Name: _____

Medical Math Formulas

Objectives after completion of this lecture student should be able to:
        convert from the US system to the metric system of measurement
        Find the common numerical value of different metric systems
        Calculate drip rates for IV therapy
        Calculate correct dosage for different medications

How to convert Pounds to Kilograms
        Weight in pounds divided by 2.2= kg

$$Lbs / 2.2 = kg$$

How to convert Kilograms to Pounds
        Weight in Kilograms multiplied by 2.2 = Lbs

$$kg \times 2.2 = Lbs$$

How to convert from kilograms to grams
        1 kilogram = 1000 grams
        kg X 1000= grams
        5kg X 1000 = 5,000 grams

How to convert grams to kilograms
        1 gram =0.001 kg
        gm / 1000 = kg
        5gm/1000= 0.005kg

How to convert grams to mg
        1 gram = 1000mg
        gm X 1000 = mg
        2gm X 1000 = 2,0000mg

How to convert mg to grams
        .001mg=1gram
        mg / 1000 = gm
        500mg / 1000 = 0.5gm
How to convert from cubic centimeters (cc) to milliliters (ml)

        These measures are equal

How to covert Liters (L) to milliliters (ml)
        1 liter = 1,000 ml
        L X 1000 =ml
        5L X 1000= 5,000ml

Name: _____

How to convert milliliters (ml) to Liters
        1000 ml = 1 Liter
           ml / 1000 = liters
           2500ml / 1000= 2.5L

IV Drip calculations

Drip sets
      60gtts/ml   microdrip set   60 drops per cc
      10gtts/ml   macrodrip set   10 drops per cc
      15gtts/ml   15 drops per cc
      20gtts/ml   20 drops per cc

To find drips per minute
     VTBI (volume to be infused) X (Drips Set) / time (in minutes)
                <u>VTBI X Drip Set</u>
                Time (minutes)
You have an order to start an IV an infuse 150cc/hr using a 10 drop set
               <u>150 X 10</u>   =   <u>1500</u> =   25 drips per minute
                 60   60

How many ml per minute is this
          gtts / drip set
          25 / 10=2.5 cc/min

If you have a question that states how many cc per hour is the patient receiving they are
receiving 30 gtts on 15 drop set.   30/15 = 2 cc per minute times 60 = 120

Parental medication dosages
     You must know drug order, concentration on hand, and desired amount.

For example
     Drug order: 40mg
     Concentration   100mg
     Volume of solution   10ml
     Amount you want to give   X

<u>Drug ordered (mg)   </u>   =   <u>Concentration on Hand (mg)</u>
Amount to give(ml)   Volume of solution (ml)

         <u>40</u>   =   <u>100</u>
         X   10
You then must cross multiply and divide to solve for X.
     40 X 10= 400 / 100 = 4 X=4 (you want to administer 4 ml.)

1.	400 kg = _____ gm		10.	1.5 gm = _____ mg
2.	25 kg = _____ gm		11.	15 L = _____ ml
3.	2 kg = _____ gm		12.	250 ml = _____ L
4.	60 gm = _____ kg		13.	0.25 L = _____ ml
5.	750 gm = _____ kg		14.	4 L = _____ ml
6.	4 mg = _____ gm		15.	1320 ml = _____ L
7.	13 mg = _____ gm		16.	220 lbs = _____ kg
8.	230 mg = _____ gm		17.	33 lbs = _____ kg
9.	2 gm = _____ mg		18.	60 kg = _____ lbs

19. The doctor orders Demerol 100 mg. The tablets you have on hand are 50 mg each. How many tablets do you give?

20. The label indicates that there is 1.0 gram of drug in each cc. How many cc's do you give to administer 1.5 gm of the drug?

21. You are ordered to administer a dose of two 7.5 gm tablets of a drug. How many mg does this equal?

22. You are ordered to give diazepam 2.5mg IV push. The drug is supplied as 10 mg in 2 cc. How many cc should you push?

23. You are instructed to administer 30mg of a drug which is supplied in a concentration of 10mg per 0.5 ml. How many ml should you administer?

24. You are ordered to give 0.75mg epinephrine 1:10,000 IV push. The drug is supplied as 1mg in 10cc. How many cc should you administer?

25. Your patient weighs 175 pounds. You are ordered to give 0.05mg/kg of atropine. How many mg of atropine should you give?

METRIC SYSTEM/DOSAGE PROBLEMS II

1. 15 gm = _____ mg		11. 8 mg = _____ gm	
2. 35 gm = _____ mg		12. 750 mg = _____ gm	
3. 50 mg = _____ gm		13. 10 gm = _____ mg	
4. 14 mg = _____ gm		14. 154 cc = _____ L	
5. 100 mg = _____ gm		15. 1.75 L = _____ cc	
6. 10 L = _____ ml		16. 198 lbs = _____ kg	

Name: _____

7. 33 L =	_____ ml		17. 44 lbs =	_____ kg
8. 15 cc =	_____ L		18. 55 lbs =	_____ kg
9. 965 cc=	_____ L		19. 60 kg =	_____ lbs
10. 500 ml =	_____ L		20. 16 kg =	_____ lbs

21. You are ordered to give lidocaine 75mg IV push. The drug is supplied as 100mg/10cc. How many cc should you administer?

22. You are told to add 0.5gm of lidocaine to 250cc of D5W. Lidocine is supplied in a concentration of 50mg/ml. How many ml of this solution would you put into the IV bag?

23. Your patient weighs 88 pounds. You are ordered to give 1mg/kg of lidocaine. Lidocaine is supplied as 100mg/10cc. How many cc should you give?

METRIC SYSTEM/DOSAGE PROBLEMS III

1. You have an ampule of a solution containing 500mg/10cc. You are to give 400mg. How much solution will you give?

2. A patient ingested 25 tablets of 10mg each. How many grams has he taken?

3. You are instructed to administer 80mg of furosemide, which is supplied in a concentration of 10mg/ml. What volume of medication must be given?

4. Your patient weighs 154 pounds. You need to give 0.5 mEq/kg of sodium bicarbonate. How many mEq will you give?

5. You are ordered to give 3mg of morphine sulfate intravenously to a patient with chest pain. You have 15mg morphine in 10cc. How many cc will you give?

6. A patient is to receive Bretylol in a dose of 5mg/kg. The patient weighs 70kg. How many mg should the patient receive?

8. The ER physician has ordered you to give the patient 10mg of Compazine IM for nausea and vomiting. The drug is packaged in ampules containing 5mg/ml. How many cc would you give to the patient?

9. A drug is supplied as 1gm in 10cc. How many ml should be given to deliver 500mg?

10. A drug is supplied as 0.4 mg in 1cc. How many cc should be given to provide a 1.2 dose?

11. A physician wants 75 mg of lidocaine administered to a patient in an IV bolus. The drug is supplied in a prefilled syringe containing 100mg of lidocaine in 5ml of solvent. Calculate the number of cc to be administered?

12. You have orders to infuse 150ml/hr via a macro drip set. How many drips per minute must you infuse?
13. You have a patient that has an IV of D5W hanging with a micro drip set he is receiving 45 drips per minute. How many ml/hr is this patient receiving?

14. You have a patient that needs to receive 200ml.hr with a 15 drop set what flow rate will you need to set this IV at?

15. You have a patient hat has an IV of NS that is on a macrodrip set that is infusing at a rate of 40 drips/minute. How much fluid is this patient receiving every 15 minutes?

16. You have a patient that has orders to infuse a bol;us of 200ml/15 minutes what flow rate must you set your macro drip set to?

17. You have orders to infuse 150ml/hr via a macro drip set what is the flow rate you must set your IV at?

18. You have orders to infuse 30ml/hr via microdrip set what is the flow rat you must set your IV at?

Scenario:
Read the scenario and answer the question. Be sure to show your work.

You have a patient to be transferred your patient is a 60 year old male that is post MI he weighs 90kg and has no known drug allergies. He has 2 IVs the first IV is in his Left Arm with a 20 gauge with a micro drip set with D5W running at 45ml/hr. The second IV is in his right arm with a 16 gauge with NS hanging on a macrodrip set at a rate of 215ml/hr/ You are transporting the patient to a receiving facility. You are 35 minutes into transport and the patient begins to crash. You call the closest facility for orders and are orders to give the patient a bolus of 5ml/kg over 10 minutes of NS. You complete the bolus upon arrival at the facility that you diverted to. You discuss with the ED physician and the patient receives 750ml of fluid while you are at the receiving facility (patient received 250ml in right arm and 500ml in left arm). The physician gives your orders to administer 200ml/hr of NS to this patient throughout the rest of your transport, while you were at this hospital the IV in the Right arm Infiltrated. You set the IV rate and continue your transport another 28 minutes to the final receiving facility.

1. What is the initial drip rate of the IV in the right arm?
2. What is the initial drip rate of the IV on the Left arm?
3. How long did you have the patient prior to stopping at the initial facility after he crashed?
4. How much fluid did you give the patient when you bloused him after he crashed?
5. What rate did you set the left IV to?
6. What rate did you ser the Right IV to?
7. What flow rate did you set the IV to when you left the facility where the patient was evaluated in after he crashed?
8. How much fluid did the patient receive totatl?
9. How much fluid did the patient receive in the Left IV?
10. How much fluid did the patient receive in the Right IV?