SCEMSS Medical Math Study Guide

In light of some recent difficulties in providers from certain systems being unable to pass our medical math, we are asking you to give them this study guide a minimum of 1 week prior to their System Entry date. Here are examples of the 5 different types of medical math questions (there are 2 questions of each kind on the test). They will need to show their work so we can see how they arrive at the answers and calculators are not allowed for the test.

1. The dose of drug A is 1mg/kg for a patient weighing 176 pounds. How many mg would you give?

2. You have 100mg/5ml. Medical control orders 75mg. How many ml would you give?

3. You have microdrip tubing (60 drops/ml) and 1gram of a drug. Medical control orders 250ml at a drip rate of 3mg/min. How many drops per minute is that?

4. Your are told to give 300ml of fluid through a 10gtts/ml infusion set over 60 minutes. How many drops per minute is that?

5. 100mg/10ml = _____ mg/ml

The 3 formulas to remember:

To find a DRUG DOSE: $\frac{V \times D}{C}$ $\frac{\text{Volume} \times \text{Dose}}{\text{Concentration}}$ To find a DRIP RATE only: $\frac{V \times D}{T}$ $\frac{\text{Volume} \times \text{Drop Set (10 or 60)}}{\text{Time}}$
    D stands for DOSE   D stands for DROP

To find a DRUG DOSE infused through a DRIP RATE: $\frac{V \times D \times D}{C}$ $\frac{\text{Volume} \times \text{Dose} \times \text{Drop Set (10 or 60)}}{\text{Concentration}}$
    Combine above formulas as shown

Think of **volume** as anything **Liter**, **milliliter**, **microliter** (like a liter of pop, pop is a fluid and fluids are given for volume)
Dose is always what or how the **doctor orders** a drug to be given.
Concentration is how the drug comes **packaged** (what you **HAVE** on hand)

With a calculator handy: 210 lbs divided by 2.2 is **95.45**
(Pounds divided by 2.2)

Without a calculator: Half of 210 lbs is 105 but you still have to minus 10%
(Pounds divided in half, minus 10%)   10% of 105 is roughly 10 so 105 minus 10 is **95**

```
        95.45
You could also take 22 | 2100.00   By moving the decimal one place to the right on both sides of the division equation.
        198            This would make the 2.2 a 22. and the 210.0 lbs would now be 2100.
        120
        110
        100
         88
        120   this would repeat 4545454545
```

Don't forget to convert g to mg or mg to mcg when a concentration of a drug comes packaged differently than the dose ordered.

Example: 1g = 1000mg, 400mg = 400,000 mcg.
Always add a thousand's place of three zeros/decimals when going to a smaller unit

One more trick: Remove an ending zero **above** the line **for every** ending zero **below** the line to make the numbers easier to work with...

You have microdrip tubing (60 drops/ml) and 400mg of xyz drug. Medical control orders 500ml at a rate of 5mcg/kg/min. Patient weighs 220lbs. How many drops per minute is that?
           1̶0̶0kg
$\frac{5̶0̶0\text{ml (Volume)} \times 5\text{mcg/kg/min (Dose)} \times 6̶0̶\text{drops/ml (Drop Set)}}{400\text{mg (Concentration)} = 4̶0̶0̶,̶0̶0̶0̶\text{mcg}}$ = $\frac{5 \times (5 \times 1) \times 6}{4}$ = $\frac{150}{4}$ = 37.5   Since you can't give a half drop, round up
The five zeros above are cancelled out by the five zeros below the line

Or would you rather multiply $\frac{500 \times (5 \times 100) \times 60}{400,000}$ = $\frac{15,000,000}{400,000}$

Some have found the youtube videos Drug Calcs Made Easy by Turbo Medic helpful in case this study guide doesn't do it for you. Just remember, he uses a calculator. You will need to know long division and long multiplication for the test.