

10 Alaska AK STAR

GRADE
8
MATH

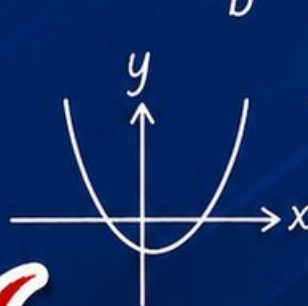
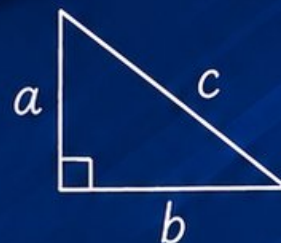
PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

10 PRINTED
TESTS 

2 ONLINE
TESTS 

- ✓ Build Confidence
- ✓ Master Key Math Skills
- ✓ Answer Explanations for Every Question
- ✓ Test-Taking Strategies That Work



$$3x - 7 = 2(x + 5)$$
$$x = 17$$

$$y = mx + b$$

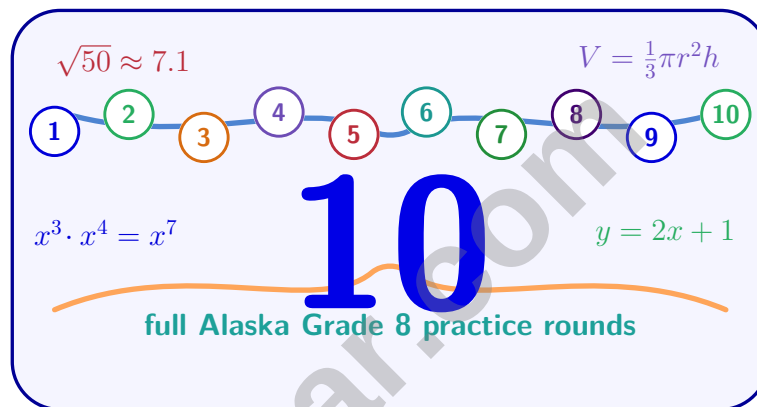


USE THESE TWO
**ADDITIONAL ONLINE
PRACTICE TESTS**

FOR EXTRA REVIEW AFTER
THE PRINTED TESTS
IN THIS BOOK.

10 Alaska AK STAR Grade 8 Math Practice Tests

Alaska Grade 8 AK STAR Practice for clear problem-solving across long-range functions, exponent models, geometry, data, and probability



Ten complete 40-question Grade 8 AK STAR practice rounds with linear relationships, scientific notation, real numbers, equations, functions, geometry, data analysis, probability, answer keys, and clear explanations for every item.

Jay Daie and Reza Nazari



Copyright ©

Testinar Inc



Published by Testinar Inc

Testinar.com

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the author, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law, including Section 107 or 108 of the 1976 United States Copyright Act.

This publication is independently produced and has no official connection to any state, district, or national testing program.

Test names and organizational names used herein are the property of their respective trademark holders.



Copyright ©

Welcome, Alaska Grade 8 Problem Solver!

Ten focused rounds for sharper Alaska AK STAR math thinking

This book gives you ten full Grade 8 AK STAR math practice tests. Each round is built to help you notice structure, compare quantities, use linear reasoning, handle real numbers, and explain your thinking with care.

Grade 8 standards focus: This page supports **Operations with Scientific Notation** (8.EE.4): Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. It also prepares you for **Angles in Triangles and Parallel Lines** (8.G.5): Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about angles created when parallel lines are cut by a transversal, and the....

Your Alaska Practice Promise

I will read every question carefully, choose a strategy that fits, write enough work to prove my answer, and use corrections as training for the next test.

Read

Model

Verify

How to Use This Book

A ten-session plan for confident Grade 8 review

1. **Warm up with the review pages.** Notice the big ideas before starting the tests.
2. **Complete one test at a time.** Treat each 40-question round like a real practice session.
3. **Show your reasoning.** Jot a proportion, equation, diagram, number line, or quick estimate when it helps.
4. **Correct actively.** Rework missed items before reading the explanation.
5. **Choose the next target.** After each test, name one skill and one habit to improve.

Grade 8 standards focus: Keep the routine connected to **Slope and the Equations of a Line** (8.EE.6): Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line. Derive $y = mx$ and $y = \dots$. Another recurring target is **Scatter Plots and Patterns in Data** (8.SP.1): Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association.

Alaska review rhythm: Work a test, score it, study your misses, then come back ready for the next round with one clear goal.



What Is Inside?

Ten Alaska AK STAR tests, 400 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Linear relationships, integer exponents, scientific notation, real-number reasoning, and careful reading.
Tests 4–6	Expressions, equations, inequalities, transformations, geometry, and multi-step problem solving.
Tests 7–9	Data analysis, probability, mixed review, stamina, and choosing efficient strategies.
Test 10	A final Alaska round to show growth across the whole book.
Answer Pages	Compact keys and explanations that show why each answer works.

The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.

Grade 8 standards focus: Use these habits while practicing **Solving Real Problems with Systems** (8.EE.7): Solve real-world and mathematical problems leading to two linear equations in two variables. The same routine helps with **Solving Linear Inequalities** (8.EE.7): Solve linear equations in one variable.



Scan me!
For more practice
& answers

Table of Contents

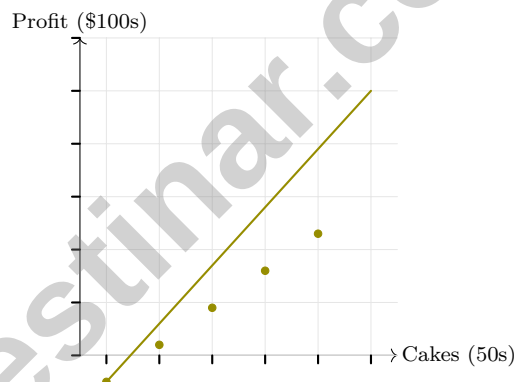
★ Practice Test 1	_____	14
★ Practice Test 2	_____	30
★ Practice Test 3	_____	46
★ Practice Test 4	_____	61
★ Practice Test 5	_____	76
★ Practice Test 6	_____	93
★ Practice Test 7	_____	111
★ Practice Test 8	_____	127
★ Practice Test 9	_____	144
★ Practice Test 10	_____	160
Practice Test Answer Keys	_____	177
Practice Test Answers and Explanations	_____	183

1) A cube has an edge length of 4 units. What is its volume?

- ☐ A. 16 cubic units ☐ C. 48 cubic units
☐ B. 24 cubic units ☐ D. 64 cubic units

2) Two students find the surface area of a composite solid made of a cube (edge 3 cm) sitting on a rectangular prism (base 3×3 cm, height 2 cm). Student A computes: Cube SA + Prism SA = $54 + 42 = 96 \text{ cm}^2$. Student B subtracts the shared face: $54 + 42 - 2(9) = 96 - 18 = 78 \text{ cm}^2$. Who is correct and why?

- ☐ A. Student A; they forgot the shared face ☐ C. Student A; both solids are separate
☐ B. Student B; they correctly subtract the overlapping area twice ☐ D. Neither; the correct answer is 48 cm^2



3)

A bakery's profit model is $P = 3.2c - 250$, where P is profit and c is the number of cakes sold. How many whole cakes must be sold to achieve at least a \$500 profit?

- ☐ A. 156 cakes ☐ C. 235 cakes
☐ B. 172 cakes ☐ D. 281 cakes



4) A student multiplies $(3.5 \times 10^4) \times (2 \times 10^3)$ and gets 7×10^7 . Which is true?

- ☐ A. The exponents should be multiplied to get 10^{12} .
- ☐ B. The coefficient is wrong; should multiply as $3.5 \times 2 = 7$, not separate.
- ☐ C. The student is correct.
- ☐ D. The coefficient should be changed to 0.7.

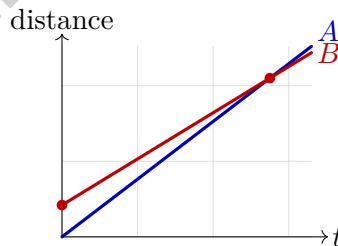
5) Expand $(x + 5)^2$.

- ☐ A. $x^2 + 10x + 25$
- ☐ B. $x^2 + 25$
- ☐ C. $x^2 + 5x + 25$
- ☐ D. $x^2 + 10x + 10$

6) Does the relation $\{(5, 10), (5, 15), (6, 12)\}$ represent a function?

- ☐ A. Yes, because all y -values are positive.
- ☐ B. No, because 5 is paired with two different outputs.
- ☐ C. Yes, because there are three ordered pairs.
- ☐ D. No, because 10 and 15 are both outputs.

7) Function $A(t) = 60t$ (mph). Function B passes through $(0, 1)$ and $(5, 5)$ (on distance-time graph, with t in hours). Which travels faster?

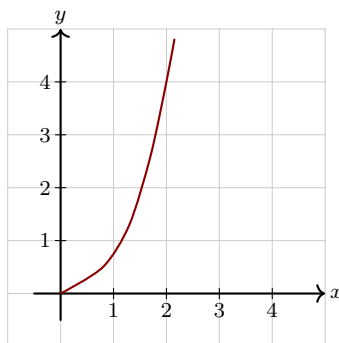


- ☐ A. Function A
- ☐ B. Function B
- ☐ C. Both same speed.
- ☐ D. Cannot be determined.



Scan me!
For more practice
& answers

8) Which graph represents a NONLINEAR function?



☐ A. Yes, the curve is parabolic

☐ B. No, it starts at the origin

☐ C. Yes, it only has positive y -values

☐ D. No, the points are integers

9) If $3^a \cdot 3^5 = 3^{12}$, what is the value of a ?



1) A laptop costs \$1,200 cash. The store's installment offer is \$110/month for 12 months. Which analysis correctly explains why someone might choose installments despite the extra cost?

- ☐ A. Installments save money (\$120 is refunded later) ☐ C. Installments are always cheaper than paying cash
- ☐ B. The store benefits, so customers should too ☐ D. The customer doesn't have \$1,200 cash now but can afford \$110/month

2) A scatter plot shows the relationship between hours studied (x) and test score (y). The line of best fit has the equation $y = 8x + 50$. What does the slope of 8 represent?

- ☐ A. For each hour studied, the test score increases by 8 points on average ☐ C. The y-intercept is 8 units above the origin
- ☐ B. The test score when 8 hours are studied ☐ D. For each point increase in test score, hours studied increases by 8

3) Three similar figures X , Y , and Z have corresponding sides in the ratios $X : Y = 3 : 4$ and $Y : Z = 4 : 7$. If X has a side of 6 cm, what is the length of the corresponding side in Z ?

- ☐ A. 14 cm ☐ C. 8 cm
- ☐ B. 10.5 cm ☐ D. 18 cm

4) Two hikers start from the same point, walking in opposite directions. One walks at 4 mph, the other at 5 mph. After how many hours are they 27 miles apart?



5) Which two perfect squares have $\sqrt{40}$ between them?

☐ A. 25 and 36

☐ C. 49 and 64

☐ B. 64 and 81

☐ D. 36 and 49

6) A fair coin is flipped and a fair die is rolled. What is the probability of getting tails AND rolling a 5 or 6?

☐ A. $\frac{1}{6}$

☐ C. $\frac{2}{18}$

☐ B. $\frac{1}{4}$

☐ D. $\frac{2}{6}$

7)

Decimal Types

Terminating	Repeating
0.5, 0.75	0. $\overline{12}$

Which decimal is rational?

☐ A. 0.123456... (non-repeating)

☐ C. 0.454545... (repeating)

☐ B. π

☐ D. e (Euler's number)

8) Convert $0.2\overline{7}$ to a fraction in simplest form.

☐ A. $\frac{27}{100}$

☐ C. $\frac{27}{90}$

☐ B. $\frac{27}{99}$

☐ D. $\frac{5}{18}$

9) Which is the best estimate of 4π ?

☐ A. 8.0

☐ C. 12.56

☐ B. 10.56

☐ D. 14.0



Scan me!
For more practice
& answers

1) A quadrilateral is rotated 90 degrees counterclockwise about a point. Which of the following is true about the rotated figure?

- ☐ A. The angles change
- ☐ B. The side lengths change
- ☐ C. The figure is congruent to the original
- ☐ D. The figure is similar but not congruent

2) A line passes through (2, 9) and (5, 18). Which equation represents this line?

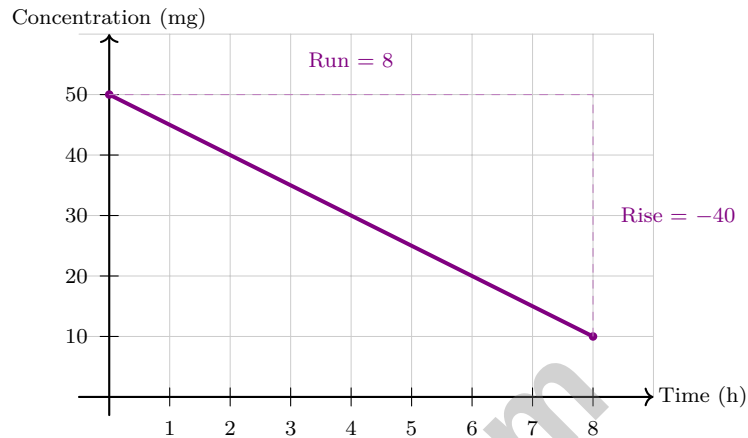
- ☐ A. $y = 3x + 3$
- ☐ B. $y = 3x + 9$
- ☐ C. $y = 2x + 5$
- ☐ D. $y = x + 7$

3) An online music streaming service charges per song. A listener downloads 8 songs for \$9.60. What is the cost per song?

- ☐ A. \$1.00
- ☐ B. \$1.10
- ☐ C. \$1.20
- ☐ D. \$1.30



- 4) A graph shows medication concentration (mg) in the bloodstream versus time (hours). The line passes through (0, 50) and (8, 10).



What is the slope?

- ☐ A. -5 mg/h ☐ C. 5 mg/h
☐ B. $-\frac{1}{2}$ mg/h ☐ D. $\frac{1}{2}$ mg/h
- 5) A student solves: "A jar has pennies and quarters totaling \$5.00 with 40 coins. How many quarters are there?" The student correctly sets up $p + q = 40$ (coins) and $0.01p + 0.25q = 5.00$ (dollars) and solves to get $q \approx 19.17$. Which statement best describes the issue?
- ☐ A. The student should have used cents: $p + 25q = 500$ instead.
☐ B. The student should use elimination instead of substitution.
☐ C. The answer must be a whole number, so the problem statement likely has a typo.
☐ D. The system is correct, and 19.17 quarters is a valid final answer.



Scan me!
For more practice
& answers

Alaska AK STAR Grade 8 Practice Test Answer Keys**How to use this section with a Grade 8 student:**

1. check the answer first and circle any item that needs another look
2. retry the problem with fresh work before reading the explanation
3. write one short lesson learned from each missed or guessed item

A strong review routine turns every correction into a sharper plan for the next Alaska AK STAR practice test.



Scan me!
For more practice
& answers

Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice D is correct.** (8.EE.2) Volume of a cube = $e^3 = 4^3 = 64$ cubic units.
- 2) **Choice B is correct.** (8.G.9) When composites solids touch, the shared face is covered on both objects. It must be subtracted twice (once from each solid's SA). Student B is correct: $96 - 18 = 78 \text{ cm}^2$.
- 3) **Choice C is correct.** (8.SP.3) Set $P = 500$: $500 = 3.2c - 250 \Rightarrow 3.2c = 750 \Rightarrow c = \frac{750}{3.2} \approx 234.4$. Since cakes are whole items, the bakery must sell at least 235 cakes.
- 4) **Choice C is correct.** (8.EE.4) $3.5 \times 2 = 7$ and $10^{4+3} = 10^7$, giving 7×10^7 . The coefficient 7 is already in standard form $[1, 10]$, so no renormalization is needed.
- 5) **Choice A is correct.** (8.EE.7) $(x + 5)^2 = (x + 5)(x + 5) = x^2 + 5x + 5x + 25 = x^2 + 10x + 25$.
- 6) **Choice B is correct.** (8.F.1) Input 5 maps to both 10 and 15, violating the definition of a function.
- 7) **Choice A is correct.** (8.F.2) Speed is the slope. A has slope 60 mph. B has slope $(5 - 1)/(5 - 0) = 4/5 = 0.8$ mph. Since $60 > 0.8$, A travels faster.
- 8) **Choice A is correct.** (8.F.3) A nonlinear function does not form a straight line. This graph shows a parabola (curved shape), characteristic of a quadratic or nonlinear function.
- 9) **The correct answer is 7.** (8.EE.1) Using the product rule, $a + 5 = 12$, so $a = 7$. Verification: $3^7 \cdot 3^5 = 3^{12}$.
- 10) **Choice A is correct.** (8.F.5) The graph shows a spike from 0 to 5 mg in 1 hour, then a gradual decrease from 5 to 2 mg over 3 hours. The steepest positive slope is in the first hour.
- 11) **The correct answer is no solution.** (8.EE.8) The two equations represent lines with the same slope $\frac{1}{2}$ but different y -intercepts (1 and 4), making them parallel. Parallel lines never intersect, so the system has no solution.
- 12) **Choice D is correct.** (8.G.3) Reverse the translation: $(x, y) \rightarrow (x - 3, y + 5)$. So $(4, -2) \rightarrow (4 - 3, -2 + 5) = (1, 3)$.
- 13) **Choice B is correct.** (8.G.5) When parallel lines are cut by a transversal, corresponding angles, alternate interior angles, and alternate exterior angles are all congruent.
- 14) **Choice A is correct.** (8.G.6, 8.G.7) From $(\sqrt{5})^2 + (\sqrt{20})^2 = c^2$, we get $5 + 20 = 25$, so $c = \sqrt{25} = 5$.
- 15) **Choice A is correct.** (8.G.8) Check: $3^2 + 4^2 = 9 + 16 = 25 = 5^2$. This is a Pythagorean triple.
- 16) **The correct answer is 55 units.** (8.EE.7) The inequality is $45 + x \geq 100$. Subtract 45: $x \geq 55$. The worker must complete at least 55 more units.
- 17) **Choice C is correct.** (8.G.9) Volume of a cylinder: $V = \pi r^2 h \approx 3.14 \times 3^2 \times 10 = 3.14 \times 90 = 282.6 \text{ cm}^3$.
- 18) **Choice B is correct.** (8.G.7) Let the smaller angle be x . Then $x + (x + 18) = 90$, so $2x + 18 = 90$, giving $x = 36^\circ$.
- 19) **Choice D is correct.** (8.G.9) For a 12-sided polygon: $(12 - 2) \times 180 = 10 \times 180 = 1800^\circ$.
- 20) **Choice A is correct.** (8.SP.3) The correct denominator for row-conditional frequency is the row total (196), not the column total (112). The student selected the column 'Vegetarian' total by mistake.
- 21) **The correct answer is A, C.** (8.G.7) A is correct: $P(\text{heads}) = \frac{1}{2}$. C is correct: $P(\text{heads and 4}) = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$. B is wrong: $P(4) = \frac{1}{6}$. D is wrong: total outcomes = 12. E is wrong: $P(\text{not heads}) = \frac{1}{2}$.
- 22) **Choice D is correct.** (8.G.8) If $\text{MAD} = 0$, every value must equal the mean exactly, which happens only when all values are the same.
- 23) **Choice D is correct.** (8.G.9) Total tax rate: $15\% + 5\% + 15\% = 35\%$. Net income: $\$5,000 \times (1 - 0.35) = \$5,000 \times 0.65 = \$3,250$.
- 24) **Choice C is correct.** (8.EE.5) Unit rate $k = \frac{48}{2} = 24$ bacteria per hour.
- 25) **Choice A is correct.** (8.F.4) Using $y = mx + b$ with $m = 3$ and point $(1, 7)$: $7 = 3(1) + b \Rightarrow b = 4$. Equation: $y = 3x + 4$.
- 26) **The correct answer is 2.** (8.G.8) Slope = $\frac{1 - (-3)}{2 - 0} = 2$.
- 27) **Choice D is correct.** (8.G.1) Rotation preserves shape and size (rigid motion), so $D'E'F'G'$ is congruent to $DEFG$ and remains a parallelogram. Statements A, B, and C are all true.
- 28) **Choice C is correct.** (8.G.9) $V_A = \frac{1}{3} \times 16 \times 9 = 48 \text{ cm}^3$. $V_B = \frac{1}{3} \times 64 \times 18 = 384 \text{ cm}^3$. Ratio: $\frac{384}{48} = 8$. When linear scale is $2\times$, volume scales by $2^3 = 8\times$.



Scan me!
For more practice
& answers

A Note for a Careful Thinker

Hi, Careful Thinker!

◇ This full-length book gave you ten complete Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. This book gave you room to practice the kind of thinking eighth graders need: modeling linear relationships, solving systems, connecting algebra and geometry, and interpreting data. ◇

★ **Remember this:** The goal was never just to finish pages. The goal was to become the kind of student who knows how to begin, how to adjust, and how to check. ★

Your Careful-Thinking Toolkit

- **Read Twice:** First for the story, second for the math.
- **Label Values:** Give each number a job.
- **Check Signs:** Negatives and inequalities deserve attention.
- **Use Evidence:** Let the work prove the answer.

Grade 8 test-day tip: On test day, underline the question before solving. It keeps your answer aimed at the right target.

If you want to share something or ask a question, please email me at jay@testinar.com.

Jay Daie

Your Math Practice Coach

PRACTICE TODAY. SUCCEED TOMORROW!

This book includes **10** full-length Math practice tests and **2** online tests to help Grade 8 students build confidence, strengthen skills, and excel on standardized assessments.

Each practice test is carefully crafted to reflect the latest standards and includes a variety of question types, realistic test conditions, and detailed answer explanations.

Perfect for classroom use, homework, test preparation, and extra practice at home.



THIS BOOK INCLUDES:

10

Full-Length
Printed Tests

2

Online
Practice Tests



Detailed Answers
& Explanations



MORE PRACTICE. GREATER RESULTS.

Give your child the tools to build strong math skills, confidence, and a positive attitude toward learning.

WHAT YOU'LL GAIN



Build Confidence

Practice regularly to feel prepared and test-ready.



Master Key Skills

Develop strong math skills and problem solving abilities.



Improve Understanding

Learn with clear explanations and step-by-step solutions.



Test Strategies

Learn proven strategies to approach every question with confidence.



Boost Performance

Apply your knowledge and achieve your best score!

TOPICS COVERED

- ✓ The Number System
- ✓ Expressions & Equations
- ✓ Inequalities
- ✓ Functions
- ✓ Geometry
- ✓ Ratios & Proportions
- ✓ Statistics & Probability
- ✓ Data Analysis
- ✓ Measurement
- ✓ Pythagorean Theorem
- ✓ Surface Area & Volume
- ✓ And More!



2 ONLINE TESTS

Use these two additional online practice tests for extra review after the printed tests in this book.



2 EXTRA ONLINE TEST ACCESS CODE IS INSIDE THE BOOK!

Don't lose it—your extra practice and success start here!



PRACTICE
REGULARLY



STAY
FOCUSED



SOLVE
CONFIDENTLY



SUCCEED
BRIGHTLY