Nur 211 Math Requirements
Sample Problems

1. The physician orders 1000 cc D_5W with ¼ % NS to infuse in 8 hours. The drop factor of the administration set is 10. Calculate the number of drops/min.

gtts = 10 gtts x 1000ml x 1hr = 20.8 or 21 gtts
min ml 8h 60min min

2. The physician orders 1000 cc D_5 ½ NS to infuse at 45gtt/min. The drop factor of the administration set is 15. Calculate the number of hours (total time) the infusion will require.

hrs = 1hr x 1 min x 15gtt x 1000ml = 5.55hr or 5.6 hr
60min 45 gtt ml

3. At 1 A.M. 750 ml of $D_{10}W$ remains to infuse at 63gtt/min. If the tubing is a microdrip, when will the infusion be absorbed?

hrs = 1 min x 60 gtt x 750ml x 1hr = 11.9hrs 12:54 PM
63 gtts ml 60min

4. The physician has ordered Tagamet 200 mg IVSS in 100 ml D5W to run over 20 minutes every 6 hours. The administration set drop factor is 15gtt/ml. Calculate the drops per minute.

gtts = 15 gtts x 100 ml = 75 gtts
min ml 20min min

5. When you receive report at 3PM, you are told that there is 650ml remaining in the patient's IV. The prescribed rate is 125ml/hr. After report, you note that the physician changed the rate to 80 ml/hr. What time will you hang the next IV?

hr = 1hr x 650ml = 8.13 hr 11:06 or 11:08 PM
80ml

6. Calculate Mr. Smith's Absolute or Total Granulocyte Count if his WBC is 800 and the neutrophil count is 30.

800 x 30 = 240 AGC
100

7. The physician orders Lidocaine 50 mg bolus IV, repeat in 15 minutes to a total of 100 mg; Lidocaine drip 2 g in 500 ml D_5W at 2 mg/min on volumetric pump after Lidocaine bolus. Calculate the ml/hr.

$\frac{ml}{hr} = \frac{500\ ml}{2g} \times \frac{2mg}{min} \times \frac{60min}{hr} \times \frac{1g}{1000mg} = \frac{30\ ml}{hr}$

8. An IV line of D_5W was started at 75 ml/hr and a loading dose of Theophylline, 6 mg/kg, was given over 30 minutes followed by a continuous infusion of 0.5 mg/kg/hour. If Mr. Presley weighs 140 pounds, what was the loading dose of Theophylline in mg for Mr. Presley? How many mg will he receive per hour with the continuous infusion? What is the rate of infusion in ml/hr using a standard solution of Theophylline 800 mg in 500 ml of D5W?

a.) $mg = \frac{6mg}{kg} \times \frac{1kg}{2.2lbs} \times \frac{140\ lbs}{} = 381.8mg$

b.) $\frac{mg}{hr} = \frac{0.5mg}{kg} \times \frac{1\ kg}{2.2\ lbs} \times \frac{140lbs}{} = \frac{31.8\ mg}{hr}$

c.) $\frac{ml}{hr} = \frac{500\ ml}{800mg} \times \frac{31.8\ mg}{hr} = 19.9$ or 20 ml

9. The physician orders an insulin drip of 7 units/hour using a standard solution of 100units/500ml NS. What is the rate of the IV if the nurse is placing the IV on an electronic infusion device (EID)?

$mL = \frac{7\ units}{hr} \times \frac{500\ ml}{100\ units} = \frac{35\ ml}{hr}$

10. Body Surface area - The physician orders Adriamycin at 40mg/m^2/24°. Mr. Jones is 5'8", 150 lbs. If you have a vial labeled Adriamycin 50mg/ml, how many ml will you add to the IV of 1 liter D_5 ½ NS? At what rate will the IV infuse on the EID?

Using the Nomagram in your text, line up height and weight to arrive at 1.8 m^2 or BSA

a.) $mL = \frac{1\ mL}{50\ mg} \times \frac{40\ mg}{m^2} \times 1.8\ m^2 = 1.44ml$

b.) $\frac{ml}{hr} = \frac{1000ml}{24hr} = \frac{42\ ml}{hr}$

11. The physician orders two units of packed red blood cells (PRBCs). If the blood is started at 4PM, what time will the 2nd unit be hung if the rate is 125 ml/hr?

Whole blood contains 500ml of blood and PRBCs contain 250 ml.

$hr = \frac{1\ hr}{125\ ml} \times 250\ ml = 2hr$ 6PM

12. The physician orders PCA: Morphine at a basal rate of 1 mg/hour plus 2 mg q 20 minutes. Calculate the maximum dose of Morphine Mr. Brown will receive in 3 hours.

Remember My Dear Aunt Sally from Math class in High School? Multiply, Divide, add and subtract.

$$\frac{\text{mg}}{\text{hr}} = \left(\frac{2\text{mg}}{20\text{ min}} \times \frac{60\text{ min}}{1\text{ hr}}\right) + \frac{1\text{ mg}}{\text{hr}} = \frac{7\text{ mg}}{\text{hr}}$$

$$3\text{hr} \times \frac{7\text{mg}}{\text{hr}} = 21\text{mg in 3 hr}$$

13. Using the weight-based Heparin protocol, calculate the amount of Heparin Mr. Green, a 220 pound man should receive. What is the bolus in units? What will the bolus be in ml if the vial is labeled Heparin, 5000 units per ml? What will be the rate of infusion in units/hour? What will the rate of infusion be in ml/hr?

We will review this in seminar and at the final exam math workshop.

a. bolus in units 8000 units (80 units per kg)
b. 1.6ml
c. 18units/kg/hr = 1800 units/hr. If IV Heparin is in concentration of 100units/ml, then rate would be 18 ml/hr