Dosage Calculations

Worksheet #1

Formulas to Know

A. Flow Rate: How many mL/hour do I give?
   - \[ \frac{\text{Volume in mL}}{\text{Time}} = \frac{\text{mL}}{\text{hr}} \]
     \[ \frac{1000 \text{ mL}}{5 \text{ hr}} = 200 \text{ mL/hr} \]

B. How many gtt/min? (drops/min)
   - \[ \frac{\text{Volume in mL} \times \text{gtt factor}}{\text{Time in min}} = \frac{\text{gtt/min}}{\text{min}} \]
     \[ \frac{125 \text{ mL} \times 10}{60 \text{ min}} = \frac{21 \text{ gtt/min}}{60 \text{ min}} \]

C. How to figure out mL/hr via pump (piggy back)
   - \[ \frac{\text{Volume in mL}}{\text{Time in min}} = \frac{\text{mL}}{\text{hr}} \]
     \[ \frac{50 \text{ mL}}{20 \text{ min}} = \frac{150 \text{ mL/hr}}{20 \text{ min}} \]

D. Convert from pounds to kg. Use a conversion factor.
   - eg. Change 40 lb to kg.
     \[ \frac{40 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lb}}}{2.2 \text{ lb}} = \frac{40 \times 1 \text{ kg}}{2.2} = \frac{40 \text{ kg}}{2.2} = 18.2 \text{ kg} \]

E. IV Ahead or behind: No more than 25% ahead or behind.

   \[ \text{Ordered gtt/min} = \% \text{ variation} \]

1000 mL D5NS to run over 10 h at 125/h mL, Drop factor = 10, After 2 hours, 900 mL remain.............IV is behind schedule:
Original flow rate = **21 gtt/min**  
Time remaining = **8 hours**

1. Recalculated mL/hr:  \( \frac{900 \text{ mL}}{8 \text{ h}} = 113 \text{ mL/hr} \)

2. Recalculated Drop rate:  \( 113 \text{ mL} \times \frac{10 \text{ gtt/mL}}{60 \text{ min}} = 19 \text{ gtt/min} \)

3. % variation = \( \frac{21 \text{ gtt/min} - 19 \text{ gtt/min}}{19 \text{ gtt/min}} \times 100\% = 11\% \text{ increase} \)
   
   OK to change rate (within 25%)  
   
   \( 19 \text{ gtt/min} \)

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**Solve the following questions:**

1. **Order:** IV of D5W @ 75mL/hr
   
   a) Calculate the drip rate using a macrodrip (10 drops/mL) set.
   
   b) What is the total volume of IV solution infused over a 24-hour period?

2. **Order:** Administer 3 L of D5 1/2 NS over 24 hours
   
   a) Calculate the hourly rate.
   
   b) Calculate the drip rate using a microdrip administration set.

3. You have 1 L of IV fluid infusing at 60 mL/hr. How many hours will it take to infuse the whole litre?
4. **Order:** Ancef 250 mg IV q6h  
**Parenteral Drug Manual:** 1 g vial: Add 4.5 mL sterile water for a total volume of 5 mL. Add medication to a 50 mL minibag and administer over 20 minutes.

   a) What is the final concentration per mL?

   b) What volume of medication will you administer?

   c) Calculate the drip rate using a macrodrip (12 drops/mL) administration set.

   d) A pump becomes available. What will you set the pump at for the piggyback infusion?

5. **Order:** Benadryl 40mg IV q8h prn  
**Label reads:** Benadryl 50mg/mL  
**Parenteral Drug Manual:** Add medication to 50 mL minibag and infuse over 30 minutes

   a) What volume will you add to the minibag?

   b) Calculate the drip rate using a macrodrip (15 drops/mL) administration set.

   c) A pump becomes available. What will you set the pump at for the piggyback infusion?
6. **Order:** 1) IV NS @ 100 mL/hr.
    2) Vancomycin 100mg IV q8h

   **Label Reads:** Vancomycin 500 mg/mL

   **Parenteral Drug Manual:** Dilute in 100 mL minibag and administer over 30-60 minutes.

   a) What volume of medication will you administer?

   b) Considering the IV rate you decide to administer it over _____ minutes.

   c) What drip rate will you require to administer this medication (macro, 10 drops/mL)?

   d) A pump becomes available. What will you set the pump at for the piggyback infusion?

7. **Order:** Crystapen 750 000 units IV q6h

   **Parenteral Drug Manual:** Reconstitute 1 000 000 unit vial with 1.8 mL of sterile water for a final volume of 2 mL. Further dilute into a 50 mL minibag and administered over 45 minutes.

   a) What volume of medication will you administer?

   b) What drip rate will you set (macro 10 drops/mL)?

   c) A pump becomes available. What will you set the pump at for the piggyback infusion?
8. Calculate the hourly rate to infuse 1500 mL over 4 hours?

   a) Calculate the hourly rate

   b) What drip rate will you set (macro 20 drops/mL)?

10. If 2200 mL of RL is administered at 95 mL/hr. How many hours will it take to infuse all the IV fluid?

11. Order: NS @ 80 mL/hr. Using a macrodrip (10 drops/mL), what is the drip rate?

12. Order: IV @100mL/hr and Lanoxin 0.125 mg IV daily
    Label Reads: Lanoxin 0.25 mg/2 mL ampules
    Parenteral Drug Manual: Administer in 25 mL minibag over 20 minutes.
    a) What volume of medication will you draw up?

    b) What will your piggyback flow rate be by pump?
13. **Order:** Infuse 650 ml of NS over 5 hours. What hourly rate would you set the pump at?

14. **Order:** IV NS @ 100 ml/hr.  
   When you arrive to check the IV (macro 10 drops/mL) you count 15 gtt/min, is this correct?  
   Yes or No. If no, what should the gtt/min be?

**Answers:**

1. a) 13 gtt/min  
   b) 1800 mL
2. a) 125 mL/hr  
   b) 125 gtt/min
3. 16.7 hours
4. a) 200 mg/mL  
   b) 1.3 mL  
   c) 30 gtt/min  
   d) 150 mL/hr
5. a) 0.8 mL  
   b) 25 or 26 gtt/min  
   c) 100 mL/hour (102)
6. a) 0.2 mL  
   b) 60 min: try to keep the piggy back at the same rate of the primary IV infusion unless more than one IV med to be admin within the hour.
7. a) 1.5 mL  
   b) 11 gtt/min  
   c) 66 mL/hr
8. 375 mL/hr
9. a) 250 mL/hr  
   b) 83 or 84 gtt/min accepted
10. 12.3 hours
11. 13 gtt/min
12. a) 1 mL  
   b) 75 & 78 mL/hr accepted
13. 130 mL/hr
14. No, should be 17 gtt/min