

Dimensional Analysis

A simple approach to dosage calculation

Dimensions are units of measure.

The dimensions must be analyzed in order to solve the problem.

This simple technique enables you to eliminate unwanted units of measure.

Once this is mastered, you will be able to calculate drug dosages quickly and safely.

Determine the following:

- 1. the known quantity
 - 2. the quantity you want to find
 - 3. an equivalence between them
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Problem: How many days are there in 3 weeks?

- 1. the known quantity – 3 weeks

 - 2. the quantity you want to find – the number of days

 - 3. the equivalence between them – there are 7 days in 1 week
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Let's set up the problem

$$\frac{\text{days}}{1} = \frac{3 \text{ weeks}}{1} \times \frac{7 \text{ days}}{1 \text{ week}}$$

Cross cancel the weeks to eliminate them

This leaves only the unit you need to keep
– ‘days’.

$$\text{Now, } \frac{3}{1} \times \frac{7 \text{ days}}{1} = 21 \text{ days}$$

Let's try one more

- The baby is 18 months old. What is his age in years?
 - 1. known quantity - 18 months
 - 2. quantity you want to find - years
 - 3. equivalence between them - 1 year = 12 months
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Set up the problem

$$\frac{\text{Years}}{1} = \frac{18 \text{ months}}{1} \times \frac{1 \text{ year}}{12 \text{ months}}$$

Cross cancel months to eliminate them.

This leaves only the wanted unit –
years. Now, $\frac{18}{1} \times \frac{1 \text{ year}}{12} = 1.5 \text{ years}$

Let's Try a Medication Problem:

- The doctor has ordered Tylenol 600mg. You have available Tylenol tablets, 300mg each. How many tablets will you give?
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LET'S ANALYZE THE AVAILABLE INFORMATION

- The known quantity is 600mg
 - The unit you are solving for is tablets
 - The equivalence is one tablet contains 300mg
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Now, set up the problem:

$$\frac{\text{Tabs}}{1} = \frac{600\text{mg}}{1} \times \frac{1 \text{ tab}}{300\text{mg}}$$

Cross cancel the mg's to eliminate them. This leaves only the unit you are solving for.

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- You now have only one unit left – tablets. This is the unit you are solving for.
 - Reduce 600 and 300 by eliminating 2 zeroes from each
 - $\text{Tab} = \frac{6}{1} \times \frac{1 \text{ tab}}{3} = \frac{6 \text{ tab}}{3} = 2 \text{ tabs}$
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Does the answer make logical sense?

Never consider a problem solved until you think about whether or not the answer makes sense.

The order was for 600mg. Each tablet contains 300mg. Does the patient need more than 1 tablet or less?

The patient needs more than 1 tablet because he needs more than 300mg.
