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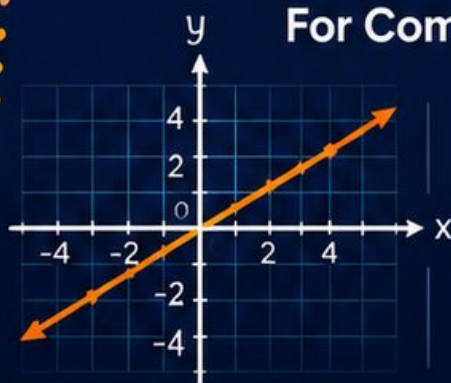
Alaska AK STAR

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$$A = \pi r^2$$
$$C = 2\pi r$$
$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}b^2 h$$



8

 PRINTED
TESTS

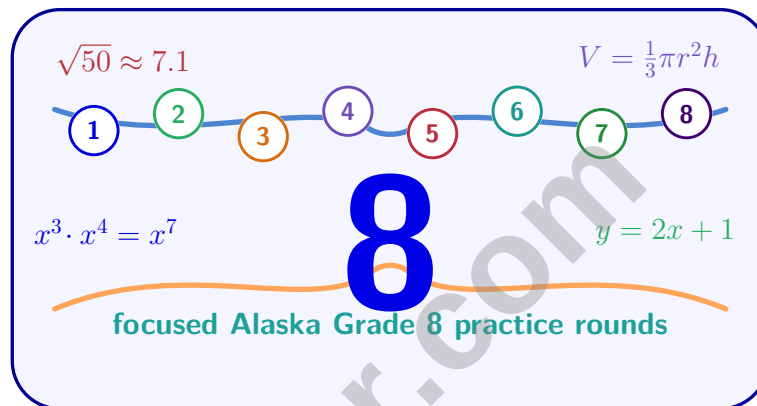
2

 ONLINE
TESTS

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

8 Alaska AK STAR Grade 8 Math Practice Tests

Standards-Aligned Alaska Practice for Functions, Geometry, and Data



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

Jay Daie and Reza Nazari



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Welcome, Alaska Grade 8 Problem Solver!

Eight focused rounds for sharper AK STAR math thinking

This book gives you eight full Grade 8 AK STAR math practice tests. Each round is built to help you recognize structure, reason with real numbers and exponents, analyze linear relationships, connect equations with graphs, and explain your thinking with care.

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

An eight-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 an exponent rule, equation, graph, transformation, diagram, 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.

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?

Eight AK STAR tests, 320 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Real and irrational numbers, integer exponents, scientific notation, equations, and careful reading.
Tests 4–6	Slope, systems of equations, functions, inequalities, transformations, congruence, and similarity.
Tests 7–8	Pythagorean reasoning, volume, data analysis, linear models, probability, mixed review, and stamina.
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.



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& answers

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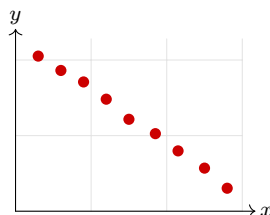
1) The line through $(a, 2)$ and $(3, 8)$ has slope 2. What is the value of a ?

☐ A. 0

☐ C. 2

☐ B. 1

☐ D. 6



2)

A scatter plot of battery life (hours) versus daily phone usage (hours) shows points forming a tight downward trend from upper left to lower right. What does this pattern tell you?

☐ A. Battery life improves with more usage

☐ C. Weak relationship between usage and battery

☐ B. Phone usage does not affect battery life

☐ D. Increased usage is associated with shorter battery life

3) A function shows distance from home vs. time. The distance is zero at time $t = 0$, increases to a maximum of 150 miles at $t = 2$, then decreases back to zero at $t = 4$. Is this best described as one linear function or a piecewise linear function?

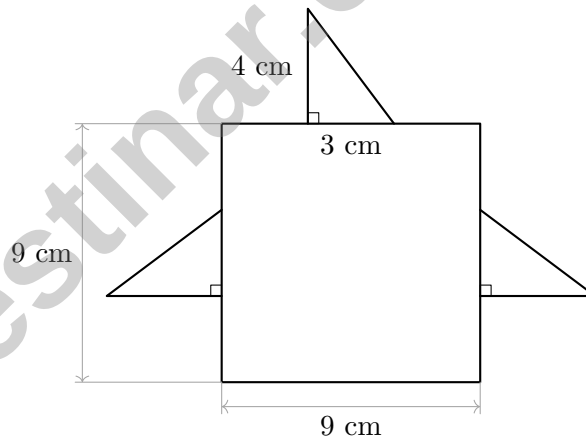


- 4) A right triangle has legs of 9 units and 40 units. What is the length of the hypotenuse?

- 5) Two square pyramids have the same height (10 cm). Pyramid X has a base edge of 3 cm; Pyramid Y has a base edge of 6 cm. What is the ratio of Pyramid X's volume to Pyramid Y's volume?

☐ A. 1 : 2☐ C. 2 : 1☐ B. 1 : 4☐ D. 1 : 3

- 6) A composite figure has a square base (9 cm by 9 cm) with three congruent right triangles on three sides (base 3 cm, height 4 cm each). What is the total area?

☐ A. 81 cm²☐ C. 117 cm²☐ B. 99 cm²☐ D. 126 cm²

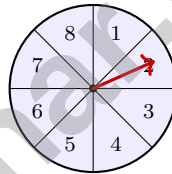
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- 7) In a survey of 200 people on movie preferences, 120 prefer comedy. Of those who prefer comedy, 84 are female. What is the relative frequency of females among comedy-lovers?

☐ A. 0.42 ☐ C. 0.70
☐ B. 0.60 ☐ D. 0.84

- 8) The line of best fit for a dataset is $y = -3x + 48$. At what value of x is y equal to 12?

- 9) A spinner is divided into 8 equal sections. If a student spins it once, what is the probability of landing on a specific section?



☐ A. $\frac{8}{1}$ ☐ C. $\frac{1}{2}$
☐ B. $\frac{1}{8}$ ☐ D. $\frac{1}{4}$

- 10) A student is asked: "There are 6 routes from city A to city B, and 5 routes from city B to city C. How many different routes from A to C through B are there?" The student writes: $6 + 5 = 11$. What is the correct answer?

☐ A. 11 (student is correct) ☐ C. 1 (routes are not independent)
☐ B. 30 (use Counting Principle: 6×5) ☐ D. $6^5 = 7,776$



1) What is the sum of the interior angles of an octagon?

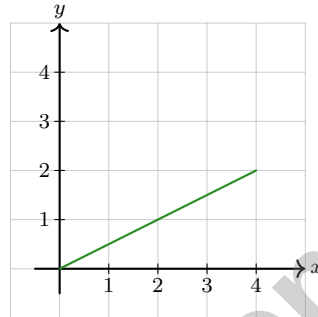
☐ A. 1350°

☐ C. 1260°

☐ B. 900°

☐ D. 1080°

2) Which of the following graphs shows a LINEAR function?



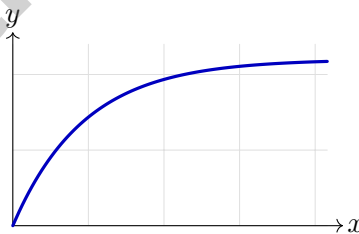
☐ A. No, the slope is less than 1

☐ C. No, only if it passes through the

☐ B. No, because the rate of change
varies

origin
☐ D. Yes, the line is straight

3) Which real-world scenario matches: graph starts at origin, rises steeply, then gradually levels off?



☐ A. A plant growing slower and slower
as it matures

☐ C. Water flowing out of a tank at
constant rate

☐ B. A car accelerating uniformly over
time

☐ D. A ball rolling down a ramp with no
friction



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4) Which triangle is NOT a right triangle?

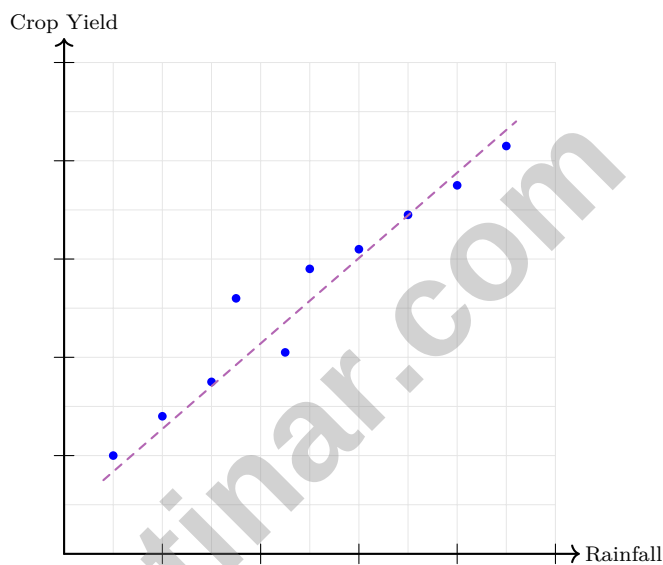
☐ A. sides 5, 12, 13

☐ C. sides 8, 15, 17

☐ B. sides 3, 4, 5

☐ D. sides 7, 8, 9

5) A scatter plot of rainfall versus crop yield shows $r = 0.68$. A farmer reads this and concludes: “**More rain always means higher yields.**” Is this conclusion reasonable?



☐ A. No; correlation of 0.68 indicates a moderate relationship, not always

☐ C. No; rainfall has no effect on yields at all

☐ B. Yes; positive correlation means the relationship always holds

☐ D. Yes; any positive correlation guarantees the outcome



- 1) A two-way table categorizes 150 households by income level and internet access:

	Has Internet	No Internet	Total
Low Income	40	50	90
High Income	55	5	60
Total	95	55	150

Among high-income households, what is the relative frequency of those without internet, as a decimal?

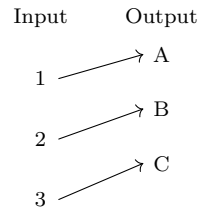
- ☐ A. 0.033 ☐ C. 0.367
☐ B. 0.083 ☐ D. 0.917
- 2) If a figure is rotated 360° about the origin, what happens to the figure?
- ☐ A. It is reduced in size by one-fourth ☐ D. It returns to its original position
☐ B. It is reflected across the origin and orientation
☐ C. It moves to a different quadrant
- 3) A gardener's budget is $B = 50x + 75y$, where x is the number of seed packets and y is the number of tools. The gardener can spend at most \$300. Which inequality represents this constraint?
- ☐ A. $50x + 75y \leq 300$ ☐ C. $50x + 75y < 300$
☐ B. $50x + 75y \geq 300$ ☐ D. $50x + 75y > 300$
- 4) Identify the system with no solution.
- ☐ A. $y = \frac{1}{2}x + 1$ and $y = \frac{1}{2}x - 3$ ☐ C. $y = \frac{1}{2}x + 1$ and $x - 2y = -2$
☐ B. $y = \frac{1}{2}x + 1$ and $y = -2x + 1$ ☐ D. $y = \frac{1}{2}x + 1$ and $2y = x + 2$



5) A student expands $(x + 2)(x + 3)$ and writes $x^2 + 5x + 6$. Is this correct?

- ☐ A. Yes, it is correct. ☐ C. No; the middle term is wrong.
☐ B. No; the constant term is wrong. ☐ D. No; all terms are wrong.

6) Analyze this mapping and determine if it is a function:



- ☐ A. Yes, this is a function. ☐ C. No, because there are three inputs and three outputs.
☐ B. No, because inputs are numbers and outputs are letters. ☐ D. Yes, but only if each input is positive.

7) Missing value problem: Function through $(2, 9)$ and $(5, 24)$ has what equation?

- ☐ A. $y = 5x - 1$ ☐ C. $y = 3x + 3$
☐ B. $y = 5x + 1$ ☐ D. $y = 6x - 3$



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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.



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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice A is correct.** (8.EE.6) Using slope formula: $2 = \frac{8-2}{3-a}$, so $2(3-a) = 6$, giving $6-2a = 6$, thus $a = 0$.
- 2) **Choice D is correct.** (8.SP.1) The tight downward trend shows a strong negative association: as phone usage increases, battery life decreases. This is a clear negative correlation pattern.
- 3) **The correct answer is piecewise linear.** (8.F.5) If the distance increases at a constant rate for 2 hours and then decreases at a (possibly different) constant rate for 2 hours, it is piecewise linear. If the rate of change is not constant throughout, it is nonlinear (e.g., if the curve is smooth like a parabola).
- 4) **The correct answer is 41.** (8.G.6, 8.G.7) Using the Pythagorean Theorem: $9^2 + 40^2 = 81 + 1600 = 1681$, so $c = \sqrt{1681} = 41$ units (the 9-40-41 triple).
- 5) **Choice B is correct.** (8.G.9) $V_X = \frac{1}{3} \times 9 \times 10 = 30 \text{ cm}^3$. $V_Y = \frac{1}{3} \times 36 \times 10 = 120 \text{ cm}^3$. Ratio: $\frac{30}{120} = 1 : 4$.
- 6) **Choice B is correct.** (8.G.1) Decompose: square plus triangles. Square area = $9 \times 9 = 81 \text{ cm}^2$. Each right triangle area = $\frac{1}{2} \times 3 \times 4 = 6 \text{ cm}^2$. Three triangles total = 18 cm^2 . Total area = $81 + 18 = 99 \text{ cm}^2$.
- 7) **Choice C is correct.** (8.SP.3) Relative frequency of females among comedy-lovers: $\frac{84}{120} = 0.70$. This is a row-conditional frequency.
- 8) **The correct answer is 12.** (8.SP.3) Set $y = 12$: $12 = -3x + 48 \Rightarrow -3x = -36 \Rightarrow x = 12$.
- 9) **Choice B is correct.** (8.G.7) Each of the 8 equal sections has probability $\frac{1}{8}$.
- 10) **Choice B is correct.** (8.NS.2) The student made an error by adding. Since each route A-B can combine with any route B-C, we multiply: $6 \times 5 = 30$. This is the Counting Principle for independent choices.
- 11) **Choice B is correct.** (8.SP.2) Shoe size and favorite color have no clear logical or numerical relationship, so we would expect no meaningful correlation.
- 12) **Choice D is correct.** (8.NS.3) Circumference = $2\pi r = 2 \times 3.14 \times 2 = 12.56 \text{ m}$.
- 13) **Choice D is correct.** (8.NS.2) Since $4^2 = 16$ and $5^2 = 25$, and $16 < 18 < 25$, we have $4 < \sqrt{18} < 5$. More precisely, $\sqrt{18} \approx 4.24$.
- 14) **Choice D is correct.** (8.NS.2) $100x - 10x = 37.\overline{7} - 3.\overline{7} = 34$. The repeating parts cancel, leaving $90x = 34$.
- 15) **Choice D is correct.** (8.NS.2) $5^2 = 25$ and $6^2 = 36$. The midpoint is $(5.5)^2 = 30.25$. Since $30 < 30.25$, we have $\sqrt{30} < 5.5$, so it rounds to 5.
- 16) **Choice A is correct.** (8.EE.7) Expand: $2x + 6 = 3x - 3$. Subtract $2x$ and add 3: $9 = x$, so $x = 9$.
- 17) **Choice D is correct.** (8.EE.3) Divide coefficients and subtract exponents: $\frac{8.4}{2.1} = 4$ and $10^{6-3} = 10^3$, giving 4×10^3 .
- 18) **The correct answer is A, C.** (8.F.3) A: $y = 6x - 2$ has the form $y = mx + b$ (linear). C: $y = -x + 9$ is also in the form $y = mx + b$ (linear). B has a cubic term, D has a reciprocal, and E has a square root, making B, D, and E nonlinear.
- 19) **Choice A is correct.** (8.EE.7) Subtract 2: $3x \geq -6$. Divide by 3: $x \geq -2$.
- 20) **Choice A is correct.** (8.F.2) Slope of r : $(7-3)/(3-1) = 4/2 = 2$. Slope of s : 1. Since $2 > 1$, r increases faster.
- 21) **Choice B is correct.** (8.G.7) Vertical angles are congruent. Adjacent angles are supplementary: $180 - 72 = 108^\circ$. The four angles are $72^\circ, 108^\circ, 72^\circ, 108^\circ$.
- 22) **Choice C is correct.** (8.G.9) $A = 5000(1.06)^2 = 5000 \times 1.1236 = \$5,618$.
- 23) **Choice D is correct.** (8.EE.1) Numerator: $g^8 \cdot g^{-2} = g^6$. Then $\frac{g^6}{g^3} = g^3$.
- 24) **Choice D is correct.** (8.EE.2) $\sqrt{40}$ is irrational because 40 is not a perfect square. The others equal 5, 10, and 12 respectively.
- 25) **Choice C is correct.** (8.EE.4) Check: $\frac{5}{1.5} \approx 3.33$ and $10^{-15-(-20)} = 10^5$. So the answer is approximately 3.3×10^5 .
- 26) **Choice D is correct.** (8.EE.5) At (4, 9), the ratio $y : x = 9 : 4$. This is equivalent to $2.25 : 1$. Slope $k = 9/4 = 2.25$.
- 27) **Choice A is correct.** (8.EE.8) When two distinct lines do not intersect (parallel lines), they have no points in common, so the system has no solution.



One Last Encouragement

Hi, Determined Student!

◇ You did meaningful Grade 8 practice. That matters because confidence is built through action, not waiting until everything feels easy. This wide-ranging book gave you eight serious Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. ◇

★ **Remember this:** Carry this with you: you can learn hard things by breaking them into steps, asking good questions, and reviewing with honesty. ★

Take This With You

- **You Can Start:** Even when the problem looks big.
- **You Can Adjust:** When the first method is not enough.
- **You Can Learn:** From every corrected mistake.
- **You Can Improve:** One practice session at a time.

Grade 8 test-day tip: Walk into test day ready to think, not ready to be perfect. Thinking clearly is the goal.

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

Jay Daie

Your Grade 8 Math Friend

PRACTICE TODAY, SUCCEED TOMORROW!

Give your child the confidence and skills they need with **8 full-length Grade 8** Math practice tests that mirror real test formats and cover all key math standards. Perfect for building skills, strengthening problem-solving abilities, and achieving success on test day!

WHAT'S INSIDE?



STANDARDS-ALIGNED PRACTICE

Questions designed to cover essential Grade 8 math standards.



VARIETY OF QUESTION TYPES

Multiple-choice, short answer, and more to build well-rounded skills.



REAL-WORLD APPLICATIONS

Engaging problems that connect math to everyday life.



STEP-BY-STEP PROGRESS

Track improvement and build confidence with every test.



BUILD SKILLS & BOOST CONFIDENCE

Strengthen understanding and feel prepared for test day.



COVERS ALL ESSENTIAL TOPICS

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



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More Practice. More Confidence.
Better Results.