

**SUMMARY KEY TERMS AND CONCEPTS**

Drug calculations use the metric system of measurement. Volume and weight measures are the most common. Household measures (cup, teaspoon, etc.) are also used in administering medication. There are three types of drug calculation: prepared-strength doses, doses from solutions with a concentration expressed as a percentage, and intravenous dose calculations. Prepared-strength doses involve calculating how many tablets, capsules, or milliliters of a liquid are needed to administer a given amount of drug, and are most easily solved using a proportion, after units are made consistent:

$$\frac{\text{Original dose}}{\text{Per amount}} = \frac{\text{Desired dose}}{\text{Per amount}}$$

Calculating doses based on a percent strength concentration of a solution can be done using the following formula:

$$\text{Percent strength (in decimals)} = \frac{\text{Solute (in grams or cc's)}}{\text{Total amount (solute and solvent)}}$$

An easy reference point for the amount of drug contained in a solution, in milligrams per milliliter is 1 % strength, which is 10 mg/ml. Intravenous (IV) drug dose calculations are based on solutions and solution concentrations. Given the concentration of the drug solution in milliliters per amount of drug, calculate how many milliliters per minute are needed. Convert this flow rate of milliliters per minute into drops per minute, using the Standard Drop Factor obtained from the IV6 administration set.

$$\text{Flowrate, drops/min} = \frac{\text{Amount}}{\text{Minute}} \times \frac{\text{Milliliter}}{\text{Amount}} \times \frac{\text{Drops}}{\text{Milliliter}}$$

**SELF-ASSESSMENT QUESTIONS****Prepared-strength dose calculations**

1. A bottle is labeled Demerol (meperidine) 50 mg/cc. How many cubic centimeters are needed to give a 125 mg dose?
2. Promazine HCl comes as 500 mg/10 ml. How many milliliters are needed to give 150 mg dose?
3. Hyaluronidase comes as 150 U/cc. How many cubic centimeters for a 30 U dose?
4. Morphine sulfate 4 mg is ordered. You have a vial with 10 mg/ml. How much do you need?
5. You have a morphine sulfate vial with 15 mg/cc. How many cubic centimeters for a 10 mg dose?
6. Diphenhydramine (Benadryl) elixir contains 12.5 mg of diphenhydramine HCl in each 5 ml of elixir. How many milligrams are there in one-half teaspoonful dose (1 teaspoon = 5 ml)?
7. A pediatric dose of oxytetracycline 100 mg is ordered. The dosage form is an oral suspension containing 125 mg/5 cc. How much of the suspension contains a 100-mg dose?
8. How much heparin is in 0.2 ml, if you have 1000 U/ml?
9. If you have a vial of dexamethasone with 4 mg/ml, how much do you need for a 1-mg dose?
10. If Cogentin is available as 0.5 mg/tablet, how many tablets do you need for a 1-mg dose?
11. If Temptra is available as 120 mg/5 ml, how much dose is there in one-half teaspoon?
12. If Dalmane is available as 15 mg capsules, what dosage is given with 2 capsules?
13. Terbutaline sulfate is available as 1 mg/ml in an ampule. How many milliliters are needed for a 0.25-mg dose?
14. A patient is told to take 4 mg of albuterol 4 times daily. The medication comes in 2-mg tablets. How many tablets are needed for one 4-mg dose?
15. Metaproterenol is available as a syrup with 10 mg/5 ml. How many teaspoons should be taken for a 20-mg dose?
16. If you have 3 mg/ml of d-tubocurarine, how many milliliters are needed for a dose of 9 mg?
17. If a dosage schedule requires 0.25 mg/kg of body weight, what dose is needed for an 88-kg person?
18. Using 0.5 mg/kg of body weight for atropine by aerosol, what dose is needed for a 75-kg man?
19. How much drug is needed for a 65-kg adult, using 0.5 mg/kg?
20. Pediatric dosage of an antibiotic is 0.5 g/20 lb body weight not to exceed 75 mg/kg/24 hrs.
  - a. What is the dose for a 40-pound child?
  - b. If this dose is given twice in 1 day, is the maximum dose exceeded?

**Percentage strength solutions**

1. How many grams of calamine are needed to prepare 120 g of an ointment containing 8% calamine?

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