Formula Method

$$\frac{15\ \text{mg/hour}}{125\ \text{mg}} \times 125\ \text{mL}$$

= 15 mL/hour on a pump

Proportion

EXPRESSED AS TWO RATIOS

125 mL:125 mg : : x mL:15 mg/hour

EXPRESSED AS TWO FRACTIONS

$$\frac{125\ \text{mL}}{125\ \text{mg}} \times \frac{x\ \text{mL}}{15\ \text{mg/hour}}$$

SOLUTION FOR BOTH PROPORTION METHODS

$125 \times 15 = 125x$

$$\frac{1875}{125} = x$$

15 mL/hour = x

Dimensional Analysis

Set up the equation. You are solving for milliliters per hour.

$$\frac{125\ \text{mL}}{125\ \text{mg}} \mid \frac{15\ \text{mg}}{\text{hour}}$$

Cancel "mg." Reduce the fraction. Solve.

= 15 mL/hour

How many hours will the IV run?

$$\frac{\text{Number of milliliters}}{\text{Number of milliliters per hour}}$$

$$\frac{125\ \text{mL}}{15\ \text{mL/hour}} = 8.3\ (8\ \text{hours}\ 18\ \text{minutes})$$

SELF-TEST 1 Infusion Rates

Solve the following problems. Answers appear at the end of this chapter. Round the rate to the nearest whole number.

1. Order: heparin 800 units/hour IV
   Supply: infusion pump, standard solution of 25,000 units in 250 mL D5W
   a. What is the rate? 8 mL/hour
   b. How many hours and minutes will the IV run? $\frac{800\ \text{units}}{2500\ \text{units}} \times 250\ \text{mL}$ $\frac{250}{8} = 31.25$ hours

2. Order: acyclovir 500 mg in 100 mL D5W IV over 1 hour
   Supply: infusion pump, acyclovir 500 mg in 100 mL D5W
   What is the rate? $\frac{100 \times 10}{60\ \text{min}} = 17$ 17 gtt/min

3. Order: aminocaproic acid 24 g over 24 hour IV
   Supply: infusion pump, aminocaproic acid 24 g in 1000 mL D5W
   What is the rate? $\frac{24}{1000}$ g | 24 gtt/min

SELF-TEST 1 Infusion Rates (*continued*)

4. Order: diltiazem 10 mg/hour IV
   Supply: infusion pump, diltiazem 125 mg in 100 mL D5W
   What is the rate?

5. Order: furosemide infuse 4 mg/hour
   Supply: infusion pump, furosemide 100 mg in 100 mL D5W
   What is the rate?

6. Order: regular insulin 15 units/hour IV
   Supply: infusion pump, standard solution of 125 units in 250 mL NS
   a. What is the rate?
   b. How many hours and minutes will this IV run?

7. Order: nitroglycerin 50 mg in 250 mL D5W over 24 hour via infusion pump
   What is the rate?

8. Order: heparin 1200 units/hour IV
   Supply: infusion pump, standard solution of 25,000 units in 500 mL D5W
   a. What is the rate?
   b. How many hours and minutes will the IV run?

9. Order: regular insulin 23 units/hour IV
   Supply: infusion pump, standard solution of 250 units in 250 mL NS
   a. What is the rate?
   b. How many hours and minutes will the IV run?

10. Order: streptokinase 100,000 international units/hour for 24 hour IV
    Supply: infusion pump, standard solution of 750,000 international units in 250 mL NS
    What is the rate?

mg/minute—Calculation of Rate

The order will indicate the amount of drug added to IV fluid and also the amount of drug to administer. These medications are administered through an IV infusion pump in milliliters per hour.

Note: The dimensional analysis method will combine all of the calculation steps into one equation.

PROFICIENCY TEST **Basic IV Problems**

Name: _____

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

1. Order: 1000 mL D5NS; run 150 mL/hour IV
   Supply: IV bag of 1000 mL D5NS
   a. Approximately how many hours and minutes will the IV run?
   b. How many drops per minute (macrodrip 10 gtt/mL or microdrip 60 gtt/mL)?
   c. What size tubing will you use?

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

3. Order: 150 mL NS IV over 3 hours
   Supply: bag of 250 mL NS for IV and macrotubing, 15 gtt/mL; microtubing, 60 gtt/mL
   a. What would you do to obtain 150 mL NS?
   b. What are the drops per minute?
   c. What size tubing will you use?

4. Order: 500 mL D5W IV KVO. Solve for 24 hours. An infusion pump is available. What should be the setting on the infusion pump?

5. Order: doxycycline 100 mg IVPB daily
   Supply: 125 mL/D5W to infuse over 1 hour. Macrodrip tubing, 10 gtt/mL
   a. How many drops per minute?
   b. What is the rate on an infusion pump?

6. Order: aminophylline 500 mg in 250 mL D5W to run over 8 hours IV
   Available: vial of aminophylline labeled 1 g in 10 mL; microdrip tubing
   a. How much aminophylline is needed?
   b. What is the drip rate?

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

8. Order: 1000 mL D5½NS to run at 90 mL/hour; infusion pump available
   a. What will be the pump setting?
   b. Approximately how many hours and minutes will the IV run?

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

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