NUR 133 Advanced IV Calculations Instructions

Steps to solve advanced IV calculations:

1. Calculate the clients weight in kg
   a. All of your test questions will give the weight in kilograms this year. If you had the weight in pounds, you would divide by 2.2 to get the kg weight.
   b. In med-surg nursing we round at the last operation, so we just keep the number in the calculator and multiply it by the dose to get the weight adjusted dose.
   c. In pediatrics, you’ll round the weight to the nearest tenth, to calculate the weight adjusted dose

2. Calculate the weight adjusted dose per minute if needed
   a. The dose per minute is calculation by multiplying the prescribed dose/kg by the kg weight.
      For example:
      i. 2.5 mcg/kg/minute, clients weight is 50 kg
         \[
         \begin{align*}
         2.5 \\
         \times 50 \\
         \end{align*}
         \]
         125.0 mcg/minute

3. Calculate the dose per hour
   a. if you were ordered mcg/kg/minute, first calculate the dose per minute then multiply that product by 60 seconds to get the dose per hour
      For example:
      i. 125.0 mcg/minute X 60 seconds = 7500 mcg/hour
   b. If the units/kg/hour were ordered, just calculate the dose per hour as was done in the dose per minute.
      For example:
      i. 12 units/kg/hour, clients weight 50 kgs
      ii. 12 units/kg/hour X 50 kg = 600 units /hr

4. Convert to like tags
   a. If you are converting from mg to mcg, multiply by 1000
      For example:
      i. 10 mg X 1000 = 10000 mcg
   b. If you are converting from mcg to mg divide by 1000
      For example:
      i. 7500 mcg ÷ 1000 = 7.5 mg/hr

5. Set up your ratio proportion
   a. Put what you have available on one side of the equal sign and what is desired on the opposite side.
      For example:
      \[
      \begin{array}{c}
      400 mg = 7.5 mg/hr \\
      500 ml x ml/hr \\
      \end{array}
      \]

6. Cross multiply and solve for x
   a. 400 x = 500 X 7.5
   b. 400 x = 3750
   c. X= 9.375

7. Label x, round appropriately ,and recheck
   a. Make sure that you label with an ml/hr if you are programming an IV pump
   b. Round to the nearest tenth when using a pump
   c. Make sure you recheck by replacing the answer in the ratio proportion or multiplying the answer by the concentration in 1ml to get the original order that was prescribed.
**Answering Heparin questions asking you to work through a nomogram completely:**

1. First you should always calculate your rate of infusion based on the information provided in the stem of the question. For example, your question has 1080 units/hr ordered for your client. Following your steps in ratio proportion, you know that would be 10.8 ml/hr. If no changes need to be made, you would continue your infusion at 10.8 ml/hr.

2. Next, make sure that the pTT result provided in the stem is drawn at the right time and can be used for changes according to the nomogram. (It should be between 6-12 hours according to this nomogram. Every nomogram has its own rules)

3. If it can be used to make changes, find the line on the nomogram that correlates to the pTT result.

4. Evaluate your result to identify if a bolus should be given. Boluses are given for low pTTs and withheld for high pTTs.

5. Check to see if the infusion should be held. Infusions are held for a prescribed number of minutes to treat elevated pTT results. Infusions are never held if the pTT is low.

6. Check to see if the rate should be changed. Nomograms either list the rate change in "units/hour" or "ml/hr". Rates are increased in low pTTs and decreased with high pTTs. If you already calculated your infusion rate in the stem in ml/hr, convert the rate change to ml/hr as well. For example, 100 units per hour in the concentration provided is equal to 1 ml/hr. In this question 300 units/hr is equal to 3 ml/hr

7. Calculate your new infusion rate based on the rate in the stem of the question that is provided. For example, the rate of infusion is 10.8 ml/hr in this example: 10.8 ml/hr + 3 ml/hr = 13.8 ml/hr

8. double check your answer using ratio proportion.

9. Determine when you should repeat your pTT. pTTs are repeated at greater frequency when changes are made. Once therapeutic, most Nomograms recommend that you check the pTT the next morning.

**Answering Heparin questions looking to see if there need to be a rate change:**

1. First you should always calculate your rate of infusion based on the information provided in the stem. For example, your question has 1080 units/hr. Following your steps in ratio proportion, you know that would be 10.8 ml/hr. If no changes need to be made, you would continue your infusion at 10.8 ml/hr.

2. Next, make sure that the pTT result provided in the stem is drawn at the right time and can be used for changes according to the nomogram. (It should be between 6-12 hours according to this nomogram. Every nomogram has its own rules)

3. If it can be used to make changes, find the line on the nomogram that correlates to the pTT result.

4. Evaluate your result to identify if a rate change is indicated. Rates are increased for low pTT results and decreased for high pTT results.

5. Nomograms either list the rate change in "units/hour" or "ml/hr". If you already calculated your infusion rate in the stem in ml/hr, convert the rate change to ml/hr as well. For example, 100 units per hour in the concentration provided is equal to 1 ml/hr. In this question 300 units/hr is equal to 3 ml/hr

7. Calculate your new infusion rate based on the rate in the stem of the question that is provided. For example, the rate of infusion is 10.8 ml/hr in this example: 10.8 ml/hr + 3 ml/hr = 13.8 ml/hr

8. double check your answer using ratio proportion.