

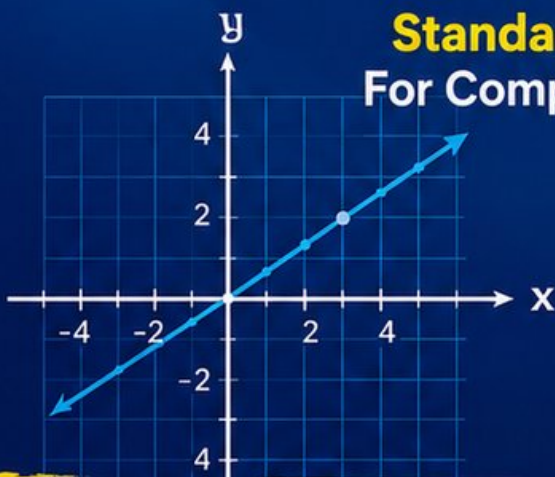
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Alaska
AK STAR

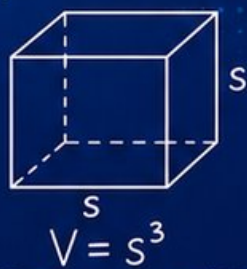
Grade 8

MATH

PRACTICE TESTS

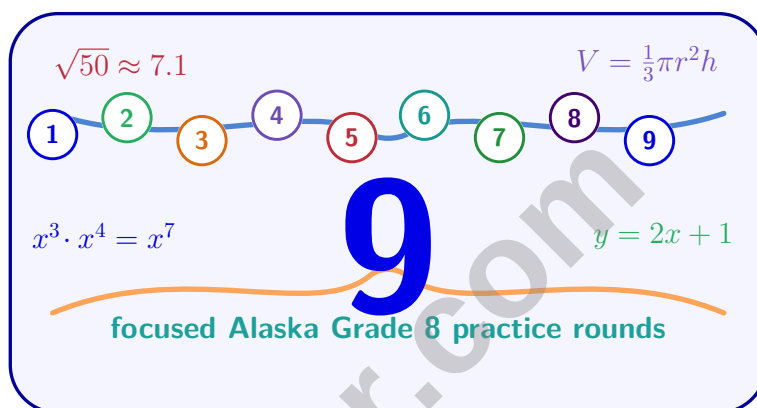
Standards Aligned Problem Solving
For Comprehensive Assessment Programs

$$2x + 3y = 12$$
$$y = mx + b$$

9 PRINTED
TESTS2 ONLINE
TESTSUse these **two additional online practice tests** for extra review after the printed tests in this book.

9 Alaska AK STAR Grade 8 Math Practice Tests

Focused Alaska Review for Linear Models, Transformations, Statistics, and Volume



Nine 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!

Nine focused rounds for sharper AK STAR math thinking

This book gives you nine 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

A nine-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?

Nine AK STAR tests, 360 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 7–9	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.

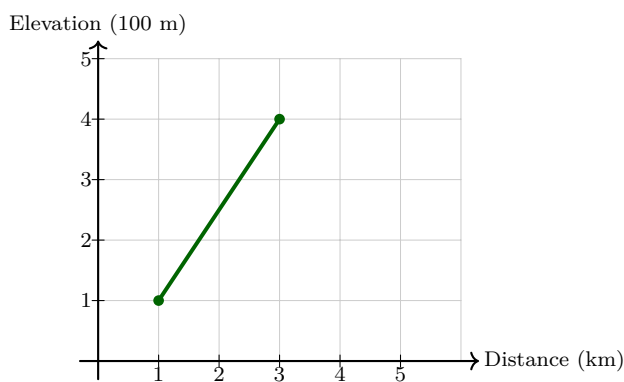


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Table of Contents

★ Practice Test 1	_____	14
★ Practice Test 2	_____	31
★ Practice Test 3	_____	47
★ Practice Test 4	_____	62
★ Practice Test 5	_____	79
★ Practice Test 6	_____	94
★ Practice Test 7	_____	108
★ Practice Test 8	_____	125
★ Practice Test 9	_____	143
Practice Test Answer Keys	_____	159
Practice Test Answers and Explanations	_____	165

1) The graph shows elevation change during a hike.

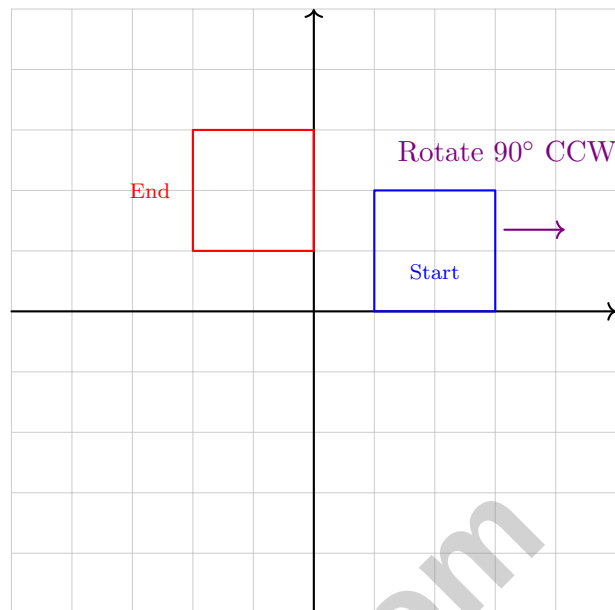


What is the slope of the line?

- ☐ A. $\frac{3}{4}$
- ☐ B. $\frac{2}{3}$

- ☐ C. $\frac{3}{2}$
- ☐ D. 2





2)

After the rotation shown, which of the original vertices maps to the new vertex at $(-2, 3)$?

☐ A. $(1, 0)$
☐ C. $(3, 2)$
☐ B. $(3, 0)$
☐ D. $(1, 2)$

3) A virus has diameter 1.2×10^{-7} m. Bacteria has diameter 8×10^{-6} m. How many times larger is the bacterium than the virus?



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4) What is the slope of the line that passes through (5, 2) and (5, 7)?

☐ A. 0

☐ C. Undefined

☐ B. 1

☐ D. 5

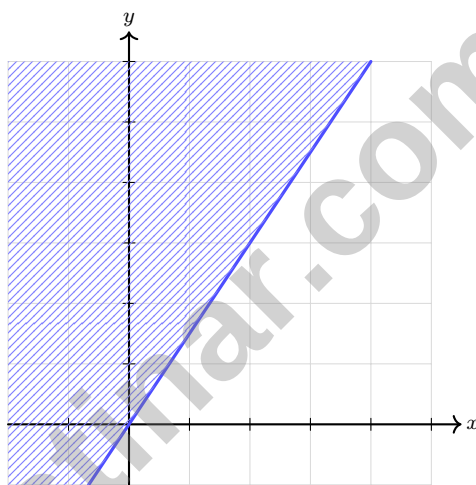
5) A plumber charges a \$50 service call fee plus \$40 per hour. If the total bill is \$170, which equation represents the time worked (in hours)?

☐ A. $50 + 40h = 170$

☐ C. $40 + 50h = 170$

☐ B. $50h + 40 = 170$

☐ D. $50 \times 40 = 170h$



6)

Which inequality does this graph show?

☐ A. $y > 1.5x$

☐ C. $y \geq 1.5x$

☐ B. $y < 1.5x$

☐ D. $y \leq 1.5x$

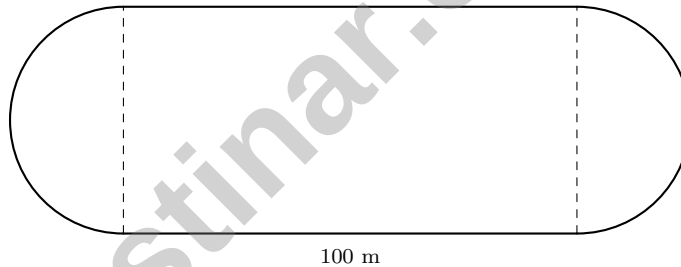


- 1) Using the model $y = 2x - 3$, suppose the actual data point is $(5, 7)$, but the model predicts $y = 7$ at $x = 5$. What is the residual (error)?

☐ A. 0☐ C. -2 ☐ B. 2☐ D. 7

- 2) A piggy bank has nickels and dimes totaling \$2.75. There are twice as many dimes as nickels. How many nickels are in the bank?

- 3) A running track is composed of a rectangle (100 m by 50 m) with two semicircles on the short ends (diameter 50 m each). Find the total perimeter of the track.

☐ A. 300 m☐ C. 378.5 m☐ B. 357 m☐ D. 400 m

- 4) Two-way table of 200 employees and training completion:

	Completed	Incomplete	Total
Salaried	96	24	120
Hourly	56	24	80
Total	152	48	200

What is the relative frequency of incomplete training among all employees?

☐ A. $\frac{24}{120} = 0.20$

☐ B. $\frac{48}{200} = 0.24$

☐ C. $\frac{24}{80} = 0.30$

☐ D. $\frac{48}{120} = 0.40$

- 5) Data set: {100, 102, 104, 106, 108} (mean = 104). Calculate MAD.

☐ A. 1.6

☐ B. 2

☐ C. 3

☐ D. 2.4

- 6) A bag contains 10 cards: 6 red and 4 blue. Two cards are drawn without replacement. What is the probability of drawing a red card first and another red card second?

☐ A. $\frac{36}{100}$

☐ B. $\frac{5}{9}$

☐ C. $\frac{1}{3}$

☐ D. $\frac{15}{90}$

- 7) An event coordinator needs to select a chairperson from 4 candidates, a secretary from 5 candidates, and a treasurer from 3 candidates. How many different leadership teams can be formed?

☐ A. $4 + 5 + 3 = 12$

☐ B. $4 \times 5 \times 3 = 60$

☐ C. $5^{4+3} = 5^7$

☐ D. $(4 + 5) \times 3 = 27$



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1) $(2 \times 10^2) \times (3 \times 10^3) \times (5 \times 10^1) = ?$

☐ A. 3×10^6

☐ C. 3×10^7

☐ B. 3×10^8

☐ D. 3×10^5

2) A cylindrical storage tank has a radius of 2.5 m and height of 4 m. What is the total surface area (including top and bottom)? Use $\pi \approx 3.14$.

☐ A. 62.8 m^2

☐ C. 102.05 m^2

☐ B. 82.25 m^2

☐ D. 128.1 m^2

3) A plant height model is $h = 3t + 8$, where h is height in inches and t is time in weeks. If the data only covers weeks 1 through 10, would predicting the height at week 15 be interpolation or extrapolation?

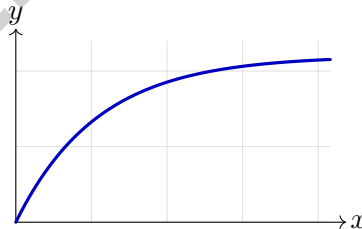
☐ A. Interpolation, because 15 is within the range

☐ C. Interpolation, because we can always predict

☐ B. Neither, because the model breaks down

☐ D. Extrapolation, because 15 is outside the data range

4) Which scenario matches a graph that rises steeply at first, then gradually?

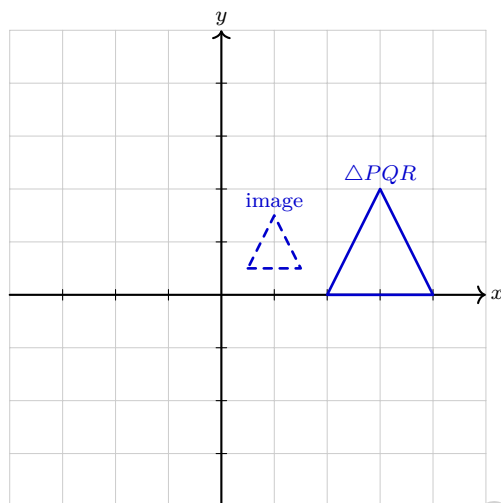

☐ A. A balloon inflating at a constant rate

☐ C. A car accelerating then cruising at constant speed

☐ B. Compound interest earning accelerating returns

☐ D. Learning a new skill (fast gains, then slower progress)


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5)

The solid blue triangle PQR is dilated to form the dashed blue image. What is the scale factor?

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

6) What is the measure of each angle in an equilateral triangle?

☐ A. 30° ☐ C. 60° ☐ B. 45° ☐ D. 90°

7) Does a triangle with sides 6, 8, 9 form a right triangle?

☐ A. Yes, because $6 + 8 > 9$ ☐ D. No, because the sides are different lengths☐ B. No, because $6^2 + 8^2 \neq 9^2$ ☐ C. Yes, because it is a Pythagorean triple

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 C is correct.** (8.EE.8) From (1, 1) to (3, 4): $\text{slope} = \frac{4-1}{3-1} = \frac{3}{2}$.
- 2) **Choice C is correct.** (8.G.1) A 90° CCW rotation uses $(x, y) \rightarrow (-y, x)$. So $(3, 2) \rightarrow (-2, 3)$.
- 3) **The correct answer is 66.67.** (8.EE.3) Divide: $\frac{8 \times 10^{-6}}{1.2 \times 10^{-7}} = \frac{8}{1.2} \times 10^1 = 6.67 \times 10^1 \approx 66.67$.
- 4) **Choice C is correct.** (8.EE.6) Both points have the same x -coordinate, making this a vertical line. Vertical lines have undefined slope.
- 5) **Choice A is correct.** (8.EE.7) Base fee is \$50, hourly rate is \$40 per hour, total is \$170. Equation: $50 + 40h = 170$. Solving: $40h = 120 \Rightarrow h = 3$ hours.
- 6) **Choice C is correct.** (8.G.8) SOLID line (includes boundary) and shading ABOVE indicate $y \geq 1.5x$.
- 7) **Choice D is correct.** (8.NS.3) $\sqrt{12} = 2\sqrt{3} \approx 3.46 < 3.5$.
- 8) **Choice A is correct.** (8.EE.8) Check (3, 1): $2(3) - 1 = 5$ ✓ and $3 + 2(1) = 5$ ✓. Both equations are satisfied.
- 9) **Choice A is correct.** (8.EE.7) "Product of a number and -2 " is $-2x$; "greater than 8" is > 8 .
- 10) **Choice A is correct.** (8.EE.7) Area = $(2x + 1)(x + 3) = 2x^2 + 6x + x + 3 = 2x^2 + 7x + 3 \text{ m}^2$.
- 11) **Choice B is correct.** (8.F.1) The segment starts at $x = 0$ and ends at $x = 4$. The domain includes all x -values in this range: $[0, 4]$.
- 12) **Choice C is correct.** (8.F.2) A grows at 50/hr. B grows at $(150 - 50)/2 = 50/\text{hr}$. Both equal.
- 13) **The correct answer is 12.** (8.NS.2) Since $12 \times 12 = 144$, $\sqrt{144} = 12$.
- 14) **Choice B is correct.** (8.G.3) A 270° counterclockwise rotation (or 90° clockwise) maps $(x, y) \rightarrow (y, -x)$.
- 15) **Choice C is correct.** (8.G.5) Let the angles be $2x$, $3x$, and $4x$. Sum: $2x + 3x + 4x = 180$, so $9x = 180$ and $x = 20^\circ$. Smallest angle: $2x = 40^\circ$.
- 16) **Choice B is correct.** (8.G.7) Let the complement be x . Then $(x + 25) + x = 90 \Rightarrow 2x + 25 = 90 \Rightarrow 2x = 65 \Rightarrow x = 32.5^\circ$.
- 17) **Choice C is correct.** (8.G.9) Each interior angle of a regular hexagon is $\frac{(6-2) \times 180}{6} = \frac{720}{6} = 120^\circ$.
- 18) **Choice D is correct.** (8.SP.1) These points deviate significantly from the trend and warrant investigation (e.g., career changes, health issues, recent graduates).
- 19) **The correct answer is A,B.** (8.G.8) Using the Pythagorean Theorem, $9^2 + 40^2 = 81 + 1600 = 1681$, so the hypotenuse is $\sqrt{1681} = 41$ units. C is false because $9 + 40 = 49$, not 41. D is false because the squares of the legs are needed. E is false because $41 > 40$.
- 20) **Choice C is correct.** (8.G.9) Interest: $I = 15000 \times 0.07 \times 5 = \$5,250$.
- 21) **Choice D is correct.** (8.EE.1) Multiply exponents: $(p^{-2})^3 = p^{-2 \cdot 3} = p^{-6}$.
- 22) **Choice C is correct.** (8.EE.2) Area of a square = $s^2 = 11^2 = 121 \text{ cm}^2$.
- 23) **Choice C is correct.** (8.EE.4) Divide coefficients: $5 \div 2.5 = 2$. Subtract exponents: $10^{-2 - (-5)} = 10^3$. Result: 2×10^3 .
- 24) **Choice C is correct.** (8.EE.5) Slope $k = \frac{8}{3}$. Equation: $y = \frac{8}{3}x$. At $x = 6$: $y = \frac{8}{3}(6) = 16$.
- 25) **Choice B is correct.** (8.F.3) The y -differences are $16 - 10 = 6$, $22 - 16 = 6$, $28 - 22 = 6$. Since x changes by 2 each time, the rate of change is $\frac{6}{2} = 3$, constant and linear.
- 26) **Choice A is correct.** (8.F.4) Initial balance \$50 (intercept). Monthly deposit \$10 (slope). Equation: $B = 10m + 50$.
- 27) **Choice A is correct.** (8.F.5) The graph rises from (0, 2) to (4, 5), then falls from (4, 5) to (6, 1). Its greatest y -value is 5, and the y -intercept is 2, so choice A is the only correct set.
- 28) **Choice C is correct.** (8.G.1) Side $AC = 11$ in is the longest side in triangle ABC. In congruent triangle DEF, side DF must be the longest side (11 in), so AC corresponds to DF .
- 29) **The correct answer is $\frac{37}{300}$.** (8.NS.2) Set $x = 0.12\overline{3} = 0.12333\dots$. Then $100x = 12.\overline{3}$ and $1000x = 123.\overline{3}$. Subtracting: $900x = 111$, so $x = \frac{111}{900} = \frac{37}{300}$.
- 30) **Choice C is correct.** (8.G.6, 8.G.7) Check option C: $9^2 + 12^2 = 81 + 144 = 225 = 15^2$. This is the 3-4-5 triple scaled by 3.



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You Know More Than You Think

Hi, Skilled Learner!

◇ After working through Grade 8 practice, you now have more tools than you may realize: models, formulas, graphs, equations, and reasoning habits. ◇

★ **Remember this:** The next step is learning when to use each tool. That comes from practice, review, and the courage to try a method even when you are unsure. This version gave you 9 opportunities to rehearse test-day habits. ★

Tools You Can Use

- **Models:** Make relationships visible.
- **Equations:** Represent unknowns clearly.
- **Graphs:** Show change and location.
- **Formulas:** Organize measurement problems.

Grade 8 test-day tip: Before solving, name the tool you plan to use. That small choice makes your work more intentional.

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

Jay Daie

Your Skill-Building Coach

CONFIDENCE TODAY, SUCCESS TOMORROW!

GRADE

8

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- | | |
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| ✓ Expressions & Equations | ✓ Pythagorean Theorem |
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| ✓ Linear Equations | ✓ Transformations |
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