

CALCULATE WITH THE UNITS IN VIEW

PTCB Calculations & Conversions

24 original worked examples, with unit checks and mistake repairs

Two worked examples to try first.

WHAT THIS IS

An unscored teaching pack for selected calculation skills relevant to PTCE preparation. Six topics contain four fully worked examples each. This is not a full course, question bank, readiness assessment or official exam.

IMPORTANT LIMITS

Independent preparation by ExamRefine, not affiliated with or endorsed by PTCB. All numbers, labels, tablet tokens and schedules are fictional classroom inputs. Do not use this pack to choose, check, prepare, dispense or administer a real medicine. Actual medication questions require the relevant prescription, product information and pharmacist. The examples do not establish clinical suitability, compounding procedures, billing rules or permission to use a reference during an exam. No pass or score improvement is guaranteed.

The full \$19 one-time pack adds 22 worked examples and a condensed phone reference. No subscription; practice access is separate.

[See the full pack and current availability at ExamRefine](#)

Work the setup before the arithmetic.

1. Use the same five-part routine throughout: identify the requested unit, arrange a ratio, cancel units, calculate, then check the result against the starting facts.
2. These are openly solved worked teaching examples. There is no score, hidden answer, official question or adaptive diagnosis. You can cover the solution, write your own setup, then compare each step.
3. Treat the supplied classroom quantities as exact unless an example says otherwise. Keep fractions or calculator precision through the working and round only when the example requests it. No example establishes a clinical rounding or significant-figure rule.
4. The word use is only a counting interval in the fictional schedule. A quantity-per-use calculation never decides whether a real amount, frequency, tablet split or treatment is appropriate.
5. All solution text is original. PTCB is linked only to explain topical relevance; NIST is linked for unit definitions and mathematical quantity conventions. Source checking is separate from independent content review.

Keep a short mistake log: the requested unit, the step that went wrong, and a reverse-check you can use next time. Do not record confidential official exam questions.

01 / Metric conversions and decimals

Grams to milligrams without guessing

SCENARIO

A fictional training label lists 0.375 g of an inert marker. Express that same mass in milligrams.

FIND

Mass in mg

USE ONLY THESE ASSUMPTIONS

This is a unit conversion of one unchanged mass, not a medicine amount. The conversion factor 1 g = 1000 mg is exact.

SET UP THE RELATIONSHIP

Start with 0.375 g. Put grams under milligrams in the conversion factor so the starting g will cancel.

TRACK THE UNITS

$$\text{g} \times (\text{mg/g}) = \text{mg}$$

WORK THE STEPS

1. Write $0.375 \text{ g} \times (1000 \text{ mg} / 1 \text{ g})$.
2. Cancel g, then multiply $0.375 \times 1000 = 375$.
3. Keep the requested unit: 375 mg. The mass did not change; its numerical value did.

RESULT

$$0.375 \text{ g} = 375 \text{ mg}.$$

THE TEMPTING MISTAKE

Dividing by 1000 gives 0.000375, which goes in the wrong direction. A milligram is a smaller unit, so more of those units are needed to express the same mass.

CHECK BEFORE MOVING ON

0.375 g is between 0.3 g and 0.4 g, so the answer must be between 300 mg and 400 mg. Also, $375 \text{ mg} \div 1000 = 0.375 \text{ g}$.

Source keys: ptcb-outline-2026, nist-prefixes, nist-quantity-equations. See the source notes; the scenario and solution are original.

09 / mg/mL and label-ratio arithmetic

Find volume from a mass-per-volume label

SCENARIO

A fictional training liquid contains 150 mg of inert marker in every 5 mL. Find the volume that represents 225 mg of marker.

FIND

Volume in mL

USE ONLY THESE ASSUMPTIONS

The classroom liquid is uniform, so the stated ratio applies to every portion. The target is supplied only for arithmetic. It is not a real medicine amount or a preparation instruction.

SET UP THE RELATIONSHIP

Multiply the target mass by 5 mL / 150 mg. Put the label's mass in the denominator so mg cancels.

TRACK THE UNITS

$$\text{mg} \times (\text{mL}/\text{mg}) = \text{mL}$$

WORK THE STEPS

1. Write $225 \text{ mg} \times (5 \text{ mL} / 150 \text{ mg})$.
2. Calculate the numerator: $225 \times 5 = 1125$.
3. Divide 1125 by 150 to obtain 7.5 mL. Alternatively, the label is 30 mg/mL and $225 \div 30 = 7.5 \text{ mL}$.

RESULT

The fictional target corresponds to 7.5 mL.

THE TEMPTING MISTAKE

Using 150 mg/mL ignores the label's 5 mL denominator and produces 1.5 mL. Read the amount and its associated volume together.

CHECK BEFORE MOVING ON

225 mg is 1.5 times 150 mg, so the volume should be 1.5 times 5 mL: 7.5 mL. Multiplying 7.5 mL by 30 mg/mL returns 225 mg.

Source keys: ptcb-outline-2026, nist-concentration, nist-quantity-equations. See the source notes; the scenario and solution are original.

Where the facts come from

The numbers, scenarios, setups, explanations, and error checks in this pack were written for ExamRefine. References support the narrow facts below; they do not endorse this product.

ptcb-outline-2026 / PTCE Content Outline, effective January 6, 2026

PDF page 2, objective 4.1; effective date on page 1. Objective 4.1 includes calculation-related topics relevant to this selected-skills pack. It does not certify this product, its coverage or its examples.

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Reference checked 2026-09-26T02:48:47Z. public_link_only: factual scope reference; no outline text, table, sample question, artwork or source PDF is included in the pack

nist-prefixes / Metric (SI) Prefixes

Prefixes table, milli and micro rows; Common metric prefixes and the relationship with their place values, introductory paragraph. Milli means 10^{-3} and micro means 10^{-6} . A leading zero makes values below one easier to read. All quantities in our examples are newly chosen.

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Reference checked 2026-09-26T02:48:47Z. public_link_only: narrow unit facts, expressed in original prose; no images, tables, copied worked examples or source files are included

Source notes, continued

nist-volume / SI Units - Volume

Common Units of Volume table, row 1000 mL = 1 L; opening unit-symbol bullets. One liter equals 1000 milliliters. The pack uses L and mL consistently.

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Reference checked 2026-09-26T02:48:47Z. public_link_only: narrow unit equivalence; no source table, photograph, illustration or file is included

nist-quantity-equations / NIST Guide to the SI, Chapter 7

Sections 7.1, 7.2, 7.10.2 and 7.11. A value includes its unit; equations distinguish quantities from bare numbers. For a dimensionless fraction, percent represents a factor of 0.01. This source is not used to claim that a mass/volume strength is a dimensionless mass fraction.

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Reference checked 2026-09-26T02:48:47Z. public_link_only: mathematical quantity and notation facts, expressed in original prose; no source examples, tables or files are included

Source notes, continued

nist-concentration / NIST Guide to the SI, Chapter 8

Section 8.6.5 note 1, mass concentration; section 8.6.10, mass fraction. Mass concentration uses component mass divided by mixture volume; mass fraction uses component mass divided by mixture mass. These different denominators must not be interchanged.

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Reference checked 2026-09-26T02:48:47Z. public_link_only: narrow mathematical definitions, expressed in original prose; no source table, worked example or file is included

Review and corrections

Independently AI-reviewed before publication; not described as human or instructor review. Corrections produce a new edition. Report an issue with the edition and example number at support@examrefine.com.

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