

ALASKA AK STAR

GRADE 8 MATH

PRACTICE TESTS

5

PRINTED
TESTS



2

 ONLINE
TESTS

**Standards Aligned
Problem Solving For
Comprehensive Assessment Programs**



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



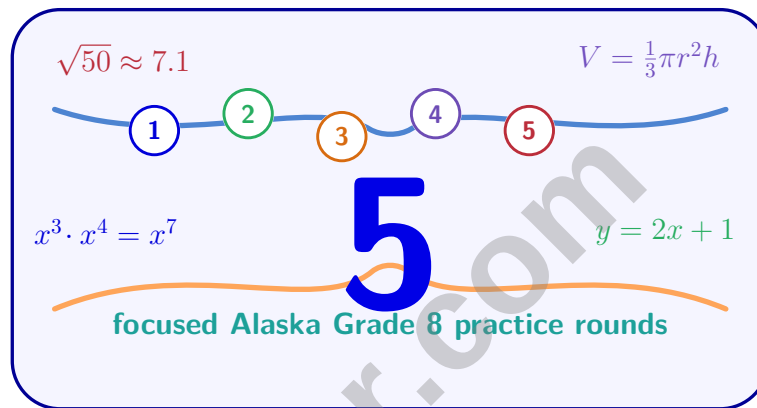
$$a^2 + b^2 = c^2$$



$$y = mx + b$$

5 Alaska AK STAR Grade 8 Math Practice Tests

Five AK STAR Rounds for Functions, Geometry, and Data



Five 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!

Five focused rounds for sharper AK STAR math thinking

This book gives you five 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 five-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?

Five AK STAR tests, 200 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 3–5	Functions, systems, transformations, geometry, data analysis, and multi-step problem solving.
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.



Scan me!
For more practice
& answers

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1) Triangle XYZ has angle measures of $45^\circ, 60^\circ, 75^\circ$. Triangle ABC is congruent to triangle XYZ. What are the angle measures of triangle ABC?

☐ A. $30^\circ, 60^\circ, 90^\circ$

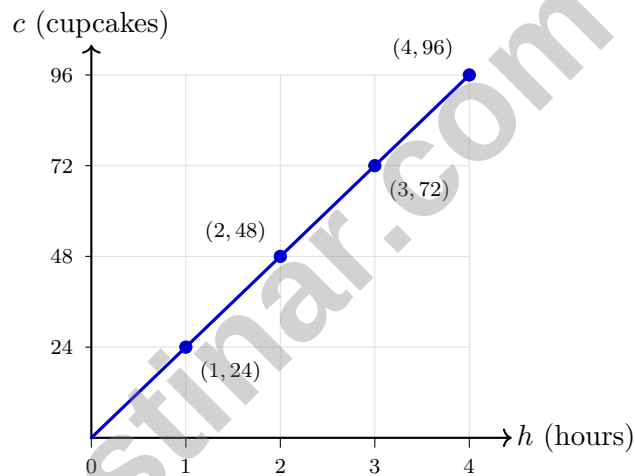
☐ C. $50^\circ, 65^\circ, 65^\circ$

☐ B. $45^\circ, 60^\circ, 75^\circ$

☐ D. $40^\circ, 60^\circ, 80^\circ$

2) A baker prepares cupcakes. The table shows the number of cupcakes c after h hours of baking:

Hours (h)	1	2	3	4
Cupcakes (c)	24	48	72	96



Which equation represents the relationship?

☐ A. $c = 24h$

☐ C. $c = h + 24$

☐ B. $c = 24h + 1$

☐ D. $c = 48h$



3) A pizza costs \$12 for each large pizza. How much do 3.5 large pizzas cost?

☐ A. \$36

☐ C. \$42

☐ B. \$39

☐ D. \$45

4) A temperature drops 4 degrees every 2 hours. What is the slope?

☐ A. $\frac{1}{2}$ degrees per hour

☐ C. 2 degrees per hour

☐ B. 4 degrees per hour

☐ D. -2 degrees per hour

5) A trapezoid has a top base of 5 cm, a bottom base of 9 cm, and two equal legs. If the perimeter is 30 cm, what is the length of each leg?

☐ A. 6 cm

☐ C. 8 cm

☐ B. 7 cm

☐ D. 9 cm

6) The table shows $f(x)$. If $f(x) = 8$, what is x ?

x	1	2	3	4
$f(x)$	4	6	8	10

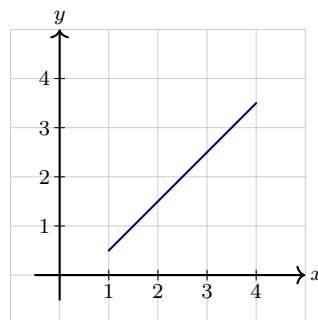
☐ A. 1

☐ C. 3

☐ B. 2

☐ D. 4

7) Which graph BEST represents a linear function?

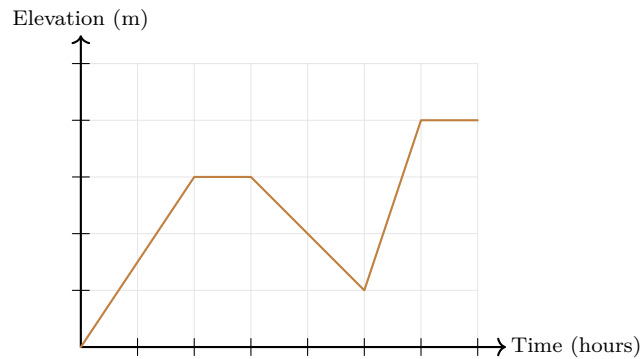

☐ A. The curved path

☐ C. Only if it starts at origin

☐ B. The straight line shown

☐ D. The slopes of individual segments


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8)

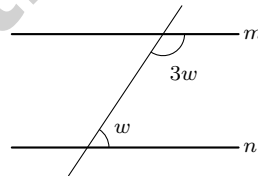
A hiker starts at sea level. Which part of the journey involves going downhill?

- ☐ A. From 0 to 2 hours ☐ C. From 3 to 5 hours
☐ B. From 2 to 3 hours ☐ D. From 5 to 7 hours

9) Which transformation rule represents a reflection across the y -axis?

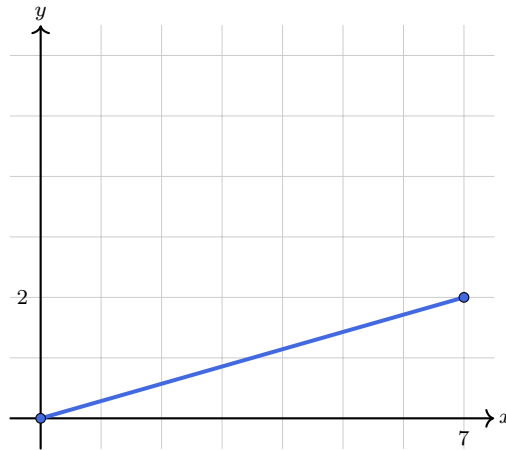
- ☐ A. $(x, y) \rightarrow (x, -y)$ ☐ C. $(x, y) \rightarrow (y, x)$
☐ B. $(x, y) \rightarrow (-x, y)$ ☐ D. $(x, y) \rightarrow (-x, -y)$

10) Parallel lines m and n are cut by a transversal t . One co-interior angle is three times the other. If the smaller angle is w° , what is w ?



- ☐ A. 30° ☐ C. 45°
☐ B. 40° ☐ D. 60°





1)

The slope is approximately:

☐ A. 3.5

☐ C. 0.29

☐ B. 0.43

☐ D. 2.86

2) Function $m(x) = -2x + 5$ compared to the x -axis. Which statement about this function is true?

☐ A. Slope is positive and y -intercept is negative

☐ C. Slope is negative and y -intercept is negative

☐ B. Slope is negative and y -intercept is positive

☐ D. Slope is positive and y -intercept is positive

3) A table shows that when $x = 1$, $y = 7$ and when $x = 5$, $y = 23$. What is the slope?

x	1	5
y	7	23

☐ A. 4

☐ C. $\frac{1}{4}$
☐ B. 8

☐ D. 16


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4) A ladder leans against a wall. The slope of the ladder line is undefined. What does this indicate?

- ☐ A. The ladder is horizontal ☐ C. The ladder is at a 45° angle
☐ B. The ladder is on the ground ☐ D. The ladder is vertical

5) Alice, Bob, and Clara are three friends. Alice is twice as old as Bob. Clara is 1 year older than Bob. The sum of all their ages is 49 years. How old is Bob?

- ☐ A. 8 ☐ C. 12
☐ B. 10 ☐ D. 14

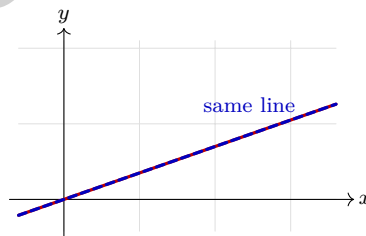
6) The table shows a linear function $m(x)$:

x	0	2	4	6
$m(x)$	5	11	?	23

What is $m(4)$?

- ☐ A. 15 ☐ C. 17
☐ B. 16 ☐ D. 18

7) Two lines on a coordinate plane are identical (the same line). How many solutions does the system have?



- ☐ A. No solution ☐ C. Exactly two solutions
☐ B. Exactly one solution ☐ D. Infinitely many solutions



1) What are the domain and range of the relation $\{(-2, 0), (0, 4), (2, 0), (4, 4)\}$?

- ☐ A. Domain: $\{-2, 2\}$; Range: $\{0\}$ ☐ C. Domain: $\{0, 4\}$; Range: $\{0, 4\}$
☐ B. Domain: $\{-2, 0, 2, 4\}$; Range: $\{-2, 0, 2, 4\}$
☐ D. Domain: $\{-2, 0, 2\}$; Range: $\{4\}$

2) A store advertises: "Pay \$250 down and \$150/month for 12 months." If the item costs \$1,500 cash, what is the finance charge?

- ☐ A. \$0 ☐ C. \$100
☐ B. \$50 ☐ D. \$550

3) Express 5^{-2} as a fraction.

- ☐ A. -25 ☐ C. $\frac{2}{5}$
☐ B. $-\frac{1}{5}$ ☐ D. $\frac{1}{25}$

4) What is $\sqrt[3]{1728}$?

- ☐ A. 10 ☐ C. 12
☐ B. 11 ☐ D. 13

5) Which number is written in correct scientific notation?

- ☐ A. 0.6×10^3 ☐ C. 60×10^2
☐ B. 60×10^{-3} ☐ D. 6.0×10^3

6) 3.2×10^{-3} equals:

- ☐ A. 3,200 ☐ C. 0.0032
☐ B. 0.032 ☐ D. 3.2



7) Which equation does NOT represent a proportional relationship?

☐ A. $y = 3x$

☐ C. $y = x$

☐ B. $y = -2x$

☐ D. $y = 2x + 1$

8) $S(m) = 500 + 25m$ and table $(0, \$600)$, $(3, \$675)$, $(6, \$750)$. Which starts with more money?

m	0	3	6
Table function	\$600	\$675	\$750

☐ A. S

☐ C. Both same.

☐ B. Table function

☐ D. Cannot be determined.

9) A bicycle rental costs \$20 per day plus a \$15 deposit. Which equation gives total cost C for d days?

☐ A. $C = 20d + 15$

☐ C. $C = 35d$

☐ B. $C = 15d + 20$

☐ D. $C = 20d - 15$

10) A student's test score improves linearly throughout a semester. After assignment 4, the score is 68. After assignment 10, the score is 82. What is the slope (improvement per assignment)?

☐ A. $\frac{7}{3}$ points per assignment

☐ C. 3 points per assignment

☐ B. 2 points per assignment

☐ D. $\frac{1}{2}$ point per assignment

11) A vending machine contains 32 coins (dimes and quarters). The total value is \$5.30. How many dimes are there?

☐ A. 8

☐ C. 14

☐ B. 12

☐ D. 18



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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 B is correct.** **(8.G.1)** Congruent triangles have equal corresponding angles. Triangle ABC has the same angle measures as triangle XYZ: 45° , 60° , 75° .
- 2) **Choice A is correct.** **(8.F.4)** Slope: $\frac{48-24}{2-1} = 24$ cupcakes per hour. The line passes through the origin (when $h = 0$, $c = 0$). Equation: $c = 24h$.
- 3) **Choice C is correct.** **(8.EE.5)** $y = 12x$. For $x = 3.5$: $y = 12(3.5) = 42$ dollars.
- 4) **Choice D is correct.** **(8.EE.8)** The change is -4 degrees (dropping) over 2 hours. Slope = $\frac{-4}{2} = -2$ degrees per hour.
- 5) **Choice C is correct.** **(8.EE.7)** Perimeter = $5 + 9 + 2\ell = 30$, where ℓ is the length of each leg. So $14 + 2\ell = 30$, giving $\ell = 8$ cm.
- 6) **Choice C is correct.** **(8.F.2)** Find the output value 8 in the table; it corresponds to $x = 3$.
- 7) **Choice B is correct.** **(8.F.3)** Linear functions are represented by straight lines. The graph clearly shows a straight line, confirming a linear relationship.
- 8) **Choice C is correct.** **(8.F.5)** From 3 to 5 hours, the elevation drops from 3m to 1m, indicating a downhill segment (decreasing function).
- 9) **Choice B is correct.** **(8.G.3)** Reflection across the y -axis negates the x -coordinate while keeping y the same: $(x, y) \rightarrow (-x, y)$.
- 10) **Choice C is correct.** **(8.G.5)** Co-interior angles are supplementary: $3w + w = 180 \Rightarrow 4w = 180 \Rightarrow w = 45^\circ$.
- 11) **Choice B is correct.** **(8.G.6, 8.G.7)** Verify: $121 + 3600 = 3721 = 61^2$. This is the 11-60-61 Pythagorean triple.
- 12) **The correct answer is (3, 6).** **(8.EE.8)** Substitute $y = 2x$ into $x + y = 9$: $x + 2x = 9$, so $3x = 9$, giving $x = 3$. Then $y = 2(3) = 6$.
- 13) **Choice A is correct.** **(8.G.8)** $d = \sqrt{(7-0)^2 + (24-0)^2} = \sqrt{49 + 576} = \sqrt{625} = 25$.
- 14) **The correct answer is (3, 7).** **(8.EE.7)** The integers 3 and 7 multiply to 21 and add to 10.
- 15) **Choice A is correct.** **(8.G.7)** Complementary angles sum to 90° . So $B = 90 - 38 = 52^\circ$.
- 16) **Choice B is correct.** **(8.G.9)** $V = \frac{1}{3} \times B \times h = \frac{1}{3} \times (4 \times 5) \times 12 = \frac{1}{3} \times 20 \times 12 = 80 \text{ cm}^3$.
- 17) **Choice B is correct.** **(8.G.1)** The square area is $20 \times 20 = 400 \text{ m}^2$. Four corner triangles are removed, and each has area $\frac{1}{2} \times 3 \times 3 = 4.5 \text{ m}^2$. The octagon area is $400 - 4(4.5) = 382 \text{ m}^2$.
- 18) **Choice D is correct.** **(8.G.9)** Check: 108° (pentagon), 144° (decagon), 162° (20-gon) are all valid. For 130° : solving $\frac{(n-2) \times 180}{n} = 130$ gives $n \approx 12.86$, which is not a whole number.
- 19) **Choice D is correct.** **(8.SP.1)** The pattern shows: high experience (right) $\rightarrow$ low reaction time (bottom), and low experience (left) $\rightarrow$ high reaction time (top). This is a negative association: as one increases, the other decreases.
- 20) **The correct answer is B, E.** **(8.EE.4)** The product is $(4 \times 5) \times 10^{3+4} = 20 \times 10^7 = 2 \times 10^8$, so choices B and E are equivalent to the original expression. Choice A uses an exponent that is too large, and choices C and D have the wrong value.
- 21) **Choice C is correct.** **(8.SP.3)** Relative frequency of mobile-app users among online shoppers: $\frac{108}{180} = 0.60 = 60\%$.
- 22) **Choice B is correct.** **(8.G.8)** Original data has MAD = 0 (all identical). Adding a value equal to the mean keeps all deviations at 0. New MAD = 0.
- 23) **Choice B is correct.** **(8.NS.2)** For each of the 5 color choices, you can pair it with any of the 9 numbers. By the Counting Principle, multiply: $5 \times 9 = 45$ different passwords.
- 24) **Choice B is correct.** **(8.SP.2)** In $y = mx + b$, $b = 5$ is the y -intercept, representing the y -value when $x = 0$.
- 25) **Choice B is correct.** **(8.G.1)** A scale factor of 0.75 means each length in the new figure is 75% of the matching original length.
- 26) **Choice C is correct.** **(8.NS.2)** $\sqrt{23}$ is irrational because 23 is not a perfect square. The other values are all rational: -4 is an integer, $\frac{7}{9}$ is a fraction, and $2.25 = \frac{9}{4}$ is a terminating decimal.
- 27) **The correct answer is \$35.** **(8.F.1)** Compute $25 + 0.10(100) = 35$.



Hi, Persistent Problem Solver!

◇ Some Grade 8 questions ask you to hold several ideas in your mind at once. That can feel hard, and that is exactly why practice matters. ◇

★ **Remember this:** You showed persistence by continuing through the set. That habit is powerful because difficult problems often open after one more good attempt. You practiced across 5 full Grade 8 practice tests, and that repeated effort matters. ★

Persistence Tools

- **Try a Smaller Case:** Use an easier number to see the pattern.
- **Draw It:** Make the situation visible.
- **Restate It:** Say the question in your own words.
- **Check One Step:** Fix the first unclear place.

Grade 8 test-day tip: When stuck, do not restart everything. Find the first step you trust, then rebuild from there.

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

Jay Daie

Your Persistence Coach

Practice Today. Succeed Tomorrow!

Give your child the confidence and skills they need with **5 full-length Grade 8 Math** practice tests that reflect 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.

COVERS ALL ESSENTIAL TOPICS

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

5
PRINTED
TESTS



2 ONLINE
TESTS



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