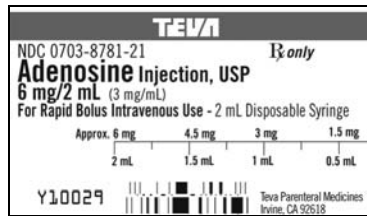


17. **Humulin NPH insulin 22 units and Humulin Regular insulin 7 units** are ordered stat. How much insulin will the nurse give?

Fill in the most appropriate syringe.



18. Adenosine 2.7 mg IV is ordered. The pharmacy sends a 2 mL single-dose vial of adenosine. How many mL will the nurse administer?



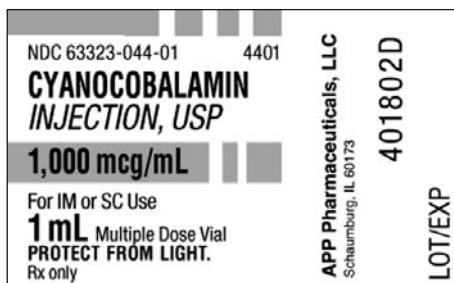
19. Heparin 4500 units subcut is ordered. The nurse has the following vial of heparin. How many mL will the nurse administer?



20. The nurse receives an order to administer ranitidine 20 mg IVP. How many mL will the nurse administer?



21. Cyanocobalamin 0.5 mg is ordered subcut. To carry out this order correctly, the nurse will administer how many mL of cyanocobalamin?



22. The physician orders amikacin 0.25 g IM q.12h. How many mL will the nurse administer per dose?



23. Enalaprilat 0.625 mg IVP q.6h. is ordered. After drawing up the ordered dose, how many mL will the nurse discard from the vial?



24. The MD orders granisetron 2000 mcg direct IV 30 minutes prior to chemotherapy. Pharmacy sends the following vial. How many mL will the nurse administer to the patient? _____



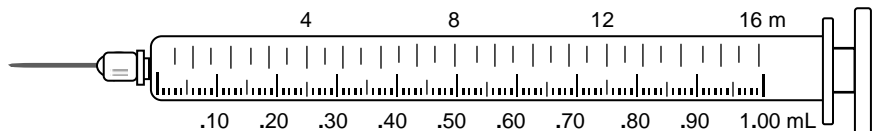
25. Adenosine 9 mg is ordered direct IV stat for the patient. Pharmacy sends the following vial. How many mL will the nurse administer? _____



26. Enoxaparin 150 mg / 1 mL prefilled syringe is available. The nurse has an order for enoxaparin 90 mg subcut. How many minims will the nurse administer? _____

27. The nurse has a 5 mL multidose vial of heparin labeled 20,000 units per mL. The order is to administer 15,000 units of heparin subcut to the patient q.12h. How many mL will the nurse administer? _____

Fill in the syringe.



28. The patient has an order for metoclopramide 5 mg IM stat. The pharmacy sends a single-dose vial of metoclopramide. How many mL will the nurse administer to the patient? _____



29. The physician writes an order for terbutaline 250 mcg subcut for the patient who is wheezing. The nurse has the following vial of terbutaline. How many mL will the nurse administer to the patient? _____



30. The patient has an order for morphine sulfate 1.5 mg direct IV injection. How many mL will the nurse administer to the patient? _____



Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Parenteral Medications

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

SITUATION:

The nurse has an order to administer levothyroxine 0.065 mg IVP q.AM. How many mL will the nurse draw into the syringe?

NDC 63323-247-10 24710

**LEVOTHYROXINE
SODIUM**
FOR INJECTION

200 mcg

For IM or IV Use

Single Dose Vial

Rx only

Sterile, Lyophilized
Preservative Free

Discard any unused portion.

Each vial contains: Levothyroxine sodium 200 mcg;
mannitol 10 mg; tribasic sodium phosphate anhydrous
0.7 mg; sodium hydroxide for pH adjustment.
Usual Dosage: See Insert.

Store dry product at 20° to 25°C (68° to 77°F)
[see USP Controlled Room Temperature].

PROTECT FROM LIGHT.

Reconstitution Directions:

Reconstitute the lyophilized levothyroxine sodium by
aseptically adding 5 mL of 0.9% Sodium Chloride
Injection, USP or Bacteriostatic Sodium Chloride
Injection, USP preserved with benzyl alcohol only.
Shake vial to insure complete mixing. Use immediately
after reconstitution. Do not add to other intravenous fluids.

APP Pharmaceuticals, LLC

a. 0.33 mL

c. 1.5 mL

b. 1.38 mL

d. 1.63 mL

Rationale / Discussion:

Module: RECONSTITUTION OF POWDERED MEDICATIONS

SINGLE-STRENGTH RECONSTITUTION

KEY POINTS:

- In single-strength reconstitution, the manufacturer identifies one amount of diluent to add to the powdered medication.
- The dosage strength of the mixed medication is used to calculate the amount to give to the patient.
- Information needed to work with single-strength reconstitution problems includes the type and amount of diluent, dosage strength of the mixed medication, length of time the solution will remain stable, and storage information.
- Once the medication is reconstituted, the nurse writes the date and time of reconstitution and the nurse's initials on the medication label.

Working With Single-Strength Reconstitution

Solve the following single-strength reconstitution problems.

1. The physician orders cefazolin sodium 0.25 g IM q.8h. The pharmacy sends a 1 g vial of sterile cefazolin powder with the following mixing instructions: "For IM use, add 2.5 mL sterile water for injection and shake. Provides a volume of 3.0 mL (330 mg / mL)."
 - a. How much diluent will be added to the cefazolin sodium powder?
-

b. What type of diluent will be added?

c. What is the dosage strength of the mixed medication?

d. How many mL of the medication will the nurse give to the patient?

2. The order is for procaine penicillin G 300,000 units IM b.i.d. A 1 gram vial of procaine penicillin G powder is in the medication drawer. The medication has the following mixing instructions: “IM use: Dissolve 4.6 mL bacteriostatic water for injection to make 200,000 units / mL.”

a. How much diluent will be added to the procaine penicillin G powder?

b. What type of diluent will be added?

c. What is the dosage strength of the mixed medication?

d. How many mL of the medication will the nurse give to the patient?

3. What data should be entered on the vial below when labeling the vial after reconstitution?



4. The physician orders 200 mg of an antibiotic IM q.12h. The pharmacy sends a vial of antibiotic powder for reconstitution with the following mixing directions: "For IM injection, IV direct (bolus) injection, or IV infusion, add 2 mL sterile water for injection. Shake well. Provides an approximate concentration of 125 mg / mL."

- a. How much diluent will be added to the antibiotic powder?

- b. What type of diluent will be added?

- c. What is the dosage strength of the mixed medication?

- d. How many mL of the medication will the nurse give to the patient?

5. The order is for ticarcillin disodium 0.5 g IM q.6h. The directions state to add 2 mL of NS. The reconstituted solution contains 1 g / 2.6 mL.

a. What is the dosage strength of the reconstituted medication?

b. How much will be given to the patient?

6. The order is for cefazolin 450 mg IM q.6h.

NDC 63323-236-10 23610

CEFAZOLIN
FOR INJECTION, USP

500 mg

For IM or IV Use

Rx only

Sterile, Nonpyrogenic
Preservative Free
Each vial contains: Cefazolin sodium equivalent to 500 mg of cefazolin. The sodium content is approximately 24 mg (1 mEq sodium ion) per 500 mg of cefazolin.
Usual Dosage: 250 mg to 1 g every six to eight hours. See package insert.

Constitution: For IM use add 2 mL Sterile Water for Injection. SHAKE WELL. Provides an approximate volume of 2.2 mL (225 mg/mL).
For IV use see insert.
Prior to Constitution: Store at 20° to 25°C (68° to 77°F) [see USP Controlled Room Temperature].
After Constitution: Stable for 24 hours at room temperature or 10 days if refrigerated 2° to 8°C (36° to 46°F).
PROTECT FROM LIGHT.
Vial stoppers do not contain natural rubber latex.

APP
APP Pharmaceuticals, LLC
Schaumburg, IL 60173

a. How much diluent will be added to the cefazolin powder?

b. What type of diluent will be added?

c. What is the resulting dosage strength of the mixed medication?

d. How many mL of the cefazolin will the nurse give to the patient?

7. The physician orders Bacitracin 6000 units IM. q.AM. The pharmacy sends the following drug:

| | |
|---|--|
| <p>Store unconstituted product in a refrigerator 2° to 8°C (36° to 46°F).</p> <p>DOSAGE AND USE: See accompanying prescribing information.</p> <p>Reconstitution with 9.8 mL of sodium chloride injection containing 2 percent procaine hydrochloride will result in a concentration of 5,000 units per mL. Diluents containing parabens should not be used.</p> <p>Lyophilized in container.</p> <p>Store solution in a refrigerator 2° to 8°C (36° to 46°F).</p> <p>Discard after 1 week.</p> <p>Each vial contains 50,000 units Bacitracin.</p> | <p>NDC 0009-0233-01</p> <p>One Vial Rx only</p> <p>Bacitracin for Injection, USP</p> <p>For Intramuscular Use</p> <p>50,000 Units</p> <p><small>Distributed by</small> Pfizer Pharmacia & Upjohn Co <small>Division of Pfizer Inc, NY, NY 10017</small></p> |
|---|--|

a. How much diluent will be added to the Bacitracin for injection powder?

b. What is the dosage strength of the mixed medication?

c. How many mL of the Bacitracin for injection will the nurse give to the patient?

d. What data should be entered on the label above after reconstitution?

8. The order is for 0.5 g IV of a drug. Reconstitution instructions for the powdered medication include: "Reconstitute with 2 mL bacteriostatic water (with benzyl alcohol) for injection. Resulting dosage strength is 300 mg / mL." How many mL will the nurse give?

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Single-Strength Reconstitution

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

SITUATION:
 The nurse has an order to administer 250 mg of Augmentin. The nurse measures 1 tsp. Which action by the nurse is most correct?

a. Convert the tsp to mL.

b. Administer the measured dose.

c. Question the date of reconstitution.

d. Use a 3 mL syringe to measure the dose.

Rationale / Discussion:

MULTIPLE-STRENGTH RECONSTITUTION

KEY POINTS:

- In multiple-strength reconstitution, the manufacturer identifies several amounts of diluent to add to the powdered medication.
- The nurse must select one of the listed amounts of diluent.
- The dosage strength of the mixed medication is used to calculate the amount to give to the patient.
- Information needed to work with multiple-strength reconstitution problems includes the type and amount of diluent, dosage strength of the mixed medication, length of time the solution will remain stable, and storage information.
- Once the medication is reconstituted, the nurse circles the amount of diluent selected and the corresponding dosage strength. The date and time of reconstitution and the nurse's initials are also written on the medication label.

Working With Multiple-Strength Reconstitution

Solve the following multiple-strength reconstitution problems.

1. When preparing multiple-strength reconstitution medications, the nurse will make the most concentrated solution when adding:
 - the largest volume of diluent.
 - the smallest volume of diluent.

2. The physician orders cefoperazone 750 mg IV q.12h. The pharmacy sends a 2 g vial of sterile cefoperazone powder with the following mixing instructions: “Diluent: sterile bacteriostatic water for injection. Add 10 mL for an approximate volume of 100 mg / mL. Add 6 mL for an approximate volume of 150 mg / mL.”

a. What is the dosage strength if the nurse chooses to add 10 mL of diluent?

b. How many mL of the mixed solution will the nurse administer to the patient?

c. What information should be written on the label of the reconstituted cefoperazone?

3. The physician orders penicillin G potassium 1 million units IV q.6h. The nurse has a vial with the following instructions:

| Add Diluent (mL) | Dosage Strength of Mixed Medication |
|------------------|-------------------------------------|
| 9.6 | 100,000 units / mL |
| 4.6 | 200,000 units / mL |
| 1.6 | 500,000 units / mL |

a. What is the dosage strength if the nurse chooses to add 9.6 mL of diluent?

b. What is the dosage strength if the nurse chooses to add 1.6 mL of diluent?

c. Select one volume of diluent, and calculate the amount of penicillin G potassium to administer.

4. The physician orders 750,000 units of penicillin G potassium. The nurse has the following vial:

| <p>SEE ACCOMPANYING PRESCRIBING INFORMATION.</p> <p>RECOMMENDED STORAGE IN DRY FORM.</p> <p>Store below 86°F (30°C).</p> <p>Buffered with sodium citrate and citric acid to optimum pH.</p> <p>AFTER RECONSTITUTION, SOLUTION SHOULD BE REFRIGERATED. DISCARD UNUSED SOLUTION AFTER 7 DAYS.</p> | <p>Rx only NDC 0049-0530-28</p> <p><i>Buffered</i></p> <p>Pfizerpen® (penicillin G potassium)</p> <p>For Injection</p> <p>TWENTY MILLION UNITS 20</p> <p>FOR INTRAVENOUS INFUSION ONLY</p> <p>Pfizer Roerig Division of Pfizer Inc, NY, NY 10017</p> | <p>USUAL DOSAGE 6 to 40 million units daily by intravenous infusion only</p> <table border="1"> <thead> <tr> <th>mL diluent added</th> <th>Approx. units per mL of solution</th> </tr> </thead> <tbody> <tr> <td>75 mL</td> <td>250,000 u/mL</td> </tr> <tr> <td>33 mL</td> <td>500,000 u/mL</td> </tr> <tr> <td>11.5 mL</td> <td>1,000,000 u/mL</td> </tr> </tbody> </table> | mL diluent added | Approx. units per mL of solution | 75 mL | 250,000 u/mL | 33 mL | 500,000 u/mL | 11.5 mL | 1,000,000 u/mL |
|--|--|--|------------------|----------------------------------|-------|--------------|-------|--------------|---------|----------------|
| | mL diluent added | Approx. units per mL of solution | | | | | | | | |
| 75 mL | 250,000 u/mL | | | | | | | | | |
| 33 mL | 500,000 u/mL | | | | | | | | | |
| 11.5 mL | 1,000,000 u/mL | | | | | | | | | |
| <p>PATIENT _____</p> <p>ROOM _____</p> <p>DATE/TIME _____</p> <p>BY _____</p> <p style="text-align: right;">7488</p> | | | | | | | | | | |

a. Select one volume of diluent. What is the dosage strength of the mixed medication if this volume of diluent is added to the vial?

b. Calculate the amount of medication to administer.

c. How long is the solution stable if refrigerated?

d. Complete the label with the correct information.

5. The physician orders ampicillin 700 mg IV q.6h. The nurse has a vial of powdered ampicillin with the following directions for reconstitution:

| | |
|--|-------------------------------------|
| For IM or IV use: Add bacteriostatic NS or sterile water for injection and shake. | |
| Diluent | Strength of Mixed Medication |
| 3.5 mL | 500 mg / mL |
| 7.2 mL | 250 mg / mL |
| Use within 1 hour of reconstitution. Stable under refrigeration for 6 hours. See package insert. | |

a. Select one volume of diluent. What is the dosage strength of the mixed medication if this volume of diluent is added to the vial?

b. Calculate the amount of medication to administer.

c. How long is the mixed solution stable?

d. If the ampicillin is given IM, which diluent volume would be preferable? Why?

e. Complete the label with the appropriate information.



6. The physician orders Cefotaxime 500 mg IM q.12h. The nurse has a vial of powdered Cefotaxime with the following directions:

| | |
|---|--|
| NDC 63323-332-15 313215 | |
| CEFOTAXIME FOR INJECTION, USP | |
| 2 g* | |
| For IM or IV Use | |
| Rx only | |
| Single Dose Vial | |
| *Each vial contains: Sterile Cefotaxime Sodium, USP equivalent to 2 g Cefotaxime. The sodium content is approximately 50.5 mg (2.2 mEq) of sodium per gram Cefotaxime. | |
| Usual Dosage: See package insert. Reconstitute with suitable diluents as listed in the package insert. Shake to dissolve. | |
| Prior to Reconstitution: Store dry powder at 20° to 25°C (68° to 77°F) [see USP Controlled Room Temperature]. Protect from light. Vial stoppers do not contain natural rubber latex. | |
| APP Pharmaceuticals, LLC Schaumburg, IL 60173 | |

- a. After reading the label, the nurse can identify the (check all that apply):
- routes of administration.
 - storage information.
 - dosage strength.
 - usual adult dosage.
 - type of diluent.
- b. To administer the ordered dose (500 mg), the nurse:
- needs to call the pharmacist for mixing instructions.
 - should read the accompanying literature.
 - will give 2 mL of the reconstituted drug.

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Multiple-Strength Reconstitution

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

| <p>SEE ACCOMPANYING PRESCRIBING INFORMATION.</p> <p>RECOMMENDED STORAGE IN DRY FORM.</p> <p>Store below 86°F (30°C).</p> <p>Buffered with sodium citrate and citric acid to optimum pH.</p> <p>AFTER RECONSTITUTION, SOLUTION SHOULD BE REFRIGERATED. DISCARD UNUSED SOLUTION AFTER 7 DAYS.</p>  | <p>Rx only NDC 0049-0530-28</p> <p>Buffered</p> <p>Pfizerpen® (penicillin G potassium)</p> <p>For Injection</p> <p>TWENTY MILLION UNITS 20</p> <p>FOR INTRAVENOUS INFUSION ONLY</p> <p> Roerig Division of Pfizer Inc, NY, NY 10017</p> | <p>USUAL DOSAGE 6 to 40 million units daily by intravenous infusion only</p> <table border="1"> <thead> <tr> <th>mL diluent added</th> <th>Approx. units per mL of solution</th> </tr> </thead> <tbody> <tr> <td>75 mL</td> <td>250,000 u/mL</td> </tr> <tr> <td>33 mL</td> <td>500,000 u/mL</td> </tr> <tr> <td>11.5 mL</td> <td>1,000,000 u/mL</td> </tr> </tbody> </table> <p>PATIENT <u>XXX</u></p> <p>ROOM <u>225</u></p> <p>DATE/ <u>2/14/xx</u> <u>1000</u></p> <p>TIME</p> <p>BY <u>TC RN</u></p> <p style="text-align: right; border: 1px solid black; padding: 2px;">7488</p> | mL diluent added | Approx. units per mL of solution | 75 mL | 250,000 u/mL | 33 mL | 500,000 u/mL | 11.5 mL | 1,000,000 u/mL |
|--|---|--|------------------|----------------------------------|-------|--------------|-------|--------------|---------|----------------|
| mL diluent added | Approx. units per mL of solution | | | | | | | | | |
| 75 mL | 250,000 u/mL | | | | | | | | | |
| 33 mL | 500,000 u/mL | | | | | | | | | |
| 11.5 mL | 1,000,000 u/mL | | | | | | | | | |

SITUATION:

The order is to add 2.4 million units of penicillin G potassium to the IV bag. The nurse draws up 5 mL of penicillin G potassium. It is most appropriate for the nurse to:

- | | |
|--------------------------------|--|
| a. add the 5 mL to the IV bag. | c. add 9.6 mL of penicillin G potassium to the IV bag. |
| b. recalculate the dose. | d. use 1,000,000 u / mL to calculate the desired dose. |

Rationale / Discussion:

Module: CALCULATIONS

INFUSION RATES

KEY POINTS:

- To set the rate of IV infusions by IV pump, the nurse needs to calculate the mL / hr of the infusion.
- To regulate the rate of IV infusions by gravity flow, the nurse needs to calculate the flow rate, or gtt / minute, of the infusion.
- To calculate the flow rate (gtt / min), the nurse needs the following information: the volume of IV fluid per hour and the drop factor of the IV tubing.
- Round all mL / hr and gtt / min to a whole number.

Working With Milliliters per Hour

Solve the following problems using the method of your choice.

1. The order is for 1000 mL D5/0.225% NS q.12h. How many mL / hr will the nurse set on the IV pump?

2. The order is for 1000 mL D5W q.16h. How many mL / hr will the nurse set on the IV pump?

3. The physician orders 3000 mL of Lactated Ringer's to infuse over 24 hours. How many mL will the patient receive per hour?

4. The order is to infuse 1 unit of packed red blood cells (250 mL) over 1 1/2 hours. Calculate the mL / hr.

5. The doctor orders ceftizoxime 1 g IVPB q.12h. The pharmacy sends ceftizoxime 1 g in 50 mL NS to infuse over 30 minutes. Calculate the mL / hr.

6. The physician orders 1 L 0.9% NS to infuse over 6 hours. Calculate the mL / hr.

7. The order is to infuse 500 mL of D5W over 10 hrs. Calculate the mL / hr.

8. The order is to infuse 1 unit of packed red blood cells (275 mL) over 2 hours. Calculate the mL / hr.

9. The physician orders 250 mL 0.9% NS to infuse over 2 1/2 hours. Calculate the mL / hr.

10. The doctor orders vancomycin 1 g IVPB q.12h. The pharmacy sends vancomycin 1 g in 200 mL 0.9% NS to infuse over 90 minutes. Calculate the mL / hr.

Working With Flow Rate

1. The nurse hangs up 1 L D5W to infuse over 8 hours. Use the following IV tubing label to calculate the flow rate.

| |
|---|
| <p>Primary IV Set Non-Vented, 72 inch</p> <p>60 drops / mL</p> |
|---|

2. The physician orders 1 L of D5LR to infuse at 83 mL / hr. The IV tubing delivers 15 gtt / mL. What is the flow rate (gtt / min)?

3. The doctor orders 1 unit of whole blood (500 mL) to infuse over 4 hours. The blood tubing delivers 10 gtt / mL. What is the flow rate of the blood?

4. The order is for 500 mL of NS TKO (30 mL / hr). The nurse selects the following IV tubing. What is the flow rate?

| |
|---|
| <p>Primary IV Set Non-Vented, 72 inch</p> <p>15 drops / mL</p> |
|---|

5. The IV is to infuse at 42 mL / hr. The drop factor on the IV tubing is 15 gtt / mL. What is the flow rate?

6. The order is to infuse 250 mL of NS over 1 1/2 hours. The drop factor is 12 gtt / mL. What is the flow rate?

7. The order is for 500 mL of D5/0.45% NS to infuse over 4 hours. The nurse selects the following IV tubing. What is the flow rate?

| |
|--|
| <p>Primary IV Set Non-Vented, 72 inch</p> <p>15 drops / mL</p> |
|--|

8. The nurse is to infuse vancomycin 1 g in 250 mL 0.9% NS over 1 1/2 hours. The nurse selects a minidrop tubing (60 gtt / mL). Calculate the flow rate.

9. The patient is to receive 1 unit whole blood (475 mL) to infuse over 3 hours. The nurse starts the transfusion using blood tubing labeled 10 gtt / mL. What is the flow rate?

10. The nurse is to infuse 1 liter D10W over 8 hours. The nurse selects IV tubing label 12 gtt / mL. Calculate the flow rate.

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With Milliliters
per Hour and Flow Rate

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

| Intake and Output | | | | | |
|-------------------|------|-----|-------------------|--------|-------|
| 7 - 3 | Oral | IV | Urine | Emesis | Other |
| | 400 | 350 | 250 200 225 | | |
| Total mL | 400 | 350 | 675 | | |
| 3 - 11 | | | | | |

**Primary IV Set
Non-Vented, 72
inch
15 drops / mL**

SITUATION:
 The nurse started an IV of 500 mL NS 0.9% at 0800, to infuse over 10 hours via gravity. The IV infused at 13 gtt / min all shift.

At 1500, the end of the shift, the nurse completed the intake and output record.

In reviewing the Intake and Output record, the nurse from the evening shift is most correct to:

a. continue to monitor the IV at 13 gtt / min.

c. increase the flow rate to 31 gtt / min.

b. question the oral intake for the day shift.

d. change the IV tubing to a minidrop.

Rationale / Discussion:

DIRECT IV MEDICATION ADMINISTRATION

KEY POINTS:

- Use drug reference information to find the rate of administration for direct IV administration of medications.
- If the dosage ordered is smaller than the recommended dose in the drug reference book, administer the dosage over the full amount of time recommended.
- The term “fraction thereof” in a drug reference book means that any fraction of a dose is given over the full amount of time recommended.
- Medications identified as “High Alert” require special attention in the preparation, administration, and follow-up care of the patient.

Working With Direct IV Medication Administration

Use the information provided to identify the rate for the administration of direct IV medications for the following problems.

1. The doctor orders morphine sulfate 10 mg IV push stat. The drug reference information for direct IV administration of morphine is:
High Alert: Administer 2.5 mg - 15 mg over 5 min.
What is the rate of administration for this dose?

2. The doctor orders hydromorphone 3 mg IV injection for severe pain. The drug reference literature states, “Administer slowly at a rate not to exceed 2 mg over 3 - 5 min. High Alert: Rapid infusion may lead to increased respiratory depression, hypotension, and circulatory collapse.” What is the rate of administration for this dose?

3. The doctor orders furosemide 80 mg direct IV injection now. What is the rate of administration for this dose?
-

furosemide
(fur-oh-se-mide)

IMPLEMENTATION

- **Direct IV: Administer undiluted.**
Rate: Administer at a rate of 20 mg / min.
 - **Intermittent Infusion: Dilute large doses.**
Rate: Not to exceed 4 mg / min.
-

4. The doctor orders glycopyrrolate 0.1 mg direct IV stat. The recommended rate for direct IV administration is 20 mcg over 1 minute. What is the rate of administration for the ordered dose?
-

5. The doctor orders diazepam 10 mg direct IV injection now. The drug reference information states, "Administer slowly at a rate of 5 mg / min in adults." What is the rate of administration for this dose?
-

6. The doctor orders lorazepam 0.001 gram IVP 30 minutes before chemotherapy. What is the rate of administration for this dose?
-

lorazepam
(lor-az-e-pam)

IMPLEMENTATION

***Rate:* Administer at a rate not to exceed 2 mg / min. Rapid IV administration may result in apnea, hypotension, bradycardia, or cardiac arrest.**

7. The doctor orders phenytoin 75 mg direct IV administration for a patient experiencing status epilepticus. What is the rate of administration for this dose?
-

phenytoin
(fen-i-toyn)

IMPLEMENTATION

- **Direct IV: Administer undiluted. Administer at a rate not to exceed 50 mg over 1 minute in adults. Rapid administration may result in severe hypotension cardiovascular collapse, or CNS depression.**
-

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With Direct IV Medication Administration

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

| Date | Physician's Orders |
|------|--|
| 2/12 | Atropine 0.8 mg IVP stat Patient C ID ***** |

atropine (at-ro-peen)

IMPLEMENTATION

- **Direct IV: Administer undiluted.**
- **Rate: Administer over 1 min. Slow administration (over >1 min) may cause a paradoxical bradycardia (usually resolved in approximately 2 min).**

SITUATION:
 Atropine is available in 1 mg / mL. To implement this order safely, the nurse is most correct to:

a. give the ordered dose slowly into the vein.

c. add the atropine dose to the primary IV fluid.

b. administer 0.8 mL over 1 minute.

d. dilute with 10 mL normal saline.

Rationale / Discussion:

INFUSION AND COMPLETION TIME

KEY POINTS:

- Use mL / hr and total amount of IV fluid to calculate the infusion time (hours and minutes).
- Use the starting time and the infusion time to calculate the completion time of the IV fluid.
- With infusion time, convert parts of an hour to minutes.

Working With Infusion Time

Use the information provided to identify the infusion time for the following problems.

1. The doctor orders 1 L of D5/0.45 NS to infuse at 125 mL / hr. What is the infusion time of the IV?

2. At 0700, 500 mL of D5W is started to infuse at 60 mL / hr. What is the infusion time of the IV?

3. At 1000, 1000 mL of Lactated Ringer's is started on the patient. The IV is infusing at 75 mL / hr. The drop factor is 10 gtt / mL. What is the infusion time of the IV?

4. The nurse restarts an IV with 800 mL D5/LR to infuse at 125 mL / hr. What is the infusion time of the IV?

5. The patient has an IVPB of famotidine 20 mg in 100 mL NS. The nurse sets the IV pump at 200 mL / hr. What is the infusion time of the IVPB?

6. The nurse starts an IV of 100 mL D5W with 10 mEq KCl to infuse at 30 mL / hr. What is the infusion time of the IV?

Working With Completion Time

1. The nurse starts 1 L of D5/0.45% NS to infuse at 125 mL / hr at 0800. What is the completion time of this IV?

2. At 1400, 250 mL of D5W is started to infuse at 60 mL / hr. What is the completion time of the IV?

3. At 2000, 1000 mL of 0.45 NS is started to infuse at 100 mL / hr. What is the completion time of the IV?

4. The nurse restarts 600 mL of IV fluid at 1930 to infuse at 75 mL / hr. What is the completion time of the IV?

5. The nurse restarts an IV bag containing 500 mL of D5/0.45% NS at 1430, to infuse at 80 mL / hr. What is the completion time of this IV?

6. The nurse restarts 750 mL of LR at 0900, to infuse at 150 mL / hr. What is the completion time of the IV?

Working With Infusion and Completion Time

1. The doctor orders 1 L NS to infuse over 10 hours. The nurse starts the IV at 0900. At 1000 the patient pulls out the IV. The nurse restarts the IV at 1100 at the same rate. Starting with the amount of IV fluid left at 1100, calculate the new infusion time and the completion time of the IV.

Infusion time _____

Completion time _____

2. The doctor orders 500 mL D10W to infuse at 75 mL / hr. The nurse starts the IV at 1330. At 1530, the IV rate is increased to 100 mL / hr, per doctor's orders. Starting with the amount of IV fluid remaining at 1530, calculate the new infusion time and completion time of the IV.

Infusion time _____

Completion time _____

3. The doctor orders 1 L NS to infuse over 8 hours. The nurse starts the IV at 1600. At 2000, the IV rate is decreased to 100 mL / hr. Starting with the amount of IV fluid remaining at 2000, calculate the new infusion time and completion time of the IV.

Infusion time _____

Completion time _____

4. The doctor orders 500 mL of NS to infuse at 100 mL / hr. The nurse starts the IV at 0530. At 0700, the IV rate is decreased to 75 mL / hr. Starting with the amount of IV fluid remaining at 0700, calculate the new infusion time and completion time of the IV.

Infusion time _____

Completion time _____

5. At 1600, 1 L D5W is started to infuse over 8 hours. At 1900, the IV infiltrates. The nurse restarts the IV at 2100 at the same IV rate. Starting with the amount of IV fluid remaining at 2100, calculate the new infusion time and completion time of the IV.

Infusion time _____

Completion time _____

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Infusion and Completion Time

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

SITUATION:

The nurse started 1 liter of D5/0.9% NS at 0700, to infuse at 125 mL / hr via gravity. The drop factor of the IV tubing is 15 gtt / mL. At 1200, the IV intake is 300 mL. In assessing the flow rate, the nurse counts 21 gtt / min. Which action(s) by the nurse are appropriate (select all that apply)?

a. Increase the flow rate to 31 gtt / min.

c. Report a completion time of 1736.

b. Increase the flow rate to 41 gtt / min for 4 hours.

d. Plan to give 1000 mL for the day shift.

e. Administer the IV fluid through an infusion pump.

Rationale / Discussion:

LABELING IV BAGS

KEY POINTS:

- When labeling a flowmeter, be sure to include the start time and end time of the IV.
- Use military time to identify the hourly fluid intake on the flowmeter.

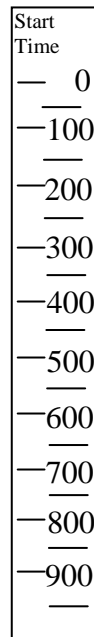
Labeling IV Bags

Label the following flowmeters to identify the IV fluid intake.

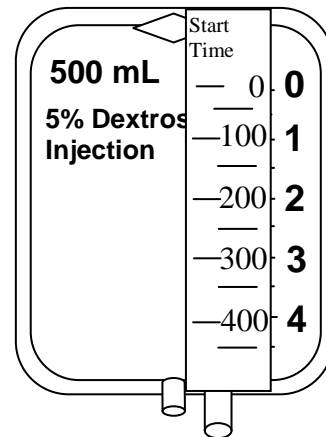
1. The doctor orders 1 L NS to infuse over 10 hours. The nurse starts the IV at 1100. Label the flowmeter with the hourly fluid intake.

| Start Time |
|---------------|
| — 0 |
| — 100 |
| — 200 |
| — 300 |
| — 400 |
| — 500 |
| — 600 |
| — 700 |
| — 800 |
| — 900 |
| — |

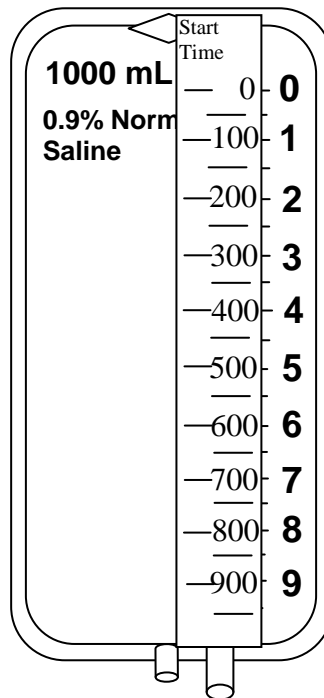
2. The nurse starts the IV at 0230, to infuse at 75 mL / hr. Label the flowmeter hourly.



3. The nurse starts the IV at 0100, at 50 mL / hr. Label the flowmeter q.2h.

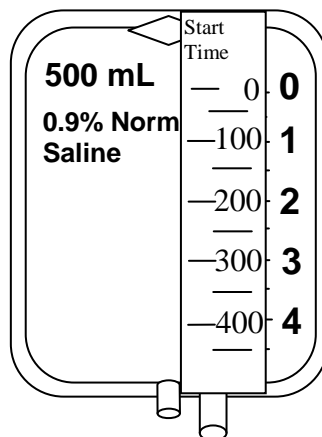


4. The nurse starts the IV at 1300, to infuse at 150 mL / hr. Label the flowmeter hourly.



Shade in the amount of IV fluid in the bag at 1700.

5. The nurse starts the IV at 2030 to infuse at 125 mL / hr. Label the flowmeter hourly.

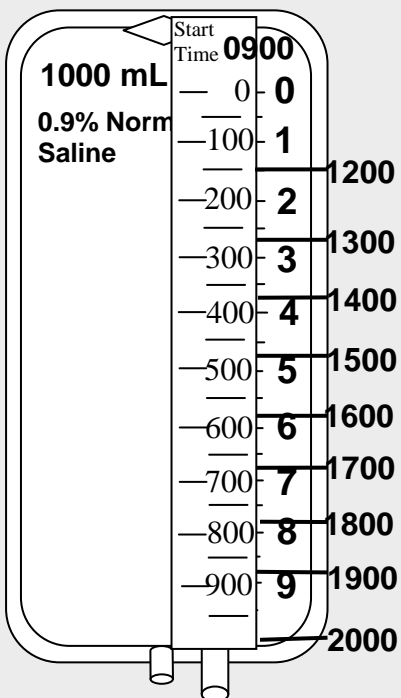


Shade in the amount of IV fluid in the bag at 2330.

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Labeling IV Bags

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.



SITUATION:
The nurse started 1 liter of 0.9% NS at 0900, to infuse at 50 mL / hr. At 1200, the IV rate is increased to 125 mL / hr. The nurse relabels the flowmeter and reports an IV intake of 525 mL at 1500. This flowmeter:

a. is labeled appropriately.

b. reflects the increased rate.

c. indicates when the IV will be finished.

d. must be recalculated.

Rationale / Discussion:

Module: PEDIATRIC CALCULATIONS

ADMINISTERING MEDICATIONS TO CHILDREN

KEY POINTS:

- The oral route is preferred for children. Children over 5 years can take chewable forms of medication. Special equipment is available for oral pediatric administration.
- Parenteral doses for children are generally not rounded, but are left at the tenths or the hundredths place.
- The maximum volume of a parenteral injection in children is generally 1 mL. For the subcut route, 0.5 mL is the maximum volume, and for the ID route, 0.01 - 0.1 mL is the maximum volume of the injection.
- Shorter length (1/2" - 1") and smaller diameter (25G - 30G) needles are used.
- The smallest possible amount of diluent is added to dilute pediatric IV medications. A pedidrip tubing (60 gtt / mL) and a burette may be used to administer pediatric IV fluids and medications.


Administering Medications to Children

Solve the following problems using the method of your choice.

1. The physician prescribed divalproex sodium 0.25 gram daily p.o. Divalproex sodium is available from the pharmacy in 125 mg delayed-release tablets. How many tablets will the nurse give?
-

2. The child is to receive cefaclor 350 mg p.o. q.12h. The pharmacy sends strawberry-flavored cefaclor oral suspension in 125 mg / 5 mL strength. How many mL will the child receive per dose?

3. The doctor orders Diflucan 60 mg b.i.d. The nurse finds the following in the medication drawer. How many mL will the nurse give?

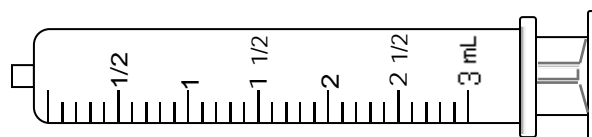
| | |
|--|---|
| <p>FOR ORAL USE ONLY.</p> <p>STORAGE <i>Before Reconstitution:</i> Store below 86°F (30°C). <i>After Reconstitution:</i> Store suspension between 41°F (5°C) and 86°F (30°C). Protect from freezing.</p> <p>SHAKE WELL BEFORE EACH USE.</p> <p>DISCARD UNUSED PORTION AFTER 2 WEEKS.</p> <p>MIXING DIRECTIONS Tap bottle lightly to loosen powder. Add 24 mL of distilled water or Purified Water (USP) to the bottle. Shake well.</p> <p>DOSAGE AND USE See accompanying prescribing information. This package contains 350 mg fluconazole in a natural orange-flavored mixture.*</p> | <p>NDC 0049-3440-19</p> <p>35 mL when reconstituted</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DIFLUCAN[®] (Fluconazole for Oral Suspension)</p> <p>ORANGE FLAVORED</p> <p>10 mg/mL</p> <p>when reconstituted</p> </div> <p> Roerig Division of Pfizer Inc, NY, NY 10017</p> |
|--|---|

4. The order is for 75 mg of Dilantin p.o. t.i.d. for a 6-year-old child. The following medication is available. How many mL will the nurse give?

| | |
|---|--|
| <p>NDC 0071-2214-20</p> <p>8 fl oz (237 mL) Rx only</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Dilantin-125[®] (Phenytoin Oral Suspension, USP)</p> <p>125 mg per 5 mL</p> </div> <p>IMPORTANT—SHAKE WELL BEFORE EACH USE</p> <p>NOT FOR PARENTERAL USE</p> <p style="text-align: center;"><small>Distributed by</small>  Parke-Davis Division of Pfizer Inc, NY, NY 10017</p> | <p>THIS PRODUCT MUST BE SHAKEN WELL ESPECIALLY PRIOR TO INITIAL USE. Each 5 mL contains 125 mg phenytoin, with a maximum alcohol content not greater than 0.6 percent.</p> <p>DOSAGE AND USE Adults, 1 teaspoonful (5 mL) three times daily; pediatric patients, see package insert.</p> <p>Advice to Pharmacist and Patient—Patient must be advised to use an accurate measuring device when using this product. See package insert for complete prescribing information.</p> <p>Store at Controlled Room Temperature 20°-25 C (68 -77 F) (see USP). Protect from freezing and light. Keep this and all drugs out of the reach of children.</p> |
|---|--|

5a. Prochlorperazine 2.5 mg p.o. b.i.d. is ordered. The pharmacy sends prochlorperazine syrup 5 mg / 5 mL. How many mL will the patient receive?

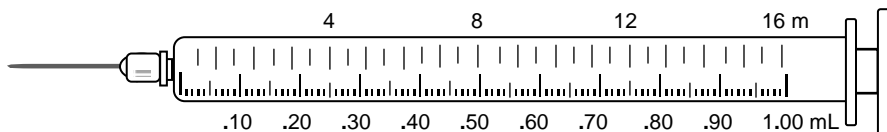
b. Fill in the most appropriate measuring device for this medication.



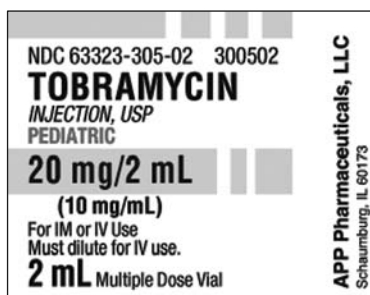
6a. Methylprednisolone 20 mg IV q.12h. is ordered. The pharmacy sends the following medication. How many mL will the nurse administer per dose?

| | | |
|---|------------------|--|
| Single-Dose Vial | For IM or IV use | NDC 0009-0190-09 |
| Protect from light. | | 2 mL Act-O-Vial® Rx only |
| DOSAGE AND USE: See accompanying prescribing information. | | Solu-Medrol® |
| *Each 2 mL (when mixed) contains methylprednisolone sodium succinate equivalent to methylprednisolone, 125 mg. Contains Benzyl Alcohol as a Preservative. Lyophilized in container. | | methylprednisolone sodium succinate for injection, USP |
| Distributed by Pharmacia & Upjohn Co Division of Pfizer Inc, NY, NY 10017 | | 125 mg* |

b. Fill in the syringe.



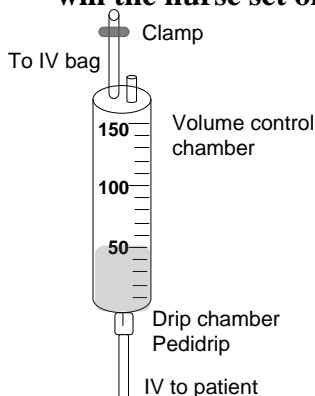
7. The physician orders IV tobramycin 12 mg q.12h. The pharmacy sends the following vial of tobramycin. How many mL will the nurse give?



- 8a. The patient has a primary IV of D5/0.225% NS infusing by gravity flow at 75 mL / hr. The IV tubing is a pedidrip tubing. The physician orders ampicillin 250 mg in 50 mL D5W IV q.6h. The IVPB is to infuse over 1/2 hour. What is the flow rate of the IVPB?

- b. At what time will the IVPB be completed if the nurse starts the IVPB at 1400?

9. The patient is to receive ampicillin 100 mg. After mixing the ampicillin, the nurse adds it to the volume control chamber and fills up the chamber with D5W to the 50 mL mark. The IV medication is to infuse over 60 minutes. How many mL / hr will the nurse set on the IV pump?



DETERMINING SAFE DOSE

KEY POINTS:

- In order to determine whether an ordered dose is safe for an individual child, the nurse needs the following information: the medication order, the child's weight (usually in kg) or body surface area (BSA), and the recommended dose from the drug reference.
- Recommended drug dosages can be stated as individual doses (for example, mg / kg or mcg / m²), total daily doses, or dosage ranges. The nurse needs to read the drug reference information carefully to interpret the recommended drug dose correctly.
- The nurse calculates the recommended dose based on a child's weight or BSA, then compares it with the ordered dose. An ordered dose is considered safe when it is equal to or smaller than the dose recommended in the drug reference.

Dosage Based on Body Weight

Solve the following problems using the method of your choice.

- 1a. The physician orders cefdinir 200 mg p.o. q.12h., for a child who weighs 30 kg. The drug reference information states that the recommended dose for children from 6 months to 12 years is 7 mg / kg q.12h. What is the maximum safe dose based on the drug literature for this child?
- _____

- b. Is the ordered dose safe?
- _____

2a. The physician orders a digitalizing dose of IV digoxin 0.25 mg p.o. q.12h., for a 12-month-old child who weighs 8 kg. The drug reference information states that the recommended digitalizing dose for children from 1 - 24 months is 30 - 50 mcg / kg. What is the maximum safe dose based on the drug literature for this child?

b. Is the ordered dose safe?

3a. The physician orders furosemide oral solution 40 mg p.o. daily, for a child who weighs 66 lb. The drug reference information states that the recommended dose of p.o. furosemide for children over 1 month is 2 mg / kg as a single dose. Maximum dose = 6 mg / kg / day. What is the maximum safe dose based on the drug literature for this child?

b. Is the ordered dose safe?

4a. A child who weighs 77 lb is started on oral morphine solution 20 mg p.o. q.3h. The recommended dose of oral morphine for children <50 kg is 0.3 mg / kg q.3 - 4h. initially. What is the maximum safe dose based on the drug literature for this child?

b. Is the ordered dose safe?

5a. The order is for phenytoin sodium 125 mg IV q.8h., for a 15-year-old patient with frequent seizures. The patient weighs 55 kg. The drug reference information states that the recommended pediatric maintenance dose of phenytoin sodium is 6 - 7 mg / kg / 24 hr in 2 - 3 divided doses. What is the safe dose range based on the drug literature for this child?

b. Is the ordered dose safe?

Dosage Based on Body Surface Area

Solve the following problems using the method of your choice.

1a. A child who has a BSA of 0.8 m^2 is given leucovorin calcium 5 mg q.6h. The drug reference book states that the recommended dose for children is $7 \text{ mg} / \text{m}^2 \text{ q.6h}$. What is the maximum safe dose based on the drug literature for this child?

b. Is the ordered dose safe?

2a. An order is written for zidovudine 0.25 g p.o. q.6h., for a child who has a BSA of 1.1 m^2 . The drug reference book states that the recommended dose for children from 3 months to 12 years is $90 - 180 \text{ mg} / \text{m}^2 \text{ q.6h}$. What is the maximum safe dose based on the drug literature for this child?

b. Is the ordered dose safe?

3a. The physician prescribes vinblastine 10 mg IV q.week, for a child who weighs 75 lb and has a body surface area of 1.15 m^2 . The drug reference book states that the recommended dose of vinblastine for children is $2.5 \text{ mg} / \text{m}^2$ as a single dose initially, up to $7.5 \text{ mg} / \text{m}^2 / \text{q.1} - 2$ weeks up to 12 weeks. What is the maximum safe dose based on the drug literature for this child?

b. Is the ordered dose safe?

4a. The order is for 0.2 mg q.AM of a drug for a child with a BSA of 0.4 m^2 . The recommended dose of the drug is $0.55 \text{ mg} / \text{m}^2$ daily. What is the maximum safe dose based on the drug literature for this child?

b. Is the ordered dose safe?

5a. An 11-year-old child with leukemia and an acute varicella zoster infection is started on acyclovir 500 mg IV q.8h. The child's BSA is 1.18 m^2 . The recommended dose of acyclovir for immunosuppressed children <12 years old with varicella zoster is $500 \text{ mg} / \text{m}^2 \text{ q.8h. for 7}$ days. What is the maximum safe dose based on the drug literature for this child?

b. Is the ordered dose safe?

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Determining Safe Dose

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

| Date | Physician's Orders |
|------|----------------------------------|
| 2/15 | Lamotrigine 10 mg p.o. b.i.d. |

Patient M
ID *****

SITUATION:
The physician is starting lamotrigine drug therapy on an 8-year-old child who weighs 27 kg.

The drug reference information states that the recommended initial pediatric dose of lamotrigine is 0.6 mg / kg / day in 2 divided doses for the first 2 weeks.

Which action by the nurse is most appropriate?

a. Administer the medication as ordered.

b. Question the ordered dose.

c. Ask the pharmacist if the ordered dose is correct.

d. Ask the parent what dose the child has been taking.

Rationale / Discussion:

NASOGASTRIC FLUID REPLACEMENT

KEY POINTS:

- To calculate fluid replacement for a child with a large volume of NG drainage, the nurse needs the following information: the rate of the primary IV, the maximum hourly IV rate, the amount of NG drainage, and the time interval for measuring and replacing the output.
- NG fluid replacement problems usually involve solving for the infusion and completion time of the replacement IV fluid.

Working With Nasogastric Fluid Replacement Problems

Solve the following problems using the method of your choice.

- 1a. An adolescent patient with an NG tube set to low continuous suction has an order for 1 L D5/0.225 NS @ 100 mL / hr. The NG drainage is to be measured q.8h. and replaced with a second IV of D5W with 10 mEq KCl per 500 mL. The patient is to receive no more than 150 mL / hr IV. What is the rate of the primary IV?
- _____

- b. What is the maximum hourly IV rate?
- _____

- c. The patient's NG tube drains 380 mL. What is the infusion time of the replacement IV?
- _____

- d. What is the completion time of the replacement IV if replacement is started at 1500?
- _____

2a. The order is for 500 mL D5/0.225% NS @ 63 mL / hr. The NG drainage is to be measured and replaced with the primary IV solution q.4h. Maximum hourly IV rate is not to exceed 85 mL / hr. What is the rate of the primary IV?

b. The nurse can increase the IV by how many additional mL / hr during the replacement of the NG drainage?

c. The child's NG tube drains 66 mL. What is the infusion time of the replacement IV fluid?

d. The fluid replacement is started at 12 noon. What is the completion time?

3a. The physician writes the following orders:

1. IV 500 mL 0.33% NS @ 75 mL / hr.

2. Replace NG drainage mL for mL q.4h. with 2nd IV of 0.45% NS with 10 mEq KCl per 500 mL.

3. Maximum hourly IV rate 100 mL / hr.

The NG output at 0400 is 100 mL. What is the infusion time of the replacement IV?

b. What is the completion time if the replacement IV is started at 0430?

- 4a. The physician writes the following orders:**
- 1. IV 500 mL D5/0.225% NS q.10h.**
 - 2. Replace NG drainage mL for mL with the maintenance IV fluid q.4h.**
 - 3. Maximum hourly IV rate 80 mL / hr.**
- The NG output at 2200 is 135 mL. What is the infusion time of the replacement IV fluid?**
-

- b. What is the completion time if the replacement IV is started at 2245?**
-

- 5a. The physician writes the following orders:**
- 1. IV 250 mL D5/ 0.9% NS at 25 mL / hr.**
 - 2. Replace NG drainage mL for mL q.4h.**
 - 3. Maximum hourly IV rate 50 mL / hr.**
- The NG output at 1500 is 65 mL. What is the infusion time of the replacement IV fluid?**
-

- b. What is the completion time if the replacement IV is started at 1600?**
-

- 6a. The physician writes the following orders:**
- 1. IV 250 mL D5W at 40 mL / hr.**
 - 2. Replace NG drainage mL for mL with the maintenance IV fluid q.8h.**
 - 3. Maximum hourly IV rate 75 mL / hr.**
- The NG output at 0600 is 115 mL. What is the infusion time of the replacement IV fluid?**
-

- b. What is the completion time if the replacement IV is started at 0700?**
-

Module: TITRATION OF IV MEDICATIONS

TITRATION OF IV MEDICATIONS

KEY POINTS:

- With titration problems, the nurse usually needs to calculate the number of mL / hr to set on the IV pump. Occasionally, the nurse must calculate the amount of medication infusing per hour.
- Information needed to solve titration problems includes the total drug, the total volume of IV fluid, and the amount of drug ordered to infuse hourly.
- Titration orders can be written as a dosage range or as a single dose of medication.

Titration in Common Clinical Practice

Solve the following titration problems.

1. Heparin 25,000 units in 250 mL D5W is sent up from the pharmacy. The order is to administer heparin at 1000 units / hr. How many mL / hr will the nurse set on the IV pump?

2. The pharmacy sends an IV of 125 mg diltiazem HCl in 500 mL D5W. The physician has ordered diltiazem HCl 5 mg / hr. Calculate the mL / hr.

3. One gram of aminophylline is added to 500 mL NS. The order is to infuse the IV over 10 hours. Calculate the mg / hr that the patient will receive.

4. The doctor writes an order for heparin 1400 units / hr. The pharmacy sends an IV of 500 mL D5W with 20,000 units of heparin. What rate will the nurse set on the IV pump?

5. The physician orders IV morphine sulfate 2 - 5 mg / hr for pain management. The pharmacy sends an IV of 250 mg of morphine sulfate in 500 mL D5W. What rate will the nurse set on the IV pump to administer 3 mg / hr?

6a. A patient with severe asthma who weighs 55 kg is started on an IV theophylline drip in the emergency room. An IV of 250 mg theophylline ethylenediamine in 500 mL NS is started at 1300. The order is to start the IV infusion at 0.5 mg / kg / hr. The dose to be increased as needed by 0.1 mg / kg / hr q.30 min, up to a maximum of 0.7 mg / kg / hr. Calculate the mL / hr that the nurse will set on the infusion pump at 1300.

b. If the theophylline drip is increased as ordered at 1330, what rate will be set on the IV pump?

Complex Titration Problems in Critical Care

Solve the following titration problems.

1. Ordered: IV dobutamine 100 mcg / min
Available: dobutamine 250 mg in 250 mL D5W
At the hand off report, the nurse is informed that the patient is receiving 5 mL / hr via IV pump.

a. Calculate the ordered mg / hr.

b. Calculate the mL / hr based on the order.

c. Is the set rate correct?

**2. Ordered: 1 mg lidocaine / min IV infusion
Available: 2 g lidocaine in 500 mL D5W**

a. Calculate the mg / hr.

b. Calculate the mL / hr.

**c. If the lidocaine is increased to 2 mg / min,
calculate the mL / hr.**

**3. Ordered: IV infusion lidocaine 4 mg / min
Available: 1 g lidocaine in 500 mL D5W**

a. Calculate the mL / hr.

**b. If the rate is reduced to 2 mg / min, calculate the
mL / hr.**

**4. The pharmacy sends an IV of magnesium sulfate
22 gram in 500 mL D5W. The order is for
50 mg / min. Calculate the mL / hr.**

**5. A patient with ventricular ectopic beats has a stat
order for an IV infusion of lidocaine at a rate of
30 mL / hr. The IV contains 1 g lidocaine in 500
mL D5W. Calculate the mg / hr that the patient
will receive.**

**6. Pronestyl 1 gram in 250 mL NS is ordered for a
patient with frequent PVCs, to infuse at 1 mL /
min. Calculate the mg / min that the patient is
receiving.**

7. The order is for IV dopamine HCl 400 mg in 500 mL NS. The patient is to receive 750 mcg / min. What rate will the nurse set on the IV pump?

**8. Ordered: Nitroglycerine 10 mcg / min IV infusion
Available: Nitroglycerine 50 mg in 250 mL NS
What rate will the nurse set on the IV pump?**

9. The order is for IV dopamine HCl 400 mg / 500 mL NS. The patient is to receive 500 - 750 mcg / min. What rate will the nurse set on the IV pump to administer the lowest dosage of dopamine HCl?

10. The order is for NTG 5 - 100 mcg / min via IV infusion to relieve chest pain. NTG 50 mg in 250 mL NS is available. What rate will the nurse set on the IV pump to deliver the highest dosage?

11. The physician orders dopamine 20 mcg / kg / min for a patient who weighs 80 kg. The pharmacy sends an IV of 400 mg of dopamine in 500 mL D5W. What rate will the nurse set on the IV pump?

12. The physician orders milrinone lactate 0.5 - 0.75 mcg / kg / min IV for a patient with CHF who weighs 121 lb. The pharmacy sends an IV of 20 mg of milrinone lactate in 150 mL D5W. What rate will the nurse set on the IV pump to administer the lowest dosage?

13. The physician orders propranolol 1 mg / hr. The pharmacy sends an IV of 15 mg propranolol in 500 mL NS. Calculate the mL / hr.

14a. The patient has a dopamine drip running at 45 mL / hr. The order is for 400 mg dopamine HCl in 500 mL D5W to infuse at 5 - 15 mcg / kg / min. The dopamine is started at 8 mcg / kg / min. The patient weighs 165 pounds. Is the correct rate set on the IV pump?

b. If the rate is increased to 9 mcg / kg / min, what rate should be set on the IV pump?

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With Titration Medication

- Read each situation, and then make a clinical judgment.
- Provide a rationale for your decision or action.

| Date | Physician's Orders |
|------|---|
| 7/10 | <p>Start D5W 500 mL with 20,000 units heparin.</p> <p>Heparin to infuse at 1100 units every hour.</p> <p>Patient C ID *****</p> |

SITUATION:
To carry out this order safely, the nurse would (select all that apply):

- a. set the infusion rate at _____ mL / hr.
- b. set the infusion rate at _____ gtt / min.
- c. use a minidrop IV tubing for gravity flow infusion.
- d. set up the IV using an infusion pump.
- e. discontinue the IV once the 500 mL have infused.

Rationale / Discussion:

ANSWERS

Module: BASIC MATH REVIEW

Working With Addition of Fractions (pp. 1 - 2)

- | | | | |
|----|------------------|-----|-------------------|
| 1. | $\frac{3}{5}$ | 6. | $15 \frac{5}{24}$ |
| 2. | $\frac{11}{21}$ | 7. | $14 \frac{4}{45}$ |
| 3. | $1 \frac{1}{15}$ | 8. | $15 \frac{1}{10}$ |
| 4. | $5 \frac{1}{4}$ | 9. | $17 \frac{5}{8}$ |
| 5. | $5 \frac{9}{20}$ | 10. | $21 \frac{3}{4}$ |

Working With Subtraction of Fractions (p. 2)

- | | | | |
|----|------------------|-----|--------------------|
| 1. | $\frac{1}{2}$ | 6. | $2 \frac{1}{2}$ |
| 2. | $\frac{3}{10}$ | 7. | $4 \frac{21}{40}$ |
| 3. | $\frac{5}{24}$ | 8. | $10 \frac{11}{24}$ |
| 4. | $2 \frac{7}{8}$ | 9. | $10 \frac{19}{42}$ |
| 5. | $7 \frac{3}{10}$ | 10. | $7 \frac{1}{10}$ |

Working With Multiplication of Fractions (p. 3)

- | | | | |
|----|------------------|-----|--------------------|
| 1. | $\frac{3}{10}$ | 6. | $14 \frac{16}{21}$ |
| 2. | $\frac{5}{9}$ | 7. | $3 \frac{3}{16}$ |
| 3. | $\frac{1}{2}$ | 8. | $11 \frac{11}{35}$ |
| 4. | $\frac{15}{16}$ | 9. | $22 \frac{11}{24}$ |
| 5. | $19 \frac{4}{5}$ | 10. | $3 \frac{13}{54}$ |

Working With Division of Fractions (pp. 3 - 4)

- | | | | |
|----|-----------------|-----|-------------------|
| 1. | $1 \frac{2}{5}$ | 6. | $\frac{12}{29}$ |
| 2. | $\frac{1}{50}$ | 7. | $\frac{11}{20}$ |
| 3. | $1 \frac{1}{4}$ | 8. | $1 \frac{13}{15}$ |
| 4. | $9 \frac{3}{7}$ | 9. | 33 |
| 5. | $\frac{14}{15}$ | 10. | $\frac{22}{35}$ |

Working With Addition of Decimals (pp. 4 - 5)

- | | | | |
|----|-----------|-----|-------|
| 1. | 6074.6132 | 7. | 21.62 |
| 2. | 142.205 | 8. | 59.52 |
| 3. | 1.988 | 9. | 65.71 |
| 4. | 1961.1713 | 10. | 28.99 |
| 5. | 56.97 | 11. | 35.99 |
| 6. | 70.8 | 12. | 28.12 |

Working With Subtraction of Decimals (p. 5)

- | | | | |
|----|----------|-----|---------|
| 1. | 321.0155 | 7. | 423.697 |
| 2. | 0.051 | 8. | 66.8 |
| 3. | 9012.333 | 9. | 8703.8 |
| 4. | 7049.263 | 10. | 853.1 |
| 5. | 7.977 | 11. | 553.9 |
| 6. | 601.05 | 12. | 939.2 |

Working With Multiplication of Decimals (p. 6)

- | | | | |
|----|---------|-----|---------|
| 1. | 75.28 | 7. | 3.6888 |
| 2. | 1.6168 | 8. | 7.344 |
| 3. | 336.742 | 9. | 320.1 |
| 4. | 78.0861 | 10. | 0.2475 |
| 5. | 0.102 | 11. | 67.6208 |
| 6. | 30.1515 | 12. | 50.47 |

Working With Division of Decimals (pp. 6 - 7)

- | | | | |
|----|-------|-----|--------|
| 1. | 45 | 7. | 48.1 |
| 2. | 112 | 8. | 83.4 |
| 3. | 7.08 | 9. | 46.7 |
| 4. | 20.5 | 10. | 0.0565 |
| 5. | 0.05 | 11. | 49.456 |
| 6. | 401.2 | 12. | 1.084 |

Module: METHODS OF CALCULATION

Working With a Method of Calculation (pp. 8 - 13)

- | | | | |
|-----|---------------|------|---------|
| 1. | 2 tablets | 13. | 2.25 mL |
| 2. | 1 1/2 tablets | 14. | 3.5 mL |
| 3. | 2 pills | 15. | 30 mL |
| 4. | 0.5 tablet | 16. | 0.6 mL |
| 5. | 3 caplets | 17. | 15 days |
| 6. | 3.5 mL | 18. | 20 mL |
| 7. | 6 mL | 19a. | 0.4 mL |
| 8. | 0.5 mL | b. | 5 doses |
| 9. | 3 mL | 20a. | 0.8 mL |
| 10. | 16 mL | b. | 5 doses |
| 11. | 10 days | c. | 0.65 mL |
| 12. | 10 days | d. | 6 doses |

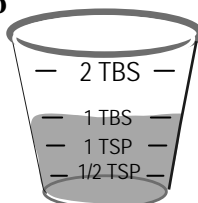
Module: SYSTEMS OF MEASUREMENT

Working With the Metric System (pp. 14 - 16)

- | | | | |
|-----|------------|-----|-------------|
| 1. | 3500 mL | 14. | 2500 mg |
| 2. | 700 mL | 15. | 0.75 g |
| 3. | 1 g | 16. | 500 mg |
| 4. | 0.1 mg | 17. | 0.075 mg |
| 5. | 10,000 mcg | 18. | 450 mcg |
| 6. | 2000 mcg | 19. | 1200 g |
| 7. | 0.0356 g | 20. | 40 mm |
| 8. | 0.00745 L | 21. | 1.4 mL |
| 9. | 0.007 dm | 22. | 10 mL |
| 10. | 10,000 M | 23. | 0.5 mL |
| 11. | 1000 mm | 24. | 20 mL |
| 12. | 1650 g | 25. | 1.5 tablets |
| 13. | 1.5 L | 26. | 0.25 mL |

Working With the Household System (pp. 17 - 18)

1. 6 tsp
2. 2 T
3. 3 tsp
4. 16 oz
5. 8 oz
6. 4.4 lb
7. 1 T



8. 10 mL



9. 24 oz
10. 8 oz

Working With Conversions Between Systems (pp. 19 - 20)

- | | |
|-------------|---------------|
| 1. 15 mL | 13. 480 mL |
| 2. 0.001 mg | 14. 2.54 cm |
| 3. 1 oz | 15. 10 mm |
| 4. 30 mcg | 16. 165 lb |
| 5. 1750 mg | 17. 90 kg |
| 6. 500 mg | 18. 0.3 L |
| 7. 1.5 oz | 19. 2 tablets |
| 8. 5 tsp | 20. 360 mL |
| 9. 0.085 g | 21. 184.8 lb |
| 10. 2 mL | 22. 2 tablets |
| 11. 4 t | 23. 3 tsp |
| 12. 9 t | 24. 0.3 mL |
| | 25. 0.75 mL |

Module: INTAKE AND OUTPUT

Working With Intake and Output (pp. 21 - 25)

- | | |
|-------------------------|--------------------------|
| 1. I 960 mL O 440 mL | 7. I 1224 mL O 425 mL |
| 2. I 270 mL O 280 mL | 8. I 1330 mL O 605 mL |

- | | | | |
|----|-----------------------|-----|-----------------------|
| 3. | O 1410 mL | 9. | I 970 mL O 480 mL |
| 4. | I 300 mL O 270 mL | 10. | I 675 mL |
| 5. | I 2020 mL O 595 mL | 11. | I 1660 mL O 800 mL |
| 6. | I 1000 mL | 12. | I 750 mL O 1125 mL |
| | | 13. | I 375 mL |

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Intake and Output (p. 26)

c. question the administration of the IVPBs.
CORRECT: *The documented parenteral intake identifies the primary IV intake (600 mL) for the day shift and an IVPB intake of 100 mL. Each IVPB contained 100 mL. The day nurse reported that two IVPBs were given.*

INCORRECT:

- a. question the recorded 100 mL urine output.
The situation does not indicate any reason to question the 100 mL output.
- b. recalculate the primary IV intake.
The primary IV has infused appropriately for the shift.
- d. plan to administer an IVPB of KCl.
The nurse should clarify if the IVPB was given before planning the administration of another dose.

Working With Nasogastric Tube Feeding Problems
(pp. 27 - 29)

1. 80 mL
2. 466 mL
3. 119 mL
4. 750 mL
5. 237 mL
6. 711 mL
7. 200 mL
8. 79 mL
9. 500 mL
10. 120 mL

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Nasogastric Tube Feeding (p. 30)

b. The amount of water added to the formula.

CORRECT: *The ordered formula strength is 2/3. The nurse starts with 200 mL of formula. To make a 2/3-strength formula, the nurse needs to add 100 mL of water, not 80 mL.*

INCORRECT:

- a. The documented NG tube intake should be 400 mL.
The documented NG tube intake is correct.
- c. The IV intake is incorrect for the ordered rate.
The documented IV intake is correct.
- d. The formula strength should be questioned.
The formula strength is ordered by the physician.

Module: READING MEDICATION LABELS

Working With Reading Medication Labels
(pp. 31 - 39)

1. a. Coreg

- b. carvedilol
 - c. 25 mg / tablet
 - d. tablet
 - e. oral

- 2.
 - a. lorazepam
 - b. 4 mg / mL
 - c. liquid for injection (milliliters)
 - d. IV or IM
 - e. Yes
 - f. single-dose
 - g. 0.7 mL

- 3.
 - a. Diflucan
 - b. fluconazole
 - c. Add 24 mL of distilled water or purified water. Shake well.

- 4.
 - a. morphine sulfate
 - b. 15 mg / mL
 - c. 20 mL
 - d. SC, IM, IV, epidural or intrathecal
 - e. Yes
 - f. No
 - g. 0.8 mL

- 5.
 - a. 7.5 mL

- 6.
 - a. haloperidol
 - b. 50 mg / 10 mL
5 mg / mL
 - c. IM
 - d. No
 - e. No
 - f. 0.5 mL

- 7.
 - a. Corvert
 - b. 1 mg / 10 mL
0.1 mg / mL
 - c. IV use only
 - d. store at controlled room temperature

- 8. a. 1.25 mg / mL
b. IV
c. No
d. 0.5 mL
- 9. a. 150 mg / 3 mL
- 10. a. Humulin R
b. 500 units
- 11. a. Novolog
b. 6 units
- 12. a. Novolin 70/30
b. 22 units
- 13. a. Humalog 50/50
b. 17 units

14.

- Trade name Generic name
- Dosage strength Form of the drug
- Route of administration Controlled substance
- Storage information Total amount

15.

- Trade name Generic name
- Dosage strength Form of the drug
- Route of administration Controlled substance
- Storage information Total amount

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Reading Medication Labels (p. 40)

d. not administer this drug.

CORRECT: *The order is for morphine, not hydromorphone. Although both drugs are opioid analgesics, they are different drugs. The nurse needs to ensure that the available drug corresponds to what is ordered.*

INCORRECT:

a. give 1.5 mL of the drug using two vials.
Before calculating how much medication to give, the nurse should ensure that correct drug is being prepared. The order is for morphine, not hydromorphone.

b. call the pharmacist to double check the order.
The nurse should first check the original order found in the Physician's Order sheet.

c. research the appropriate route of administration.

Although this is important, the nurse should first ensure that the available drug corresponds to what is ordered.

Module: ORAL MEDICATIONS

Working With Oral Medications (pp. 41 - 49)

- | | |
|---------------|--------------------|
| 1. 2 tablets | 13. 7.5 days |
| 2. 1/2 tablet | 14. 1/2 tablet |
| 3. 2 tablets | 15. 1 tablet |
| 4. 2 tablets | 16. 10 mL |
| 5. 2 tablets | 17. 12.5 mL |
| 6. 960 mg | 18. 2 tab (6.25mg) |
| 7. 8 mL | 19. 720 mg |
| 8. 2 tsp | 20. 1 tablespoon |
| 9. 20 mL | 21. 3 tablets |
| 10. 1 tablet | 22. 30 mL |
| 11. 10 mL | 23. 1 tsp |
| 12. 2 tablets | |

- 24. Digoxin 0.5 tablet
Captopril 1 tablet
furosemide 2 tabs
- 25. 4 capsules
- 26. 7.5 mL
- 27. 2 caplets
- 28. 2 tablets
- 29. a. 59 mL
b. 2 tsp
- 30. a. 26 mL
b. 2 tsp

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Oral Medications (p. 50)

b. Call the pharmacist regarding the propranolol.
CORRECT: *The nurse should call the pharmacist to clarify the propranolol 60 mg ER found in the patient's medication drawer.*

d. Give the hydralazine and the K-Dur at 0900.
CORRECT: *The nurse can administer the 0900 hydralazine and the K-Dur to the patient. The nurse should not administer the propranolol until it is clarified.*

INCORRECT:

a. Give all the 0900 medications.
The nurse should question the propranolol 60 mg ER prior to administering the drug.

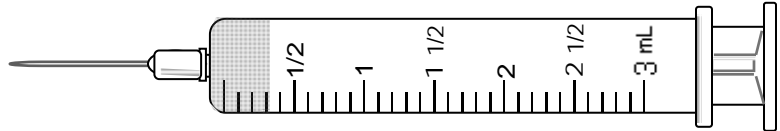
c. Call the pharmacist regarding the K-Dur.
The K-Dur may be given as ordered.

e. Give the hydralazine and propranolol at 0900.
The nurse should hold and question the administration of the propranolol 60 mg ER.

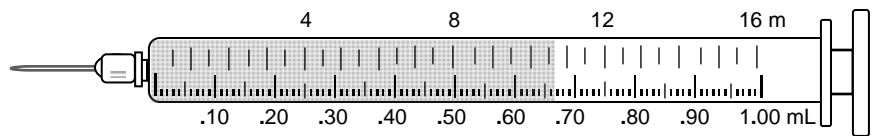
Module: SYRINGES AND NEEDLES

Working With Syringes (pp. 51 - 54)

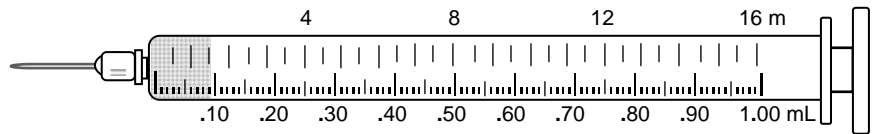
1. 0.3 mL



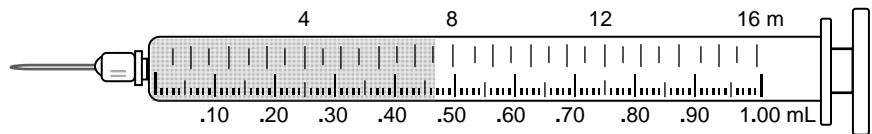
2. 0.66 mL



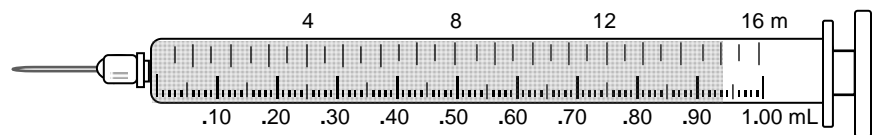
3. 0.09 mL



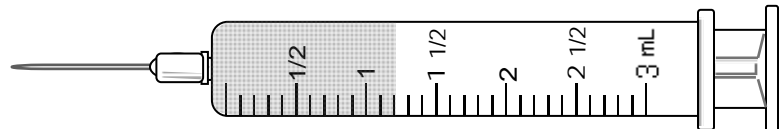
4. 7.5 minims



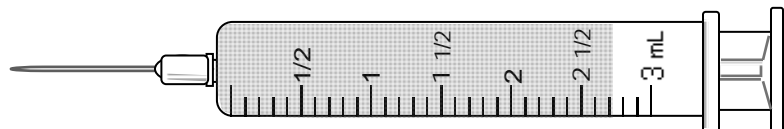
5. 15 minims



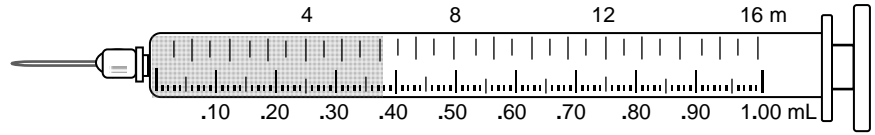
6. 1.2 mL



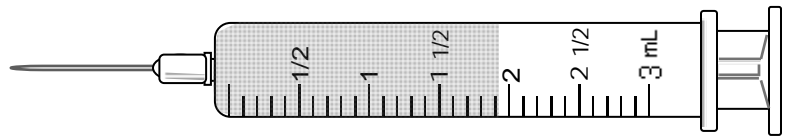
7. 2.7 mL



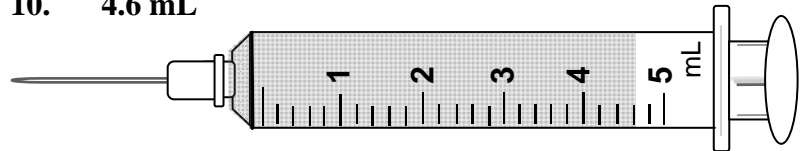
8. 0.37 mL



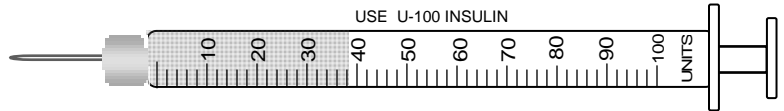
9. 1.9 mL



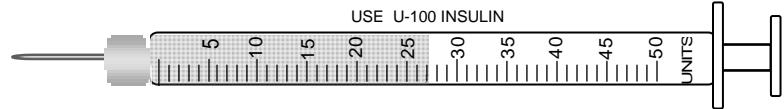
10. 4.6 mL



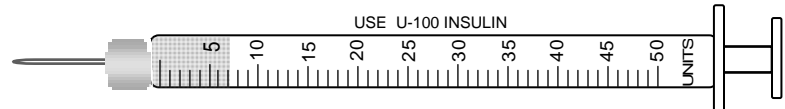
11. 38 units



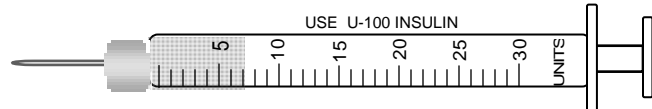
12. 27 units



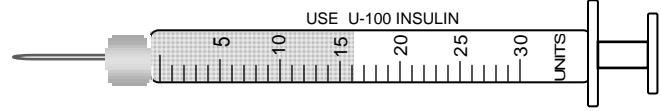
13. 7 units



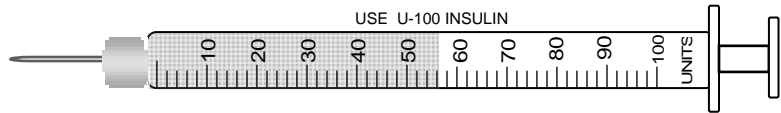
14. 7 units



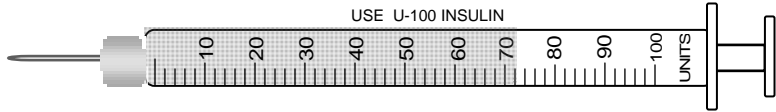
15. 16 units



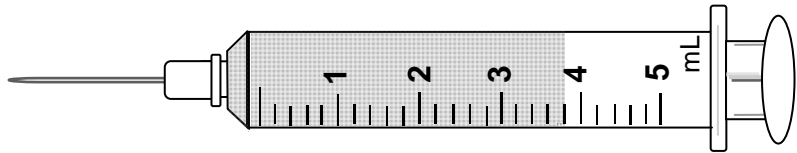
16. 56 units



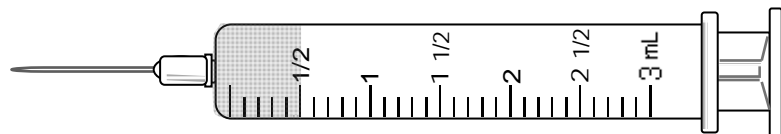
17. 72 units



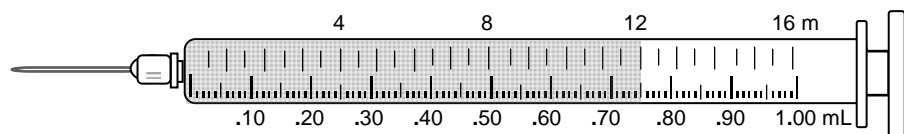
18. 3.8 mL



19. 0.5 mL



20. 0.75 mL



Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With Syringes (p. 55)

d. should divide the medication into two injections, using two 3 mL syringes.

CORRECT: *For intramuscular (IM) injections, it is recommended that no more than 3 mL be administered into one site. Although the patient would receive two injections, this is the safest action.*

INCORRECT:

a. has correctly determined the most appropriate syringe to measure and administer this dose accurately.

For IM injections, it is recommended that no more than 3 mL be administered into one site.

b. needs to contact the physician and request a higher dosage strength of the medication.

It is not necessary to contact the physician since the ordered dose can be administered through two separate IM injections.

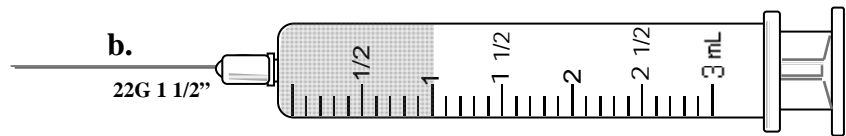
c. needs to contact the pharmacist to ensure that the ordered dose has been correctly calculated.
The nurse can ask another professional nurse to check the calculation.

Working With Needles (p. 56)

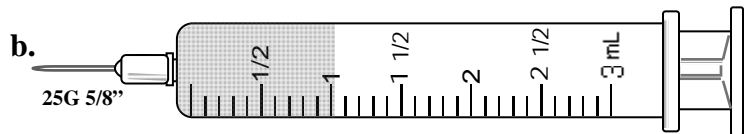
1. 28G 1/2" or 31G 5/16"
2. 21 - 23G 1 1/2"
3. 26 - 27G 3/8"
4. 21 - 23G 2"
5. 25G 5/8"
6. 18 - 19G 1"

Working With Needles (pp. 57 - 59)

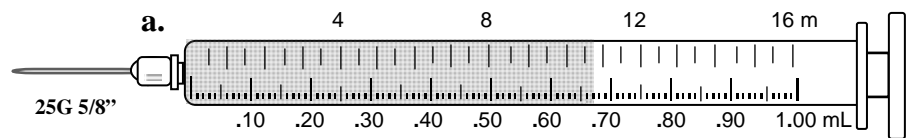
1. Meperidine 75 mg (1 mL) IM



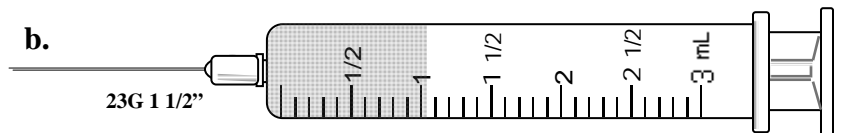
2. Filgrastim 300 mcg (1 mL) subcut



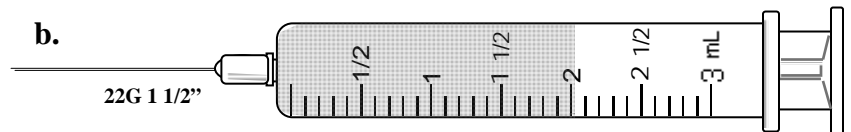
3. Heparin 5000 units (0.67 mL) subcut



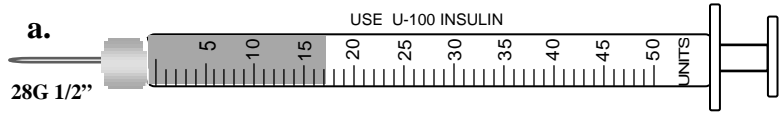
4. Hepatitis A vaccine 1 mL IM



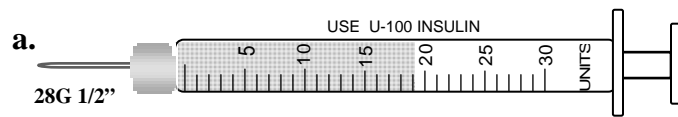
5. Ketorolac 60 mg (2 mL) IM



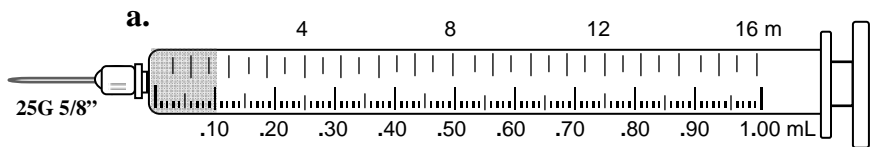
6. Humulin Regular insulin 17 units subcut



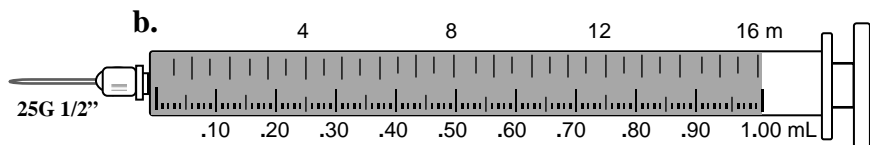
7. Humulin Regular insulin 6 units and Humulin NPH insulin 13 units subcut



8. Heparin 1000 units (0.1 mL) subcut



9. Morphine sulfate 1 mg (16 minims) subcut



Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Needles
(p. 60)

d. 
25G 1 1/2"

CORRECT: Medications ordered via the subcut route are meant to be injected into the adipose tissue. A 25G 1 1/2" needle will appropriately administer the ordered medication into the correct site.

INCORRECT:

a. 
18G 1"

b. 
20G 1 1/2"

c. 
22G 1"

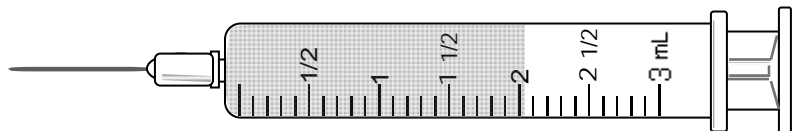
These needles cannot be used for subcut injections into the abdomen.

Module: PARENTERAL MEDICATIONS

Working With Parenteral Medications (pp. 61 - 70)

1. 0.2 mL
2. 1.5 mL
3. 0.25 mL
4. 2 mL

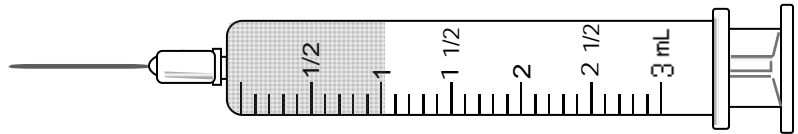
Fill in the syringe.



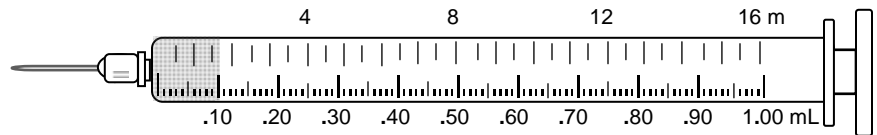
5. morphine sulfate = 0.6 mL
glycopyrrolate = 0.4 mL

Total amount = 1 mL

Fill in the syringe with the total amount.



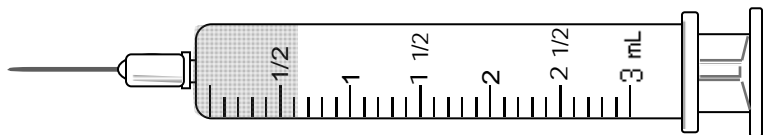
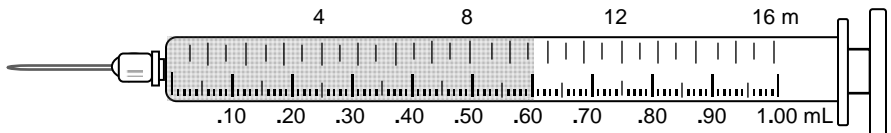
6. 0.1 mL
Fill in the syringe.



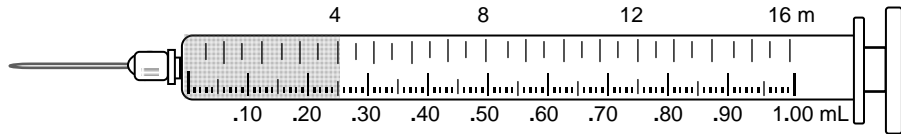
7. 0.4 mL

8. 16 minims

9. 0.6 mL
Fill in the ordered dose in each syringe.

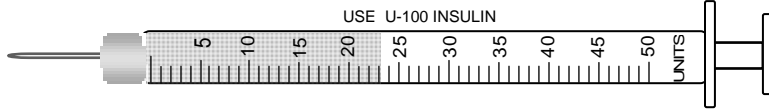


10. **0.25 mL**
Fill in the syringe.

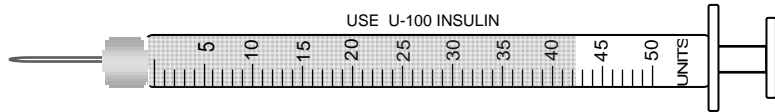


11. **2.5 mL**

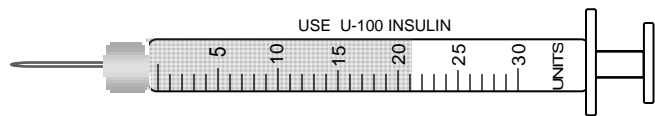
12. **23 units**
Fill in the syringe.



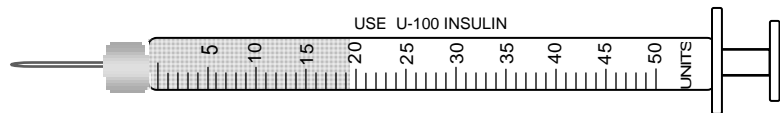
13. **42 units**
Fill in the syringe.



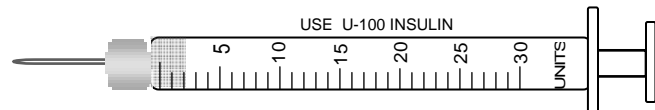
14. **21 units**
Fill in the syringe.



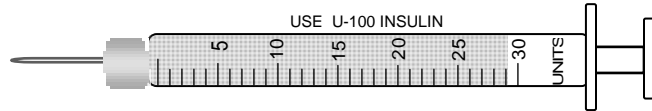
15. **19 units**
Fill in the syringe.



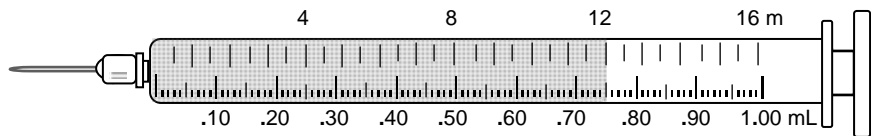
16. **2 units**
Fill in the syringe.



17. **29 units**
Fill in the syringe.



18. **0.9 mL**
 19. **0.9 mL**
 20. **0.8 mL**
 21. **0.5 mL**
 22. **1 mL**
 23. **0.5 mL**
 24. **2 mL**
 25. **3 mL**
 26. **9.6 minims**
 27. **0.75 mL**



28. **1 mL**
 29. **0.25 mL**
 30. **3 mL**

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Parenteral Medications (p. 71)

d. 1.63 mL

CORRECT: *The dosage strength of levothyroxine is 40 mcg / mL. The ordered dose is 0.065 mg, which is equivalent to 65 mcg.*

INCORRECT:

a. 0.33 mL

Use the dosage strength of 40 mcg / mL as listed under the Usual Dosage information.

b. 1.38 mL

Use the dosage strength of 40 mcg / mL as listed under the Usual Dosage information.

c. 1.5 mL

Use the dosage strength of 40 mcg / mL as listed under the Usual Dosage information.

**Module: RECONSTITUTION OF POWDERED
MEDICATIONS**

Working With Single-Strength Reconstitution
(pp. 72 - 77)

1.a. 2.5 mL

b. sterile water for injection

c. 330 mg / mL

d. 0.76 mL

2.a. 4.6 mL

b. bacteriostatic water for injection

c. 200,000 units / mL

d. 1.5 mL

3. date and time of reconstitution; nurse's initials

- 4.a. 2 mL
- b. sterile water for injection
- c. 125 mg / mL
- d. 1.6 mL

- 5.a. 1 g / 2.6 mL
- b. 1.3 mL

- 6.a. 2 mL
- b. sterile water for injection
- c. 225 mg / 1 mL
- d. 2 mL

- 7.a. 9.8 mL
- b. 5,000 units per mL
- c. 1.2 mL
- d. date and time of reconstitution; nurse's initials

- 8. 1.7 mL

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Single-Strength Reconstitution (p. 78)

- c. Question the date of reconstitution.

CORRECT: *Although the nurse's initials and time of reconstitution are written, the date of reconstitution is not written on the Augmentin label. The nurse needs to clarify this prior to administering the drug to the patient.*

INCORRECT:

- a. Convert the tsp to mL.
The nurse may want to do this prior to administration, however, it is more important to first clarify the date of reconstitution.
- b. Administer the measured dose.
The nurse must first clarify the date of reconstitution.
- d. Use a 3 mL syringe to measure the dose.
It is more important to first clarify the date of reconstitution.

Working With Multiple-Strength Reconstitution
(pp. 79 - 83)

1. the smallest volume of diluent

- 2.a. 100 mg / mL
b. 7.5 mL
c. date and time of reconstitution; nurse's initials;
circle selected volume of diluent and
corresponding dosage strength

- 3.a. 100,000 units / mL
b. 500,000 units / mL
c. 9.6 mL of diluent – give 10 mL
4.6 mL of diluent – give 5 mL
1.6 mL of diluent – give 2 mL

- 4.a. 75 mL of diluent – 250,000 units / mL
33 mL of diluent – 500,000 units / mL
11.5 mL of diluent – 1,000,000 units / mL
b. 75 mL of diluent – give 3 mL
33 mL of diluent – give 1.5 mL
11.5 mL of diluent – give 0.75 mL
c. 7 days
d. date and time of reconstitution; nurse's initials;
circle selected volume of diluent and
corresponding dosage strength

- 5.a. 3.5 mL of diluent – 500 mg / mL
7.2 mL of diluent – 250 mg / mL
b. 3.5 mL of diluent – give 1.4 mL
7.2 mL of diluent – give 2.8 mL
c. 1 hour at room temperature; 6 hours under
refrigeration
d. 3.5 mL is preferable so that the volume of the
IM injection is smaller.
e. date and time of reconstitution; nurse's initials;
circle selected volume of diluent and the
corresponding dosage strength

- 6.a. After reading the label, the nurse can identify the (check all that apply):
- routes of administration
 - storage information
- b. To administer the ordered dose (500 mg), the nurse:
- should read the accompanying literature.

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With Multiple-Strength Reconstitution (p. 84)

- b. Recalculate the dose drawn up.

CORRECT: *The circle around the dosage strength indicates that the drug has already been reconstituted. The reconstituted drug yields 500,000 units / mL. The order is for 2,400,000 units. After calculating, the nurse will draw up 4.8 mL.*

INCORRECT:

- a. Add the 5 mL to the IV bag.
The order is for 2,400,000 units. After calculating, the answer is 4.8 mL. The nurse can accurately measure this dose using a 5 mL syringe.
- c. Add 9.6 mL of penicillin G potassium to the IV bag.
The nurse needs to use the reconstituted dosage strength that is circled on the label.
- d. Use 1,000,000 U / mL to calculate the desired dose.
The nurse needs to use the reconstituted dosage strength that is circled on the label.

Module: IV CALCULATIONS

Working With Milliliters per Hour (pp. 85 - 86)

1. 83 mL / hr
2. 63 mL / hr
3. 125 mL / hr

4. 167 mL / hr
5. 100 mL / hr
6. 167 mL / hr
7. 50 mL / hr
8. 138 mL / hr
9. 100 mL / hr
10. 133 mL / hr

Working With Flow Rate (p. 87 - 88)

1. 125 gtt / min
2. 21 gtt / min
3. 21 gtt / min
4. 8 gtt / min
5. 11 gtt / min
6. 33 gtt / min
7. 31 gtt / min
8. 167 gtt / min
9. 26 gtt / min
10. 25 gtt / min

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Milliliters per Hour and Flow Rate (p. 89)

- a. continue to monitor the IV intake at 13 gtt / min.

CORRECT: *The IV is set at the appropriate rate to deliver 50 mL / hr.*

INCORRECT:

- b. question the oral intake for the day shift.
There is no indication for questioning the oral intake in this situation.
- c. increase the flow rate to 31 gtt / min.
The IV rate is accurate and should not be increased without an MD order.
- d. change the IV tubing to a minidrop.
The IV tubing does not need to be changed. The flow rate can be accurately set and monitored with the current tubing.

Working With Direct IV Medication Administration
(pp. 90 - 92)

1. 5 minutes
2. 6 - 10 minutes
3. 4 minutes
4. 5 minutes
5. 2 minutes
6. 1 minute
7. 2 minutes

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Direct IV Medication Administration (p. 93)

b. administer 0.8 mL over 1 minute.

CORRECT:

The recommended rate for direct IV administration is 1 minute.

INCORRECT:

a. give the ordered dose slowly into the vein.
For safe administration, the nurse needs to follow the recommended rate and routes of administration.

c. add the atropine dose to the primary IV fluid.
The order is for IVP (direct IV administration). The atropine should not be added to the primary IV fluid.

d. dilute with 10 mL normal saline.
The drug reference information indicates that this drug should be administered undiluted.

Working With Infusion Time (pp. 94 - 95)

1. 8 hours
2. 8 hours 20 minutes
3. 13 hours 20 minutes
4. 6 hours 24 minutes
5. 30 minutes
6. 3 hours 20 minutes

Working With Completion Time (pp. 95 - 96)

1. 4:00 PM or 1600
2. 6:10 PM or 1810
3. 6:00 AM or 0600
4. 3:30 AM or 0330
5. 8:45 PM or 2045
6. 2:00 PM or 1400

Working With Infusion and Completion Time (pp. 96 - 97)

1. Infusion time = 9 hours
Completion time = 8:00 PM or 2000
2. Infusion time = 3 hours 30 minutes
Completion time = 7:00 PM or 1900
3. Infusion time = 5 hours
Completion time = 1:00 AM or 0100
4. Infusion time = 4 hours 40 minutes
Completion time = 11:40 AM or 1140
5. Infusion time = 5 hours
Completion time = 2:00 AM or 0200

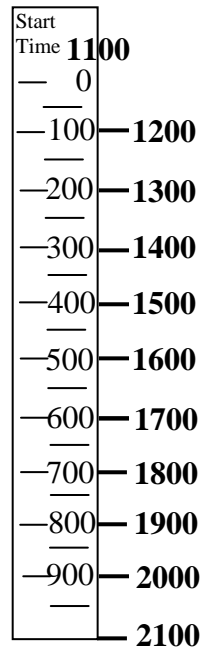
Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Infusion and Completion Time (p. 98)

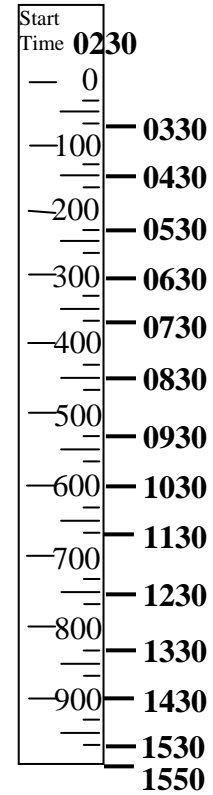
- a. Increase the flow rate to 31 gtt / min.
CORRECT: *The nurse should increase the flow rate to administer 125 mL / hr.*
- c. Report a completion time of 1736.
CORRECT: *At 1200, there are 700 mL of fluid left in the primary IV. Following the physician's orders to administer 125 mL / hr, it will take 5 hours and 36 minutes for 700 mL at 1200 to infuse into the patient.*
- INCORRECT:**
- b. Increase the flow rate to 41 gtt / min for 4 hours.
The flow rate should not be adjusted to "catch up."
- d. Plan to give 1000 mL for the day shift.
The nurse must document the actual amount of IV fluid given for the shift. Because the IV is behind, the patient will not receive 1000 mL for the shift.
- e. Administer the IV fluid through an infusion pump.
The IV has been ordered to infuse via gravity. The nurse should assess the IV site to ensure proper placement.

Labeling IV Bags (pp. 99 - 101)

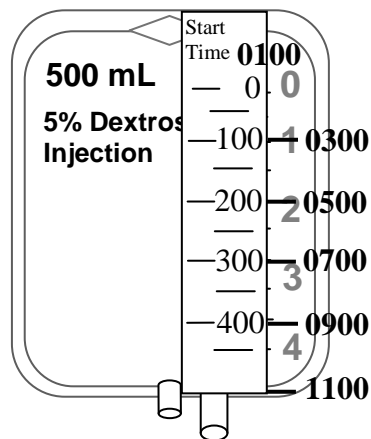
1.



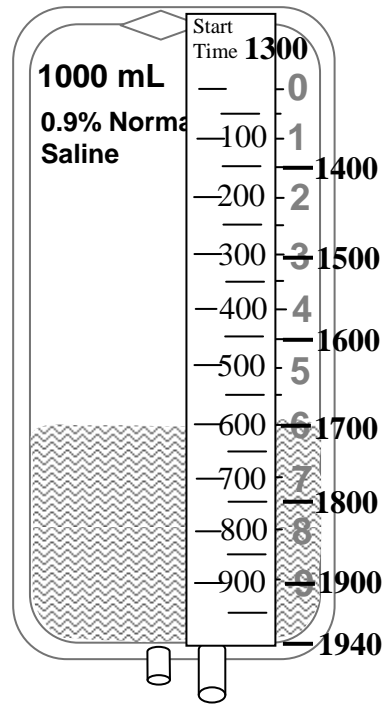
2.



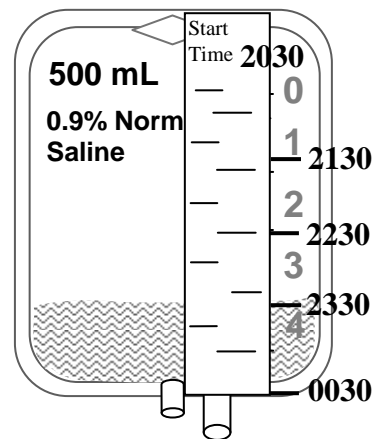
3.



4.



5.



Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Labeling IV Bags (p. 102)

d. must be recalculated.

CORRECT: *The nurse has made an error in the markings of the hourly fluid intake, beginning with the hourly fluid level at 1400, which should be at the 400 mL fluid level.*

INCORRECT:

a. is labeled appropriately.

There is an error with the hourly fluid level marking beginning at 1400.

b. reflects the increased rate.

The hourly fluid level intake is marked incorrectly on the flowmeter beginning at 1400.

c. indicates when the IV will be finished.

Since the hourly fluid level is not correct, the completion time is also incorrect.

Module: PEDIATRIC CALCULATIONS

Administering Medications to Children (pp. 103 - 106)

1. 2 tablets

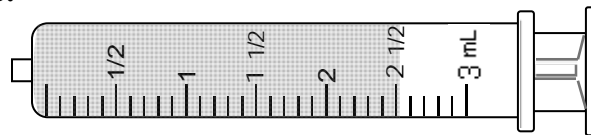
2. 14 mL

3. 6 mL

4. 3 mL

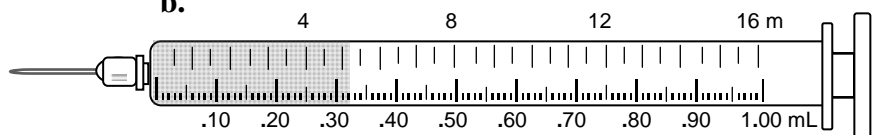
5a. 2.5 mL

b.



6a. 0.32 mL

b.



- 7. 1.2 mL
- 8a. 100 gtt / min
- b. 1430
- 9. 50 mL / hr

Dosage Based on Body Weight (pp. 107 - 109)

- 1a. 210 mg q.12h.
- b. Yes, the dose is safe.
- 2a. 400 mcg / dose
- b. Yes, the dose is safe.
- 3a. 180 mg / day
- b. Yes, the dose is safe.
- 4a. 10.5 mg q.3 - 4h.
- b. No, the dose is not safe.
- 5a. 110 - 128.33 mg / dose
- b. Yes, the dose is safe.

Dosage Based on Body Surface Area (pp. 109 - 110)

- 1a. 5.6 mg q.6h
- b. Yes, the dose is safe.
- 2a. 198 mg / dose
- b. No, the dose is not safe.
- 3a. 8.625 mg /q.1 - 2 weeks up to 12 weeks
- b. No, the dose is not safe.
- 4a. 0.22 mg / day
- b. Yes, the dose is safe.
- 5a. 590 mg q.8h. for 7 days
- b. Yes, the dose is safe.

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Determining Safe Dose (p. 111)

b. Question the ordered dose.

CORRECT: *The recommended total daily initial dose for a child weighing 27 kg is 16.2 mg / day. The order is for 10 mg b.i.d. The child will receive 20 mg /day.*

INCORRECT:

a. Administer the medication as ordered.

The nurse should first question the ordered dose, since it is more than the recommended initial dose.

c. Ask the pharmacist if the ordered dose is correct.

The nurse should communicate directly with the physician and clarify the ordered dose.

d. Ask the parent what dose the child has been taking.

The situation indicates that the physician is starting lamotrigine drug therapy on the child.

Working With Nasogastric Fluid Replacement
Problems (pp. 112 - 114)

- 1a. 100 mL / hr
- b. 150 mL / hr
- c. 7 hours 36 minutes
- d. 2236 or 10:36 PM
- 2a. 63 mL / hr
- b. 22 mL / hr
- c. 3 hours
- d. 1500 or 3:00 PM
- 3a. 4 hours
- b. 0830 or 8:30 AM
- 4a. 4 hours 30 minutes
- b. 0315 or 3:15 AM
- 5a. 2 hours 36 minutes
- b. 1836 or 6:36 PM
- 6a. 3 hours 17 minutes
- b. 1017 or 10:17 AM

Module: TITRATION OF IV MEDICATIONS

Titration in Common Clinical Practice

(pp. 115 - 116)

1. 10 mL / hr
2. 20 mL / hr
3. 100 mg / hr
4. 35 mL / hr
5. 6 mL / hr
- 6a. 55 mL / hr
- b. 66 mL / hr

Complex Titration Problems in Critical Care

(pp. 116 - 119)

1. a. 6 mg / hr
- b. 6 mL / hr
- c. No
2. a. 60 mg / hr
- b. 15 mL / hr
- c. 30 mL / hr
3. a. 120 mL / hr
- b. 60 mL / hr
4. 68 mL / hr
5. 60 mg / hr
6. 4 mg / min
7. 56 mL / hr
8. 3 mL / hr
9. 38 mL / hr
10. 30 mL / hr
11. 120 mL / hr
12. 12 mL / hr
13. 33 mL / hr
14. a. Yes
- b. 51 mL / hr

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Titration Medication (p. 120)

- a. set the infusion rate at 28 mL / hr.

CORRECT: *After calculating, the nurse will infuse the heparin at 28 mL / hr.*

- d. set up the IV using an infusion pump.

CORRECT: *The nurse will infuse the heparin at 28 mL / hr using an infusion pump.*

INCORRECT:

- b. set the infusion rate at _____ gtt / min.

Heparin is a high alert drug. It is safer to administer this drug through an infusion pump (mL / hr).

- c. use a minidrop IV tubing for gravity flow infusion.

Heparin is a high alert drug. Therefore, every effort must be made to ensure accuracy in the administration of the ordered dose. An infusion pump accurately delivers the set rate.

- e. discontinue the IV once the 500 mL have infused.

This is a continuous infusion and should not be discontinued without the physician's order.

ANSWERS

Module: BASIC MATH REVIEW

Working With Addition of Fractions (pp. 1 - 2)

- | | | | |
|----|------------------|-----|-------------------|
| 1. | $\frac{3}{5}$ | 6. | $15 \frac{5}{24}$ |
| 2. | $\frac{11}{21}$ | 7. | $14 \frac{4}{45}$ |
| 3. | $1 \frac{1}{15}$ | 8. | $15 \frac{1}{10}$ |
| 4. | $5 \frac{1}{4}$ | 9. | $17 \frac{5}{8}$ |
| 5. | $5 \frac{9}{20}$ | 10. | $21 \frac{3}{4}$ |

Working With Subtraction of Fractions (p. 2)

- | | | | |
|----|------------------|-----|--------------------|
| 1. | $\frac{1}{2}$ | 6. | $2 \frac{1}{2}$ |
| 2. | $\frac{3}{10}$ | 7. | $4 \frac{21}{40}$ |
| 3. | $\frac{5}{24}$ | 8. | $10 \frac{11}{24}$ |
| 4. | $2 \frac{7}{8}$ | 9. | $10 \frac{19}{42}$ |
| 5. | $7 \frac{3}{10}$ | 10. | $7 \frac{1}{10}$ |

Working With Multiplication of Fractions (p. 3)

- | | | | |
|----|------------------|-----|--------------------|
| 1. | $\frac{3}{10}$ | 6. | $14 \frac{16}{21}$ |
| 2. | $\frac{5}{9}$ | 7. | $3 \frac{3}{16}$ |
| 3. | $\frac{1}{2}$ | 8. | $11 \frac{11}{35}$ |
| 4. | $\frac{15}{16}$ | 9. | $22 \frac{11}{24}$ |
| 5. | $19 \frac{4}{5}$ | 10. | $3 \frac{13}{54}$ |

Working With Division of Fractions (pp. 3 - 4)

- | | | | |
|----|-----------------|-----|-------------------|
| 1. | $1 \frac{2}{5}$ | 6. | $\frac{12}{29}$ |
| 2. | $\frac{1}{50}$ | 7. | $\frac{11}{20}$ |
| 3. | $1 \frac{1}{4}$ | 8. | $1 \frac{13}{15}$ |
| 4. | $9 \frac{3}{7}$ | 9. | 33 |
| 5. | $\frac{14}{15}$ | 10. | $\frac{22}{35}$ |

Working With Addition of Decimals (pp. 4 - 5)

- | | | | |
|----|-----------|-----|-------|
| 1. | 6074.6132 | 7. | 21.62 |
| 2. | 142.205 | 8. | 59.52 |
| 3. | 1.988 | 9. | 65.71 |
| 4. | 1961.1713 | 10. | 28.99 |
| 5. | 56.97 | 11. | 35.99 |
| 6. | 70.8 | 12. | 28.12 |

Working With Subtraction of Decimals (p. 5)

- | | | | |
|----|----------|-----|---------|
| 1. | 321.0155 | 7. | 423.697 |
| 2. | 0.051 | 8. | 66.8 |
| 3. | 9012.333 | 9. | 8703.8 |
| 4. | 7049.263 | 10. | 853.1 |
| 5. | 7.977 | 11. | 553.9 |
| 6. | 601.05 | 12. | 939.2 |

Working With Multiplication of Decimals (p. 6)

- | | | | |
|----|---------|-----|---------|
| 1. | 75.28 | 7. | 3.6888 |
| 2. | 1.6168 | 8. | 7.344 |
| 3. | 336.742 | 9. | 320.1 |
| 4. | 78.0861 | 10. | 0.2475 |
| 5. | 0.102 | 11. | 67.6208 |
| 6. | 30.1515 | 12. | 50.47 |

Working With Division of Decimals (pp. 6 - 7)

- | | | | |
|----|-------|-----|--------|
| 1. | 45 | 7. | 48.1 |
| 2. | 112 | 8. | 83.4 |
| 3. | 7.08 | 9. | 46.7 |
| 4. | 20.5 | 10. | 0.0565 |
| 5. | 0.05 | 11. | 49.456 |
| 6. | 401.2 | 12. | 1.084 |

Module: METHODS OF CALCULATION

Working With a Method of Calculation (pp. 8 - 13)

- | | | | |
|-----|---------------|------|---------|
| 1. | 2 tablets | 13. | 2.25 mL |
| 2. | 1 1/2 tablets | 14. | 3.5 mL |
| 3. | 2 pills | 15. | 30 mL |
| 4. | 0.5 tablet | 16. | 0.6 mL |
| 5. | 3 caplets | 17. | 15 days |
| 6. | 3.5 mL | 18. | 20 mL |
| 7. | 6 mL | 19a. | 0.4 mL |
| 8. | 0.5 mL | b. | 5 doses |
| 9. | 3 mL | 20a. | 0.8 mL |
| 10. | 16 mL | b. | 5 doses |
| 11. | 10 days | c. | 0.65 mL |
| 12. | 10 days | d. | 6 doses |

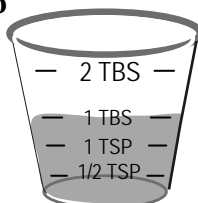
Module: SYSTEMS OF MEASUREMENT

Working With the Metric System (pp. 14 - 16)

- | | | | |
|-----|------------|-----|-------------|
| 1. | 3500 mL | 14. | 2500 mg |
| 2. | 700 mL | 15. | 0.75 g |
| 3. | 1 g | 16. | 500 mg |
| 4. | 0.1 mg | 17. | 0.075 mg |
| 5. | 10,000 mcg | 18. | 450 mcg |
| 6. | 2000 mcg | 19. | 1200 g |
| 7. | 0.0356 g | 20. | 40 mm |
| 8. | 0.00745 L | 21. | 1.4 mL |
| 9. | 0.007 dm | 22. | 10 mL |
| 10. | 10,000 M | 23. | 0.5 mL |
| 11. | 1000 mm | 24. | 20 mL |
| 12. | 1650 g | 25. | 1.5 tablets |
| 13. | 1.5 L | 26. | 0.25 mL |

Working With the Household System (pp. 17 - 18)

1. 6 tsp
2. 2 T
3. 3 tsp
4. 16 oz
5. 8 oz
6. 4.4 lb
7. 1 T



8. 10 mL



9. 24 oz
10. 8 oz

Working With Conversions Between Systems (pp. 19 - 20)

- | | |
|-------------|---------------|
| 1. 15 mL | 13. 480 mL |
| 2. 0.001 mg | 14. 2.54 cm |
| 3. 1 oz | 15. 10 mm |
| 4. 30 mcg | 16. 165 lb |
| 5. 1750 mg | 17. 90 kg |
| 6. 500 mg | 18. 0.3 L |
| 7. 1.5 oz | 19. 2 tablets |
| 8. 5 tsp | 20. 360 mL |
| 9. 0.085 g | 21. 184.8 lb |
| 10. 2 mL | 22. 2 tablets |
| 11. 4 t | 23. 3 tsp |
| 12. 9 t | 24. 0.3 mL |
| | 25. 0.75 mL |

Module: INTAKE AND OUTPUT

Working With Intake and Output (pp. 21 - 25)

- | | |
|-------------------------|--------------------------|
| 1. I 960 mL O 440 mL | 7. I 1224 mL O 425 mL |
| 2. I 270 mL O 280 mL | 8. I 1330 mL O 605 mL |

- | | | | |
|----|-----------------------|-----|-----------------------|
| 3. | O 1410 mL | 9. | I 970 mL O 480 mL |
| 4. | I 300 mL O 270 mL | 10. | I 675 mL |
| 5. | I 2020 mL O 595 mL | 11. | I 1660 mL O 800 mL |
| 6. | I 1000 mL | 12. | I 750 mL O 1125 mL |
| | | 13. | I 375 mL |

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Intake and Output (p. 26)

c. question the administration of the IVPBs.
CORRECT: *The documented parenteral intake identifies the primary IV intake (600 mL) for the day shift and an IVPB intake of 100 mL. Each IVPB contained 100 mL. The day nurse reported that two IVPBs were given.*

INCORRECT:

- a. question the recorded 100 mL urine output.
The situation does not indicate any reason to question the 100 mL output.
- b. recalculate the primary IV intake.
The primary IV has infused appropriately for the shift.
- d. plan to administer an IVPB of KCl.
The nurse should clarify if the IVPB was given before planning the administration of another dose.

Working With Nasogastric Tube Feeding Problems
(pp. 27 - 29)

1. 80 mL
2. 466 mL
3. 119 mL
4. 750 mL
5. 237 mL
6. 711 mL
7. 200 mL
8. 79 mL
9. 500 mL
10. 120 mL

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Nasogastric Tube Feeding (p. 30)

b. The amount of water added to the formula.

CORRECT: *The ordered formula strength is 2/3. The nurse starts with 200 mL of formula. To make a 2/3-strength formula, the nurse needs to add 100 mL of water, not 80 mL.*

INCORRECT:

- a. The documented NG tube intake should be 400 mL.
The documented NG tube intake is correct.
- c. The IV intake is incorrect for the ordered rate.
The documented IV intake is correct.
- d. The formula strength should be questioned.
The formula strength is ordered by the physician.

Module: READING MEDICATION LABELS

Working With Reading Medication Labels
(pp. 31 - 39)

1. a. Coreg

- b. carvedilol
 - c. 25 mg / tablet
 - d. tablet
 - e. oral

- 2.
 - a. lorazepam
 - b. 4 mg / mL
 - c. liquid for injection (milliliters)
 - d. IV or IM
 - e. Yes
 - f. single-dose
 - g. 0.7 mL

- 3.
 - a. Diflucan
 - b. fluconazole
 - c. Add 24 mL of distilled water or purified water. Shake well.

- 4.
 - a. morphine sulfate
 - b. 15 mg / mL
 - c. 20 mL
 - d. SC, IM, IV, epidural or intrathecal
 - e. Yes
 - f. No
 - g. 0.8 mL

- 5.
 - a. 7.5 mL

- 6.
 - a. haloperidol
 - b. 50 mg / 10 mL
5 mg / mL
 - c. IM
 - d. No
 - e. No
 - f. 0.5 mL

- 7.
 - a. Corvert
 - b. 1 mg / 10 mL
0.1 mg / mL
 - c. IV use only
 - d. store at controlled room temperature

- 8. a. 1.25 mg / mL
b. IV
c. No
d. 0.5 mL
- 9. a. 150 mg / 3 mL
- 10. a. Humulin R
b. 500 units
- 11. a. Novolog
b. 6 units
- 12. a. Novolin 70/30
b. 22 units
- 13. a. Humalog 50/50
b. 17 units

14.

- Trade name Generic name
- Dosage strength Form of the drug
- Route of administration Controlled substance
- Storage information Total amount

15.

- Trade name Generic name
- Dosage strength Form of the drug
- Route of administration Controlled substance
- Storage information Total amount

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Reading Medication Labels (p. 40)

d. not administer this drug.

CORRECT: *The order is for morphine, not hydromorphone. Although both drugs are opioid analgesics, they are different drugs. The nurse needs to ensure that the available drug corresponds to what is ordered.*

INCORRECT:

a. give 1.5 mL of the drug using two vials.
Before calculating how much medication to give, the nurse should ensure that correct drug is being prepared. The order is for morphine, not hydromorphone.

b. call the pharmacist to double check the order.
The nurse should first check the original order found in the Physician's Order sheet.

c. research the appropriate route of administration.

Although this is important, the nurse should first ensure that the available drug corresponds to what is ordered.

Module: ORAL MEDICATIONS

Working With Oral Medications (pp. 41 - 49)

- | | |
|---------------|--------------------|
| 1. 2 tablets | 13. 7.5 days |
| 2. 1/2 tablet | 14. 1/2 tablet |
| 3. 2 tablets | 15. 1 tablet |
| 4. 2 tablets | 16. 10 mL |
| 5. 2 tablets | 17. 12.5 mL |
| 6. 960 mg | 18. 2 tab (6.25mg) |
| 7. 8 mL | 19. 720 mg |
| 8. 2 tsp | 20. 1 tablespoon |
| 9. 20 mL | 21. 3 tablets |
| 10. 1 tablet | 22. 30 mL |
| 11. 10 mL | 23. 1 tsp |
| 12. 2 tablets | |

- 24. Digoxin 0.5 tablet
Captopril 1 tablet
furosemide 2 tabs
- 25. 4 capsules
- 26. 7.5 mL
- 27. 2 caplets
- 28. 2 tablets
- 29. a. 59 mL
b. 2 tsp
- 30. a. 26 mL
b. 2 tsp

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Oral Medications (p. 50)

b. Call the pharmacist regarding the propranolol.
CORRECT: *The nurse should call the pharmacist to clarify the propranolol 60 mg ER found in the patient's medication drawer.*

d. Give the hydralazine and the K-Dur at 0900.
CORRECT: *The nurse can administer the 0900 hydralazine and the K-Dur to the patient. The nurse should not administer the propranolol until it is clarified.*

INCORRECT:

a. Give all the 0900 medications.
The nurse should question the propranolol 60 mg ER prior to administering the drug.

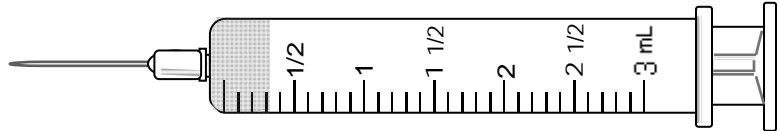
c. Call the pharmacist regarding the K-Dur.
The K-Dur may be given as ordered.

e. Give the hydralazine and propranolol at 0900.
The nurse should hold and question the administration of the propranolol 60 mg ER.

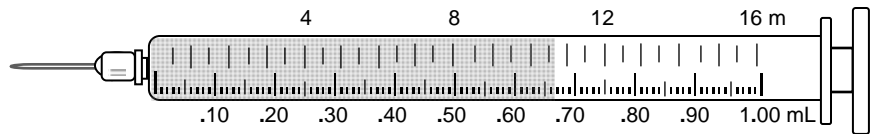
Module: SYRINGES AND NEEDLES

Working With Syringes (pp. 51 - 54)

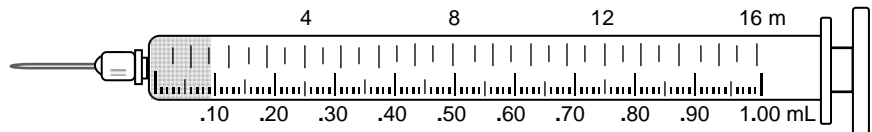
1. 0.3 mL



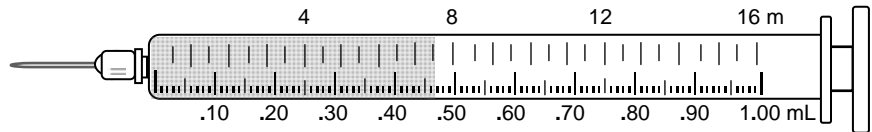
2. 0.66 mL



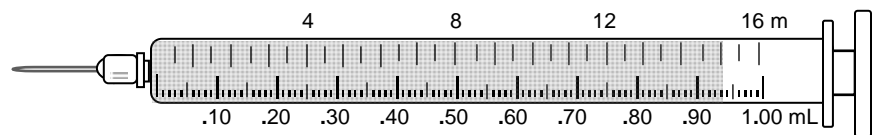
3. 0.09 mL



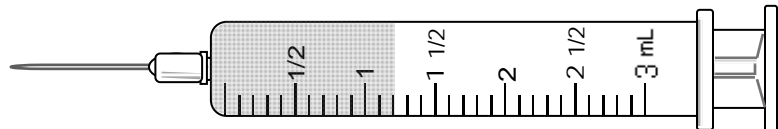
4. 7.5 minims



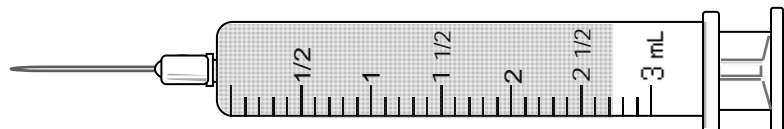
5. 15 minims



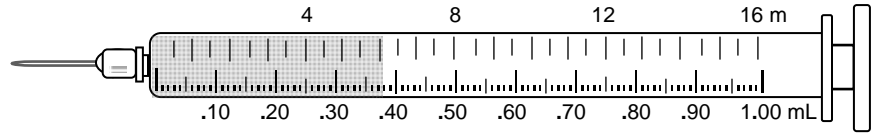
6. 1.2 mL



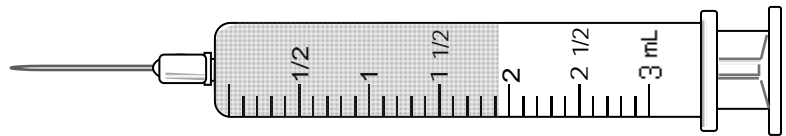
7. 2.7 mL



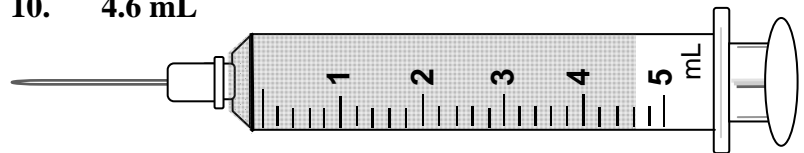
8. 0.37 mL



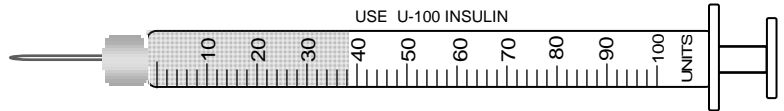
9. 1.9 mL



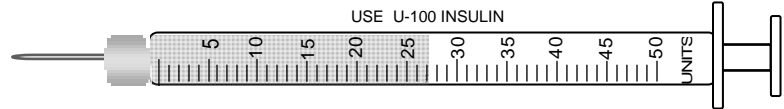
10. 4.6 mL



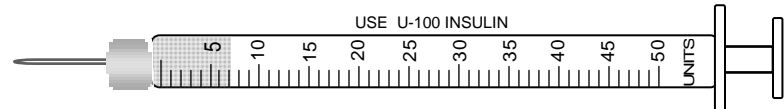
11. 38 units



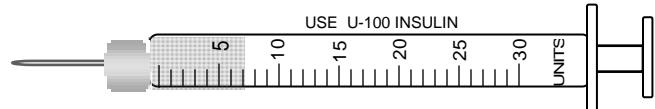
12. 27 units



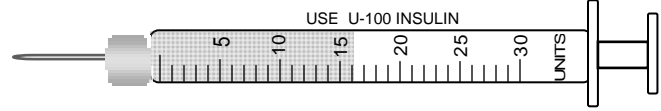
13. 7 units



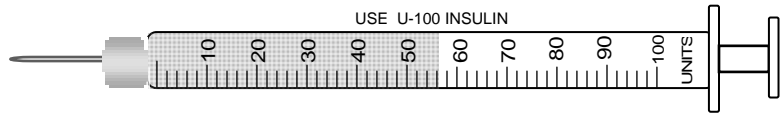
14. 7 units



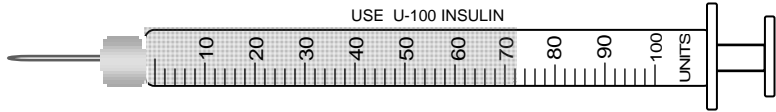
15. 16 units



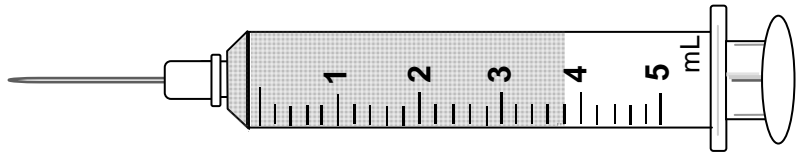
16. 56 units



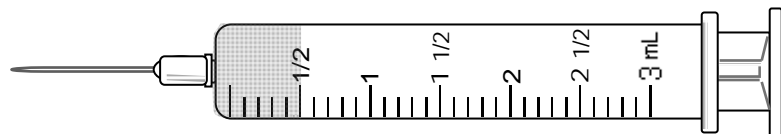
17. 72 units



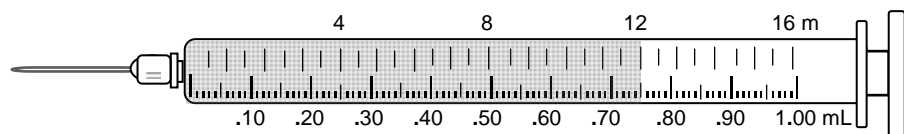
18. 3.8 mL



19. 0.5 mL



20. 0.75 mL



Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With Syringes (p. 55)

d. should divide the medication into two injections, using two 3 mL syringes.

CORRECT: *For intramuscular (IM) injections, it is recommended that no more than 3 mL be administered into one site. Although the patient would receive two injections, this is the safest action.*

INCORRECT:

a. has correctly determined the most appropriate syringe to measure and administer this dose accurately.

For IM injections, it is recommended that no more than 3 mL be administered into one site.

b. needs to contact the physician and request a higher dosage strength of the medication.

It is not necessary to contact the physician since the ordered dose can be administered through two separate IM injections.

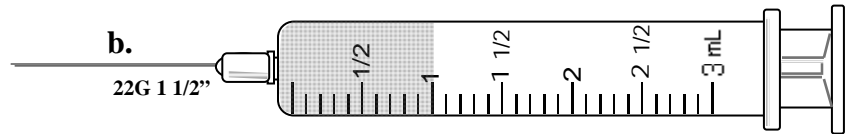
c. needs to contact the pharmacist to ensure that the ordered dose has been correctly calculated.
The nurse can ask another professional nurse to check the calculation.

Working With Needles (p. 56)

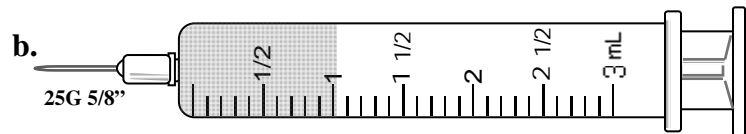
1. 28G 1/2" or 31G 5/16"
2. 21 - 23G 1 1/2"
3. 26 - 27G 3/8"
4. 21 - 23G 2"
5. 25G 5/8"
6. 18 - 19G 1"

Working With Needles (pp. 57 - 59)

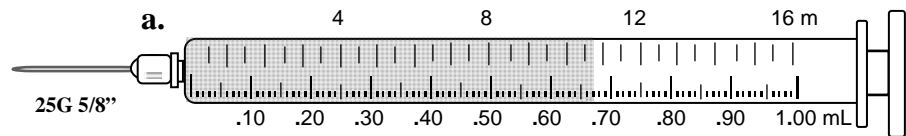
1. Meperidine 75 mg (1 mL) IM



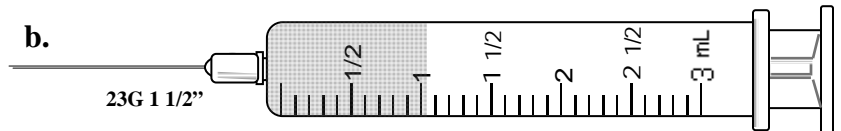
2. Filgrastim 300 mcg (1 mL) subcut



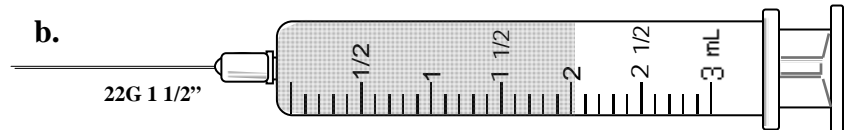
3. Heparin 5000 units (0.67 mL) subcut



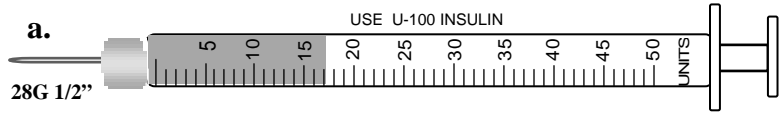
4. Hepatitis A vaccine 1 mL IM



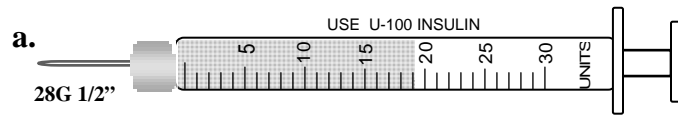
5. Ketorolac 60 mg (2 mL) IM



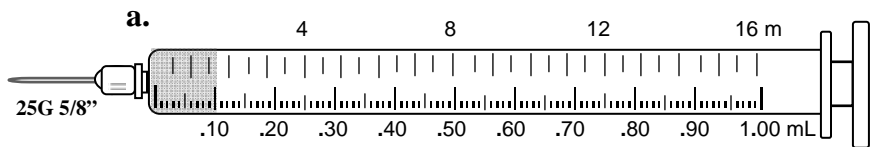
6. Humulin Regular insulin 17 units subcut



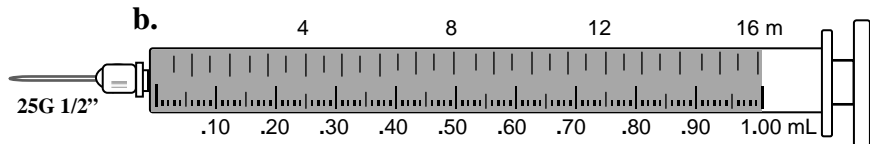
7. Humulin Regular insulin 6 units and Humulin NPH insulin 13 units subcut



8. Heparin 1000 units (0.1 mL) subcut




9. Morphine sulfate 1 mg (16 minims) subcut




Exercise: FOCUS ON SAFETY


Making Clinical Judgments in Working With Needles
(p. 60)

d. 
25G 1 1/2"

CORRECT: Medications ordered via the subcut route are meant to be injected into the adipose tissue. A 25G 1 1/2" needle will appropriately administer the ordered medication into the correct site.

INCORRECT:

a. 
18G 1"

b. 
20G 1 1/2"

c. 
22G 1"

These needles cannot be used for subcut injections into the abdomen.

Module: PARENTERAL MEDICATIONS

Working With Parenteral Medications (pp. 61 - 70)

1. 0.2 mL
2. 1.5 mL
3. 0.25 mL
4. 2 mL

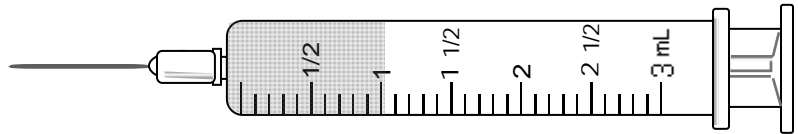
Fill in the syringe.



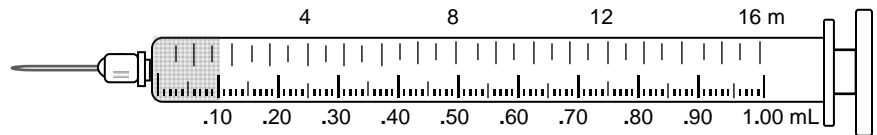
5. morphine sulfate = 0.6 mL
glycopyrrolate = 0.4 mL

Total amount = 1 mL

Fill in the syringe with the total amount.



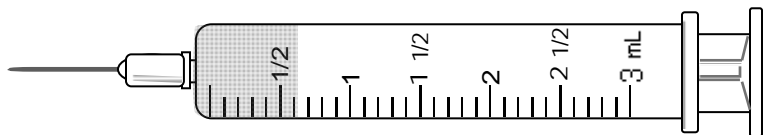
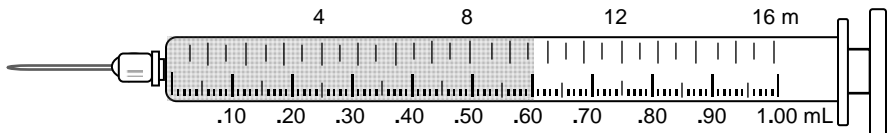
6. 0.1 mL
Fill in the syringe.



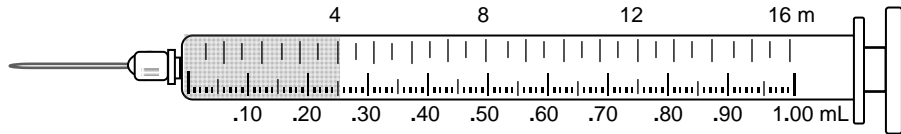
7. 0.4 mL

8. 16 minims

9. 0.6 mL
Fill in the ordered dose in each syringe.

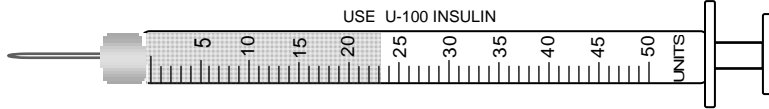


10. **0.25 mL**
Fill in the syringe.

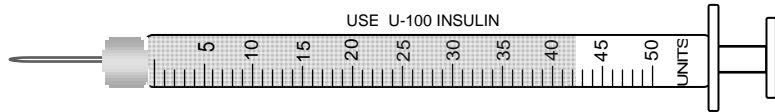


11. **2.5 mL**

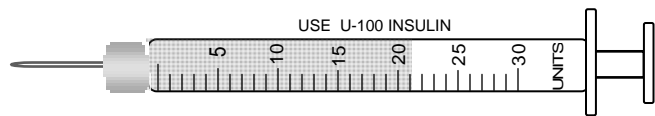
12. **23 units**
Fill in the syringe.



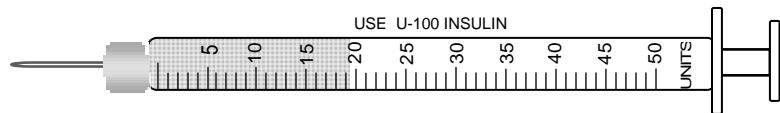
13. **42 units**
Fill in the syringe.



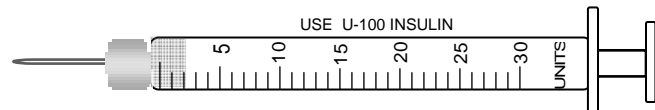
14. **21 units**
Fill in the syringe.



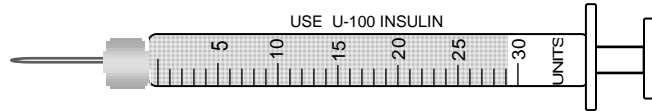
15. **19 units**
Fill in the syringe.



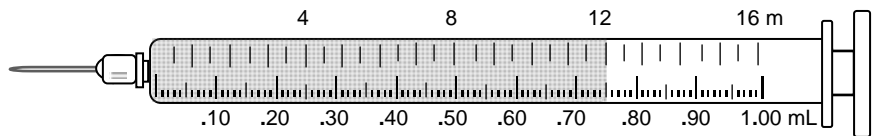
16. **2 units**
Fill in the syringe.



17. **29 units**
Fill in the syringe.



18. **0.9 mL**
 19. **0.9 mL**
 20. **0.8 mL**
 21. **0.5 mL**
 22. **1 mL**
 23. **0.5 mL**
 24. **2 mL**
 25. **3 mL**
 26. **9.6 minims**
 27. **0.75 mL**



28. **1 mL**
 29. **0.25 mL**
 30. **3 mL**

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Parenteral Medications (p. 71)

d. 1.63 mL

CORRECT: *The dosage strength of levothyroxine is 40 mcg / mL. The ordered dose is 0.065 mg, which is equivalent to 65 mcg.*

INCORRECT:

a. 0.33 mL

Use the dosage strength of 40 mcg / mL as listed under the Usual Dosage information.

b. 1.38 mL

Use the dosage strength of 40 mcg / mL as listed under the Usual Dosage information.

c. 1.5 mL

Use the dosage strength of 40 mcg / mL as listed under the Usual Dosage information.

**Module: RECONSTITUTION OF POWDERED
MEDICATIONS**

Working With Single-Strength Reconstitution
(pp. 72 - 77)

1.a. 2.5 mL

b. sterile water for injection

c. 330 mg / mL

d. 0.76 mL

2.a. 4.6 mL

b. bacteriostatic water for injection

c. 200,000 units / mL

d. 1.5 mL

3. date and time of reconstitution; nurse's initials

- 4.a. 2 mL
- b. sterile water for injection
- c. 125 mg / mL
- d. 1.6 mL

- 5.a. 1 g / 2.6 mL
- b. 1.3 mL

- 6.a. 2 mL
- b. sterile water for injection
- c. 225 mg / 1 mL
- d. 2 mL

- 7.a. 9.8 mL
- b. 5,000 units per mL
- c. 1.2 mL
- d. date and time of reconstitution; nurse's initials

- 8. 1.7 mL

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Single-Strength Reconstitution (p. 78)

- c. Question the date of reconstitution.

CORRECT: *Although the nurse's initials and time of reconstitution are written, the date of reconstitution is not written on the Augmentin label. The nurse needs to clarify this prior to administering the drug to the patient.*

INCORRECT:

- a. Convert the tsp to mL.
The nurse may want to do this prior to administration, however, it is more important to first clarify the date of reconstitution.
- b. Administer the measured dose.
The nurse must first clarify the date of reconstitution.
- d. Use a 3 mL syringe to measure the dose.
It is more important to first clarify the date of reconstitution.

Working With Multiple-Strength Reconstitution
(pp. 79 - 83)

1. the smallest volume of diluent

- 2.a. 100 mg / mL
b. 7.5 mL
c. date and time of reconstitution; nurse's initials;
circle selected volume of diluent and
corresponding dosage strength

- 3.a. 100,000 units / mL
b. 500,000 units / mL
c. 9.6 mL of diluent – give 10 mL
4.6 mL of diluent – give 5 mL
1.6 mL of diluent – give 2 mL

- 4.a. 75 mL of diluent – 250,000 units / mL
33 mL of diluent – 500,000 units / mL
11.5 mL of diluent – 1,000,000 units / mL
b. 75 mL of diluent – give 3 mL
33 mL of diluent – give 1.5 mL
11.5 mL of diluent – give 0.75 mL
c. 7 days
d. date and time of reconstitution; nurse's initials;
circle selected volume of diluent and
corresponding dosage strength

- 5.a. 3.5 mL of diluent – 500 mg / mL
7.2 mL of diluent – 250 mg / mL
b. 3.5 mL of diluent – give 1.4 mL
7.2 mL of diluent – give 2.8 mL
c. 1 hour at room temperature; 6 hours under
refrigeration
d. 3.5 mL is preferable so that the volume of the
IM injection is smaller.
e. date and time of reconstitution; nurse's initials;
circle selected volume of diluent and the
corresponding dosage strength

- 6.a. After reading the label, the nurse can identify the (check all that apply):
- routes of administration
 - storage information
- b. To administer the ordered dose (500 mg), the nurse:
- should read the accompanying literature.

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With Multiple-Strength Reconstitution (p. 84)

- b. Recalculate the dose drawn up.

CORRECT: *The circle around the dosage strength indicates that the drug has already been reconstituted. The reconstituted drug yields 500,000 units / mL. The order is for 2,400,000 units. After calculating, the nurse will draw up 4.8 mL.*

INCORRECT:

- a. Add the 5 mL to the IV bag.
The order is for 2,400,000 units. After calculating, the answer is 4.8 mL. The nurse can accurately measure this dose using a 5 mL syringe.
- c. Add 9.6 mL of penicillin G potassium to the IV bag.
The nurse needs to use the reconstituted dosage strength that is circled on the label.
- d. Use 1,000,000 U / mL to calculate the desired dose.
The nurse needs to use the reconstituted dosage strength that is circled on the label.

Module: IV CALCULATIONS

Working With Milliliters per Hour (pp. 85 - 86)

1. 83 mL / hr
2. 63 mL / hr
3. 125 mL / hr

4. 167 mL / hr
5. 100 mL / hr
6. 167 mL / hr
7. 50 mL / hr
8. 138 mL / hr
9. 100 mL / hr
10. 133 mL / hr

Working With Flow Rate (p. 87 - 88)

1. 125 gtt / min
2. 21 gtt / min
3. 21 gtt / min
4. 8 gtt / min
5. 11 gtt / min
6. 33 gtt / min
7. 31 gtt / min
8. 167 gtt / min
9. 26 gtt / min
10. 25 gtt / min

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Milliliters per Hour and Flow Rate (p. 89)

- a. continue to monitor the IV intake at 13 gtt / min.

CORRECT: *The IV is set at the appropriate rate to deliver 50 mL / hr.*

INCORRECT:

- b. question the oral intake for the day shift.
There is no indication for questioning the oral intake in this situation.
- c. increase the flow rate to 31 gtt / min.
The IV rate is accurate and should not be increased without an MD order.
- d. change the IV tubing to a minidrop.
The IV tubing does not need to be changed. The flow rate can be accurately set and monitored with the current tubing.

Working With Direct IV Medication Administration
(pp. 90 - 92)

1. 5 minutes
2. 6 - 10 minutes
3. 4 minutes
4. 5 minutes
5. 2 minutes
6. 1 minute
7. 2 minutes

Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Direct IV Medication Administration (p. 93)

- b. administer 0.8 mL over 1 minute.

CORRECT:

The recommended rate for direct IV administration is 1 minute.

INCORRECT:

- a. give the ordered dose slowly into the vein.
For safe administration, the nurse needs to follow the recommended rate and routes of administration.
- c. add the atropine dose to the primary IV fluid.
The order is for IVP (direct IV administration). The atropine should not be added to the primary IV fluid.
- d. dilute with 10 mL normal saline.
The drug reference information indicates that this drug should be administered undiluted.

Working With Infusion Time (pp. 94 - 95)

1. 8 hours
2. 8 hours 20 minutes
3. 13 hours 20 minutes
4. 6 hours 24 minutes
5. 30 minutes
6. 3 hours 20 minutes

Working With Completion Time (pp. 95 - 96)

1. 4:00 PM or 1600
2. 6:10 PM or 1810
3. 6:00 AM or 0600
4. 3:30 AM or 0330
5. 8:45 PM or 2045
6. 2:00 PM or 1400

Working With Infusion and Completion Time (pp. 96 - 97)

1. Infusion time = 9 hours
Completion time = 8:00 PM or 2000
2. Infusion time = 3 hours 30 minutes
Completion time = 7:00 PM or 1900
3. Infusion time = 5 hours
Completion time = 1:00 AM or 0100
4. Infusion time = 4 hours 40 minutes
Completion time = 11:40 AM or 1140
5. Infusion time = 5 hours
Completion time = 2:00 AM or 0200

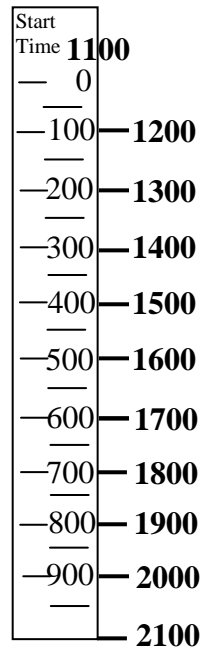
Exercise: FOCUS ON SAFETY

Making Clinical Judgments in Working With Infusion and Completion Time (p. 98)

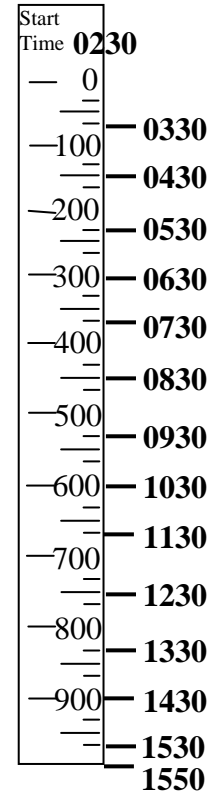
- a. Increase the flow rate to 31 gtt / min.
CORRECT: *The nurse should increase the flow rate to administer 125 mL / hr.*
- c. Report a completion time of 1736.
CORRECT: *At 1200, there are 700 mL of fluid left in the primary IV. Following the physician's orders to administer 125 mL / hr, it will take 5 hours and 36 minutes for 700 mL at 1200 to infuse into the patient.*
- INCORRECT:**
- b. Increase the flow rate to 41 gtt / min for 4 hours.
The flow rate should not be adjusted to "catch up."
- d. Plan to give 1000 mL for the day shift.
The nurse must document the actual amount of IV fluid given for the shift. Because the IV is behind, the patient will not receive 1000 mL for the shift.
- e. Administer the IV fluid through an infusion pump.
The IV has been ordered to infuse via gravity. The nurse should assess the IV site to ensure proper placement.

Labeling IV Bags (pp. 99 - 101)

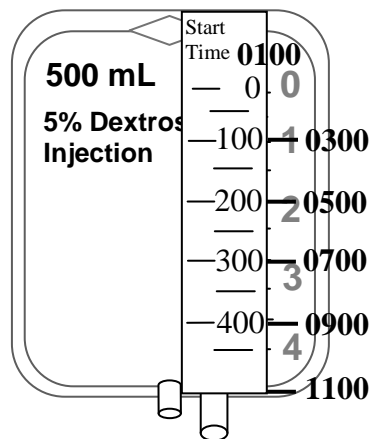
1.



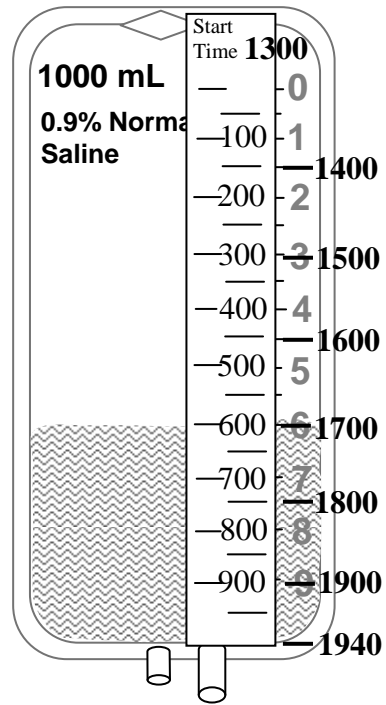
2.



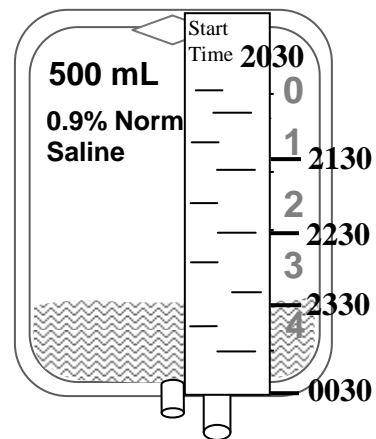
3.



4.



5.



Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Labeling IV Bags (p. 102)

d. must be recalculated.

CORRECT: *The nurse has made an error in the markings of the hourly fluid intake, beginning with the hourly fluid level at 1400, which should be at the 400 mL fluid level.*

INCORRECT:

a. is labeled appropriately.

There is an error with the hourly fluid level marking beginning at 1400.

b. reflects the increased rate.

The hourly fluid level intake is marked incorrectly on the flowmeter beginning at 1400.

c. indicates when the IV will be finished.

Since the hourly fluid level is not correct, the completion time is also incorrect.

Module: PEDIATRIC CALCULATIONS

Administering Medications to Children (pp. 103 - 106)

1. 2 tablets

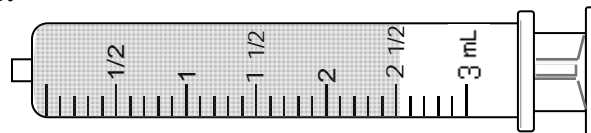
2. 14 mL

3. 6 mL

4. 3 mL

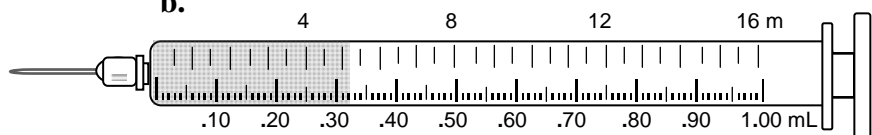
5a. 2.5 mL

b.



6a. 0.32 mL

b.



- 7. 1.2 mL
- 8a. 100 gtt / min
- b. 1430
- 9. 50 mL / hr

Dosage Based on Body Weight (pp. 107 - 109)

- 1a. 210 mg q.12h.
- b. Yes, the dose is safe.
- 2a. 400 mcg / dose
- b. Yes, the dose is safe.
- 3a. 180 mg / day
- b. Yes, the dose is safe.
- 4a. 10.5 mg q.3 - 4h.
- b. No, the dose is not safe.
- 5a. 110 - 128.33 mg / dose
- b. Yes, the dose is safe.

Dosage Based on Body Surface Area (pp. 109 - 110)

- 1a. 5.6 mg q.6h
- b. Yes, the dose is safe.
- 2a. 198 mg / dose
- b. No, the dose is not safe.
- 3a. 8.625 mg /q.1 - 2 weeks up to 12 weeks
- b. No, the dose is not safe.
- 4a. 0.22 mg / day
- b. Yes, the dose is safe.
- 5a. 590 mg q.8h. for 7 days
- b. Yes, the dose is safe.

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Determining Safe Dose (p. 111)

b. Question the ordered dose.

CORRECT: *The recommended total daily initial dose for a child weighing 27 kg is 16.2 mg / day. The order is for 10 mg b.i.d. The child will receive 20 mg /day.*

INCORRECT:

a. Administer the medication as ordered.

The nurse should first question the ordered dose, since it is more than the recommended initial dose.

c. Ask the pharmacist if the ordered dose is correct.

The nurse should communicate directly with the physician and clarify the ordered dose.

d. Ask the parent what dose the child has been taking.

The situation indicates that the physician is starting lamotrigine drug therapy on the child.

Working With Nasogastric Fluid Replacement
Problems (pp. 112 - 114)

- 1a. 100 mL / hr
- b. 150 mL / hr
- c. 7 hours 36 minutes
- d. 2236 or 10:36 PM
- 2a. 63 mL / hr
- b. 22 mL / hr
- c. 3 hours
- d. 1500 or 3:00 PM
- 3a. 4 hours
- b. 0830 or 8:30 AM
- 4a. 4 hours 30 minutes
- b. 0315 or 3:15 AM
- 5a. 2 hours 36 minutes
- b. 1836 or 6:36 PM
- 6a. 3 hours 17 minutes
- b. 1017 or 10:17 AM

Module: TITRATION OF IV MEDICATIONS

Titration in Common Clinical Practice

(pp. 115 - 116)

1. 10 mL / hr
2. 20 mL / hr
3. 100 mg / hr
4. 35 mL / hr
5. 6 mL / hr
- 6a. 55 mL / hr
- b. 66 mL / hr

Complex Titration Problems in Critical Care

(pp. 116 - 119)

1. a. 6 mg / hr
- b. 6 mL / hr
- c. No
2. a. 60 mg / hr
- b. 15 mL / hr
- c. 30 mL / hr
3. a. 120 mL / hr
- b. 60 mL / hr
4. 68 mL / hr
5. 60 mg / hr
6. 4 mg / min
7. 56 mL / hr
8. 3 mL / hr
9. 38 mL / hr
10. 30 mL / hr
11. 120 mL / hr
12. 12 mL / hr
13. 33 mL / hr
14. a. Yes
- b. 51 mL / hr

Exercise: FOCUS ON SAFETY
Making Clinical Judgments in Working With
Titration Medication (p. 120)

- a. set the infusion rate at 28 mL / hr.

CORRECT: *After calculating, the nurse will infuse the heparin at 28 mL / hr.*

- d. set up the IV using an infusion pump.

CORRECT: *The nurse will infuse the heparin at 28 mL / hr using an infusion pump.*

INCORRECT:

- b. set the infusion rate at _____ gtt / min.

Heparin is a high alert drug. It is safer to administer this drug through an infusion pump (mL / hr).

- c. use a minidrop IV tubing for gravity flow infusion.

Heparin is a high alert drug. Therefore, every effort must be made to ensure accuracy in the administration of the ordered dose. An infusion pump accurately delivers the set rate.

- e. discontinue the IV once the 500 mL have infused.

This is a continuous infusion and should not be discontinued without the physician's order.