

Medication Calculations

Before you begin to perform medication calculations, it is important that you review your knowledge on basic maths calculations, such as fractions, percentages, ratios and decimals. The following examples explain the formula and the ratio method of medication calculation.

The formula for the calculation of a medication to be administered:

$$\text{Volume or Strength Required} = \frac{\text{Strength Required}}{\text{Stock Strength or Stock Available}} \times \frac{\text{Stock Volume}}{1}$$

What is the difference between ratios and proportions?

Ratio is a comparison of two or more related quantities. Ratio is represented by a colon. For example 2 : 3.

Proportion is part of a whole. Proportions are represented as fractions or decimals. For example, $\frac{1}{2} = 0.5$.

Note:

- When administering tablets orally, the stock volume is always 1, since tablets are in their solid form.
- Units for the strength required and stock strength must be the same.

Example 1

The doctor ordered 150 mg of Aspirin for your patient. Aspirin is available as 300 mg per tablet. How many tablets would you administer to your patient?

Solution:

Using the formula method

Strength required = 150 mg.

Strength in stock = 300 mg per tablet.

$$\text{Number of tablets} = \frac{150 \text{ mg}}{300 \text{ mg per tablet}} \times \frac{1}{1} = \frac{1}{2} \text{ of a tablet.}$$

The ratio method

The steps to follow are

1. Write what you know or what is available as a ratio. For example, 300 mg : 1 tab .
2. Write the doctor's order and the unknown as a ratio. For example, 150 mg : x tab .
Use letter x for the unknown.
3. Write ratios as fractions and cross multiply to solve algebraically.

300 mg : 1 tablet,
150 mg : x tablet.

Write as fraction:

$$\frac{300 \text{ mg}}{1 \text{ tablet}} = \frac{150 \text{ mg}}{x \text{ tablet}}$$

Cross multiply to give

$$\begin{aligned}\frac{300}{1} &= \frac{150}{x} \\ 300x &= 150.\end{aligned}$$

Dividing both sides by 300 to solve for x

$$\begin{aligned}\frac{\cancel{300}x}{\cancel{300}} &= \frac{150}{300} \\ x &= \frac{1}{2} \text{ tablet.}\end{aligned}$$

Example 2

A patient is prescribed 240 mg of Gentamycin, and the stock strength is 80 mg per 2 ml. Find the volume of Gentamicin needed.

Solution:

Using the formula method

$$\text{Volume Required} = \frac{\cancel{240} \text{ mg}}{\cancel{80} \text{ mg}} \times \frac{2}{1} \text{ mL} = 6 \text{ mL of Gentamycin.}$$

Using the ratio method

Stock strength: 80 mg : 2 mL,
Doctor's order: 240 mg : x mL.

Write as fraction

$$\frac{80 \text{ mg}}{2 \text{ mL}} = \frac{240 \text{ mg}}{x \text{ mL}}$$

Cross multiply to give

$$\begin{aligned}\frac{80}{2} &= \frac{240}{x} \\ 80x &= 480.\end{aligned}$$

Dividing both sides by 80 to get x

$$\begin{aligned}\frac{\cancel{80}x}{\cancel{80}} &= \frac{480}{80} \\ x &= 6 \text{ mL.}\end{aligned}$$

Therefore, the volume of Gentamycin needed is 6 milliliters.

Other resources

- Brotto and Rafferty (2016)
- Reid-Searl, Dwyer, Moxham, and Reid-Speirs (2007)
- Online resources at [Study Support](#);
- Arrange a consultation with a Mathematics Learning Advisor.

References

- Brotto, V., & Rafferty, K. (2016). *Clinical dosage calculations for Australia and New Zealand* (2nd ed.). South Melbourne, Australia: Cengage Learning.
- Reid-Searl, K., Dwyer, T., Moxham, L., & Reid-Speirs, J. (2007). *Nursing student's maths & medications survival guide*. Frenchs Forest, Australia: Pearson.