ALTITUDE WATER LLC

Water Operator Math Workout

50 Worked Problems for WPI/ABC Class D/C & Distribution 1–2 (Colorado-Ready)

PRE-2025 WPI/ABC EXAM EDITION · COLORADO-READY

Water Operator Math by Altitude Water LLC

Developed in conjunction with a Colorado-certified Class A Water Treatment Operator & ORC — Altitude Water LLC.

Official Sources · Verified as of November 2026. Public pages only, cited for reference; confirm current details at the official source.

Source: Water Professionals International (WPI), *Standardized Water Treatment Operator Exams — Need-to-Know Criteria and Formula/Conversion Table* (as of November 2026). https://gowpi.org/services/abc-testing/standardized-exams/standardized-water-treatment-operator-exams/

Source: Water Professionals International (WPI), *Formula/Conversion Table — Water Treatment, Distribution & Water Laboratory Exams* (2024 edition, as of November 2026). https://gowpi.org/services/abc-testing/formula-conversion-tables/

Source: Water Professionals International (WPI), *Historical Need-to-Know Criteria (2019 standardized water treatment and distribution exams)* (as of November 2026). https://gowpi.org/services/abc-testing/need-to-know-criteria/

Source: Colorado CCWP Office, *CCWP – Need to know criteria and study resources* (as of November 2026). https://cdphe.colorado.gov/ccwp-need-to-know-criteria-and-study-resources

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Interactive quiz + keep-forever PDF workbook + one-page formula sheet

SECTION 1 · PRACTICE QUESTIONS

50 practice problems

Work these in order or by topic. Answers are not marked on this section. A blank is provided under each item. The quick answer key and full worked solutions begin in Section 2.

UNIT CONVERSIONS

P01 Unit Conversions — EASY

A well records a daily production of 350,000 gallons. Express this flow in million gallons per day.

A. 3.50 MGD
B. 0.35 MGD
C. 0.035 MGD
D. 350 MGD

Your answer: _____ Topic: Unit Conversions

P02 Unit Conversions — EASY

A high-service pump is discharging 850 gpm. What is this flow in million gallons per day?

A. 0.85 MGD
B. 0.59 MGD
C. 1.22 MGD
D. 5.90 MGD

Your answer: _____ Topic: Unit Conversions

P03 Unit Conversions — MEDIUM

A raw-water intake is measured at 12 cubic feet per second. What is this flow in gallons per minute?

A. 5,386 gpm
B. 89.8 gpm
C. 720 gpm
D. 4,488 gpm

Your answer: _____ Topic: Unit Conversions

P04 Unit Conversions — EASY

A distribution residual is reported as 2.4 mg/L. What is the equivalent concentration in parts per million?

A. 20.0 ppm
B. 0.29 ppm
C. 17.9 ppm
D. 2.4 ppm

Your answer: _____ Topic: Unit Conversions

P05 Unit Conversions — MEDIUM

A storage allocation of 2.5 acre-feet is to be expressed in gallons. Using 43,560 ft^3 per acre-foot and 7.48 gal/ft^3, how many gallons is 2.5 acre-feet?

A. 108,900 gal
B. 325,829 gal
C. 814,572 gal
D. 908,226 gal

Your answer: _____ Topic: Unit Conversions

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SECTION 2 · ANSWER KEY & WORKED SOLUTIONS

Quick answer key

Use this key for a fast check, then read the line-by-line solutions that follow. Every item is original educational material and is not an actual certification exam question.

ID	TOPIC	ANSWER	CHOICE
P01	Unit Conversions	**B**	0.35 MGD
P02	Unit Conversions	**C**	1.22 MGD
P03	Unit Conversions	**A**	5,386 gpm
P04	Unit Conversions	**D**	2.4 ppm
P05	Unit Conversions	**C**	814,572 gal
P06	Tank/Pipe Area & Volume	**B**	74,800 gal
P07	Tank/Pipe Area & Volume	**D**	84,554 gal
P08	Tank/Pipe Area & Volume	**A**	367 gal
P09	Tank/Pipe Area & Volume	**C**	33,822 gal
P10	Tank/Pipe Area & Volume	**D**	0.144 MG
P11	Flow & Velocity	**B**	734 gpm
P12	Flow & Velocity	**A**	2.27 ft/s
P13	Flow & Velocity	**C**	23.3 MGD
P14	Flow & Velocity	**D**	1.42 ft/s
P15	Flow & Velocity	**C**	5.54 ft/s
P16	Detention Time	**A**	3.52 h
P17	Detention Time	**C**	74.8 min
P18	Detention Time	**B**	416,667 gal
P19	Detention Time	**D**	86.4 min
P20	Detention Time	**B**	4.89 h
P21	Chlorine Dosage & Pounds Formula	**A**	52.5 lb/day
P22	Chlorine Dosage & Pounds Formula	**C**	4.96 mg/L
P23	Chlorine Dosage & Pounds Formula	**B**	12.51 lb/day
P24	Chlorine Dosage & Pounds Formula	**D**	44.0 lb/day
P25	Chlorine Dosage & Pounds Formula	**A**	2.40 mg/L
P26	Chemical Feed & Solution Purity	**B**	23.1 lb/day
P27	Chemical Feed & Solution Purity	**C**	600 lb/day
P28	Chemical Feed & Solution Purity	**A**	0.40 mg/L
P29	Chemical Feed & Solution Purity	**C**	14.4 gal/day
P30	Chemical Feed & Solution Purity	**D**	3.52 mg/L
P31	Filtration & Backwash	**A**	4.0 gpm/ft^2

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P22 Chlorine Dosage & Pounds Formula — MEDIUM

A plant uses 62 pounds of 100% chlorine in one day while treating 1.5 MGD. What chlorine dose, in mg/L, was applied?

Answer: C. 4.96 mg/L

Formula used: dose (mg/L) = (lb/day × purity) ÷ (MGD × 8.34)

1. Rearrange the pounds formula: Dose (mg/L) = (lb/day of available chemical) ÷ (MGD × 8.34).
2. Dose = 62.00 ÷ (1.50 × 8.34) = 62.00 ÷ 12.510 = 4.96 mg/L.
3. The closest listed choice is C.

COMMON TRAP
The wrong answers are classic exam-day traps, not random numbers. Choice A (41.3 mg/L) forgot to divide by 8.34 lb/gal. Choice D (5.53 mg/L) used 7.48 instead of 8.34.

Standard water-operator engineering formula consistent with the publicly posted WPI Formula/Conversion Table equation forms (the copyrighted table text is not reproduced). See Official Sources.

P23 Chlorine Dosage & Pounds Formula — EASY

How many pounds of 100% chlorine are needed each day to dose a 750,000-gallon-per-day well system at 2.0 mg/L?

Answer: B. 12.51 lb/day

Formula used: lb/day = MGD × dose (mg/L) × 8.34 ÷ purity (decimal)

1. Use the pounds formula: lb/day = Flow (MGD) × Dose (mg/L) × 8.34 lb/gal.
2. 0.75 MGD × 2.00 mg/L × 8.34 = 12.510 lb/day of available chemical.
3. The closest listed choice is B.

COMMON TRAP
The wrong answers are classic exam-day traps, not random numbers. Choice A (1.50 lb/day) forgot to multiply by 8.34 lb/gal. Choice C (11.22 lb/day) used 7.48 instead of 8.34 in the pounds formula.

Standard water-operator engineering formula consistent with the publicly posted WPI Formula/Conversion Table equation forms (the copyrighted table text is not reproduced). See Official Sources.

P24 Chlorine Dosage & Pounds Formula — MEDIUM

Laboratory tests show a chlorine demand of 1.6 mg/L. The operator wants a 0.8 mg/L residual in a plant that treats 2.2 MGD. How many pounds of 100% chlorine should be fed per day?

Answer: D. 44.0 lb/day

Formula used: lb/day = MGD × dose (mg/L) × 8.34 ÷ purity (decimal)

1. Use the pounds formula: lb/day = Flow (MGD) × Dose (mg/L) × 8.34 lb/gal.
2. 2.20 MGD × 2.40 mg/L × 8.34 = 44.035 lb/day of available chemical.
3. The closest listed choice is D.

COMMON TRAP
The wrong answers are classic exam-day traps, not random numbers. Choice C (5.28 lb/day) forgot to multiply by 8.34 lb/gal.

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