Drug Dosage Calculations

Abbreviations Commonly Used in Dosage

Abbreviation	Term
po	by mouth (or orally)
susp	suspension
pm	as needed
tab	tablet
cap	capsule
q	every
bid	twice a day
tid	three times a day
qid	four times a day

The basic drug dosage formula listed below can be used for most drug dosage calculations. These calculations are necessary when a doctor orders a particular desired dose of medication and the medication you have available on hand is in the form of mass/tablet or mass/volume.

Formula:

$$\frac{D}{H} \times Q = X \qquad \frac{Desired}{Have} \times Quantity = X$$

Term	Symbol	Meaning	Example
Dosage ordered or desired dose	D	The amount of medication that the physician prescribed	"Give 500 milligrams" "Give grains/v" "Give 1.2 milliliters"
Dosage strength or supply on hand	H	The amount of drug in a specific unit of measure (what is available; in stock)	250 milligrams Grains/v
Unit of measure or quantity of unit	Q	The unit of measure for the specific dosage strength or supply on hand	per 2 milliliters per capsule per tablet
Unknown Dosage	X	The dosage you are trying to calculate	Not applicable

Tips for Correct Calculations:

- Make sure that all measurements are in the **same units**. If necessary, convert between units.
- In most cases, it is best to **convert a larger unit to smaller units** (e.g. convert grams to milligrams). This conversion uses multiplication and most often keeps the calculation in whole numbers.
- Always check for **reasonableness of your answer**. Does the drug dosage make sense? (Amounts less than half a tablet or greater than 3 tablets are not common, but still possible.)
- When solving dosage problems for drugs supplied in tablets or capsules, the **quantity, Q**, is always **1** because the supply dosage is *per tablet* or *per capsule*.

Example 1:

The doctor orders 90 milligrams of liquid cough syrup. The liquid cough syrup has a label that reads 120 milligrams (mg for short) in 5 milliliters (or mL for short). How much cough syrup should the nurse give to the patient?

Given:
D = 90 mg
H = 120 mg
Q = 5 mL

$$x = \frac{D}{H} \times Q$$

$$x = \frac{90 \text{ mg}}{120 \text{ mg}} \times 5 \text{ mL}$$

$$x = \frac{3}{4} \times 5 \text{ mL}$$

$$x = \frac{15}{4} \text{ mL}$$

$$x = 3.75 \text{ mL}$$

Therefore, the nurse should give 3.75 mL of the cough syrup to the patient.

Example 2:

Ampicillin 500 mg capsules are supplied. MD orders 1.5 g. How many capsules should be given to the patient?

Given:
D = 1.5 g
H = 500 mg
Q = 1 capsule

$$X = \frac{D}{H} \times Q$$

Step 1:

Since the desired dose is in grams, but the capsules available on hand are in milligrams, convert 1.5 grams (g for short) into mg.

$$1.5 \text{ g} \times 1000 \text{ mg/g} = 1500 \text{ mg}$$

Step 2:

Use the formula to calculate the number of capsules that should be given.

$$x = \frac{1500 \text{ mg}}{500 \text{ mg}} \times 1 \text{ capsule}$$

x = 3 capsules

Therefore, 3 capsules of Ampicillin should be given to the patient.

Practice Questions

1) The doctor orders "ibuprofen 600 mg PO BID". You have 300 mg tablets of ibuprofen on hand. How many tablets should be given to the patient at one time?

2) The physician ordered "enalapril maleate 7.5 mg PO daily." You have 5 mg tablets of enalapril maleate available on hand. How many tablets should be given to the patient?

3) Atenolol 0.05 g capsules are supplied. MD orders 100 mg. How many capsules should be given to the patient?

4) The order says, "erythromycin suspension 600 mg PO q6h." The supply on hand is erythromycin 400 mg per 5 mL. How many milliliters of medication should be given to the patient?

5) The doctor orders "valporic acid 0.5 g PO TID." The bottle of valporic acid on hand says 50 mg per 1 mL. How many milliliters should be given?

6) The physician ordered "penicillin V potassium 400 000 units PO QID". You have penicillin V potassium 200 000 units per 5 mL. How many milliliters should be given to the patient?

Answers:

1) 2 tablets
2) 1.5 tablets
3) 2 capsules
4) 7.5 mL
5) 10 mL
6) 10 mL