

7

Alaska
AK STAR

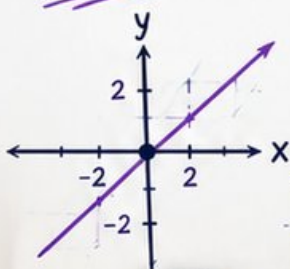
GRADE 8

MATH

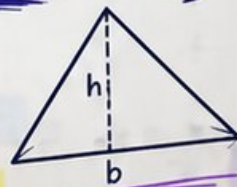
PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

$$y = mx + b$$

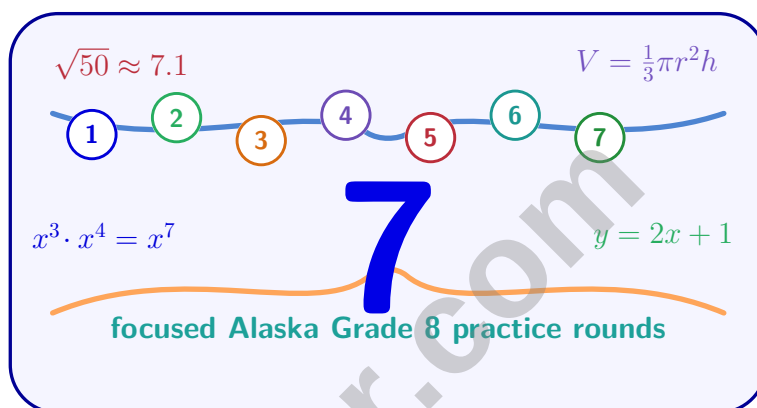
BUILD
CONFIDENCE.
SHARPEN SKILLS.
ACE YOUR
EXAM!Practice
Today
Succeed
Tomorrow!

$$A = \frac{1}{2}bh$$

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

7 Alaska AK STAR Grade 8 Math Practice Tests

Seven AK STAR Rounds for Grade 8 Skill, Strategy, and Review



Seven 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!

Seven focused rounds for sharper AK STAR math thinking

This book gives you seven 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 seven-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?

Seven AK STAR tests, 280 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.
Test 7	Pythagorean reasoning, volume, data analysis, linear models, probability, mixed review, and stamina.
Answer Pages	Compact keys and explanations that show why each answer works.

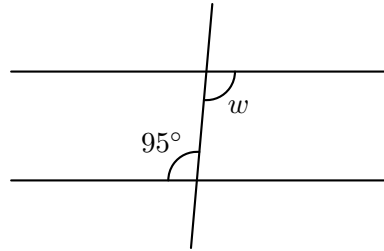
The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.



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1)

Two parallel lines are cut by a transversal. The angle 95° and angle w are alternate interior angles. What is w ?

☐ A. 5°

☐ C. 95°

☐ B. 85°

☐ D. 175°

2) Which system below can be solved by the elimination shown: adding the two equations to eliminate y ?

☐ A. $3x + y = 10$ and $2x + y = 7$

☐ C. $x - 2y = 3$ and $2x + y = 5$

☐ B. $4x + 3y = 12$ and $2x - 3y = 6$

☐ D. $5x + 2y = 11$ and $3x + y = 6$

3) Multiply: $(x + 3)(x - 5)$

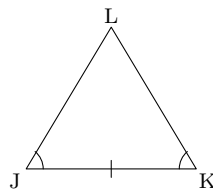
☐ A. $x^2 - 15$

☐ C. $x^2 - 2x - 15$

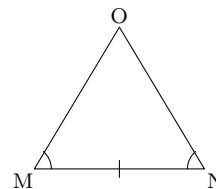
☐ B. $x^2 + 3x - 5$

☐ D. $x^2 + 8x - 15$

4) Triangle JKL is congruent to triangle MNO. Which congruence statement is correct?



and



☐ A. Triangle $JKL \cong$ Triangle MNO

☐ C. Triangle $JKL \cong$ Triangle NOM

☐ B. Triangle $JKL \cong$ Triangle MON

☐ D. Triangle $JKL \cong$ Triangle ONM



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5) If each interior angle of a regular polygon is 150° , how many sides does it have?

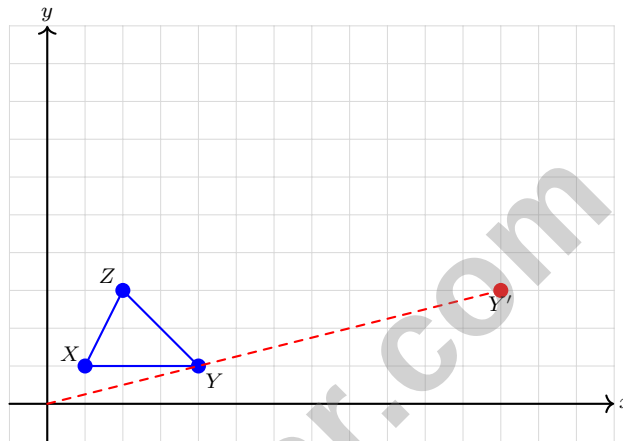
☐ A. 11

☐ C. 13

☐ B. 12

☐ D. 14

6) Triangle XYZ has vertices at $X(1, 1)$, $Y(4, 1)$, and $Z(2, 3)$. If dilated by scale factor 3 from the origin, where is the vertex that corresponds to Y ?



☐ A. (12, 3)

☐ C. (7, 4)

☐ B. (4, 1)

☐ D. (3, 3)

7) A math teacher says: “A function is when you input a number and always get the same output.” Is this definition correct?

☐ A. Yes, this is a complete definition.

that different inputs produce the same output.

☐ B. No, because constant functions like $y = 5$ are not functions.

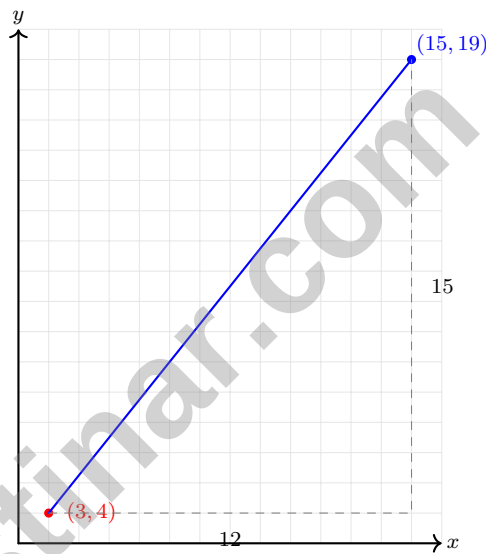
☐ D. Yes, as long as the input is positive.

☐ C. No, a function only requires that each input has exactly one output, not



8) Solve for m : $\frac{m}{5} - 2 = 3$. Show all work and verify your solution.

9) A construction site has a diagonal brace from $(3, 4)$ to $(15, 19)$. What is the length of the brace (rounded to nearest unit)?



☐ A. 27 units

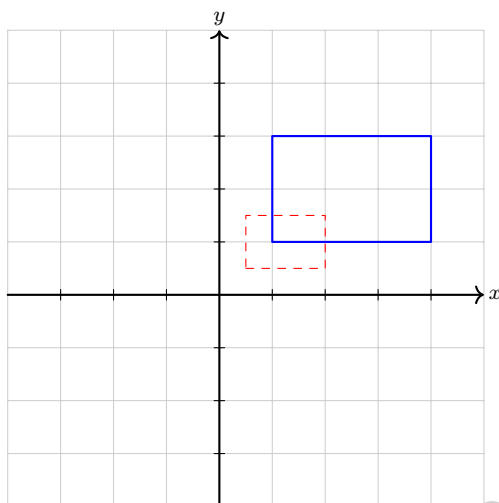
☐ C. 20 units

☐ B. 19 units

☐ D. 15 units



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1)

The blue rectangle is dilated to form the red rectangle. What is the scale factor?

- ☐ A. $\frac{1}{2}$
☐ B. 2

- ☐ C. $\frac{1}{3}$
☐ D. 3

2) A square park has an area of 169 square yards. What is the length of one side of the park?

3) What is the slope of the line $y = -2x + 5$?

- ☐ A. -2
☐ B. 2

- ☐ C. $-\frac{1}{2}$
☐ D. 5



4) A phone plan charges \$20 base plus \$0.10 per text. If you budget at most \$35, which inequality shows max texts?

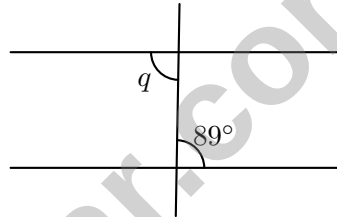
☐ A. $0.10t + 20 > 35$

☐ C. $0.10 + 20t \geq 35$

☐ B. $20t + 0.10 \leq 35$

☐ D. $0.10t + 20 \leq 35$

5) Calculate $(8.5 \times 10^4) - (3.7 \times 10^4)$ in scientific notation.



6)

Two parallel lines are cut by a transversal. Angles q and 89° are alternate interior angles. What is q ?

☐ A. 1°

☐ C. 91°

☐ B. 89°

☐ D. 178°



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1) Which order is correct from smallest to largest?

☐ A. $\sqrt{2}, \sqrt{5}, \sqrt{3}$

☐ C. $\sqrt{3}, \sqrt{2}, \sqrt{5}$

☐ B. $\sqrt{5}, \sqrt{3}, \sqrt{2}$

☐ D. $\sqrt{2}, \sqrt{3}, \sqrt{5}$

2) A health clinic surveys 280 patients about diet type:

	Vegetarian	Omnivore	Total
Age 18–40	84	112	196
Age 41+	28	56	84
Total	112	168	280

What is the joint relative frequency of age 41+ omnivores, as a percentage?

☐ A. 20%

☐ C. 33%

☐ B. 25%

☐ D. 40%

3)

	Basketball	Volleyball	Total
Boys	12	8	20
Girls	10	15	25
Total	22	23	45

Based on the table, if one student is selected at random, what is the probability of selecting a girl who plays volleyball?

☐ A. $\frac{15}{25}$

☐ C. $\frac{15}{45}$

☐ B. $\frac{15}{23}$

☐ D. $\frac{10}{45}$

4) A square pyramid has a base edge of 12 cm and a volume of 576 cm^3 . What is the height of the pyramid in centimeters?



- 5) A drawer has 8 distinct socks. If you pick 2 socks one at a time (without replacement) for a pair, in how many ways can this be done if order matters?

☐ A. $8 + 7 = 15$

☐ B. $8 \times 7 = 56$

☐ C. $\binom{8}{2} = 28$

☐ D. $8^2 = 64$

- 6) A path forms a rectangular frame: outer 25 m by 15 m, inner 20 m by 10 m. What is the area of the path only, in m^2 ?



- 7) If r is a nonzero rational number and i is an irrational number, which expression is definitely rational?

☐ A. $r + i$

☐ B. $r \times i$

☐ C. $\frac{r}{r}$ (where $r \neq 0$)

☐ D. $i - r$

- 8) Which equals $0.\overline{54}$?

☐ A. $\frac{54}{100}$

☐ B. $\frac{27}{50}$

☐ C. $\frac{54}{90}$

☐ D. $\frac{54}{99} = \frac{6}{11}$

- 9) A student claims $\sqrt{50}$ is between 5 and 6 because 50 is between 5 and 6. What is the student's error?

☐ A. Correct reasoning☐ B. Should use 7 and 8 instead☐ C. $\sqrt{50}$ is actually an integer☐ D. Should compare 50 to perfect squares, not integers

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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 C is correct.** (8.G.7) Alternate interior angles are congruent when a transversal cuts parallel lines. So $w = 95^\circ$.
- 2) **Choice B is correct.** (8.EE.8) In option B, the y coefficients are $+3$ and -3 . Adding these equations eliminates y : $(4x + 3y) + (2x - 3y) = 12 + 6 \Rightarrow 6x = 18$.
- 3) **Choice C is correct.** (8.EE.7) FOIL: $(x + 3)(x - 5) = x^2 - 5x + 3x - 15 = x^2 - 2x - 15$.
- 4) **Choice A is correct.** (8.G.1) The vertices must be listed in corresponding order. The matching arcs and tick marks show $J \leftrightarrow M$, $K \leftrightarrow N$, and $L \leftrightarrow O$, so the congruence statement is $\triangle JKL \cong \triangle MNO$.
- 5) **Choice B is correct.** (8.G.9) Using $\frac{(n-2) \times 180}{n} = 150$: $(n - 2) \times 180 = 150n \Rightarrow 180n - 360 = 150n \Rightarrow 30n = 360 \Rightarrow n = 12$.
- 6) **Choice A is correct.** (8.G.1) Apply dilation: $(x, y) \rightarrow (kx, ky)$ where $k = 3$. Point $Y(4, 1) \rightarrow Y'(4 \times 3, 1 \times 3) = (12, 3)$.
- 7) **Choice C is correct.** (8.F.1) The definition of a function only requires that each input has exactly one output. Different inputs can produce different outputs, and some functions are constant while others are not.
- 8) **The correct answer is $m = 25$.** (8.EE.7) Add 2 to both sides: $\frac{m}{5} = 5$. Multiply both sides by 5: $m = 25$. Verify: $\frac{25}{5} - 2 = 5 - 2 = 3 \checkmark$.
- 9) **Choice B is correct.** (8.G.8) $d = \sqrt{(15 - 3)^2 + (19 - 4)^2} = \sqrt{12^2 + 15^2} = \sqrt{144 + 225} = \sqrt{369} \approx 19.2$ units. (Rounds to 19.)
- 10) **Choice B is correct.** (8.G.9) From $V = \pi r^2 h$: $1695.6 = 3.14 \times 36 \times h \Rightarrow h = \frac{1695.6}{113.04} = 15$ in.
- 11) **Choice B is correct.** (8.G.8) Expanded data: 4, 4, 8, 8, 8, 12, 12, 12, 12, 12. The mean is 9.2. Deviations: $|4 - 9.2| = 5.2$ (twice), $|8 - 9.2| = 1.2$ (three times), $|12 - 9.2| = 2.8$ (five times). Sum = $10.4 + 3.6 + 14 = 28$. MAD = $28/10 = 2.8$.
- 12) **Choice B is correct.** (8.F.3) When second differences are constant, the function is quadratic (nonlinear). Linear functions have constant first differences, not second.
- 13) **The correct answer is 5.** (8.EE.7) Solve $45 + 5q \geq 70$, giving $q \geq 5$. The minimum whole number is 5.
- 14) **Choice B is correct.** (8.F.5) Total distance = 3 miles. Total time = 6 minutes. Average speed = $3 \div 6 = 0.5$ miles/min. The flat segment adds time but no distance.
- 15) **Choice B is correct.** (8.G.3) Reflection across the x -axis maps $(x, y) \rightarrow (x, -y)$. So $(2, 2) \rightarrow (2, -2)$, giving y -coordinate -2 .
- 16) **The correct answer is 3.** (8.G.8) The boundary line is $y = 3$.
- 17) **Choice D is correct.** (8.G.5) Corresponding angles are equal: $5x - 10 = 3x + 50$, so $2x = 60$ and $x = 30$.
- 18) **Choice A is correct.** (8.G.6, 8.G.7) The diagonal of a square with side s is $s\sqrt{2}$. Using the Pythagorean Theorem: $10^2 + 10^2 = d^2$ gives $d = 10\sqrt{2}$.
- 19) **Choice B is correct.** (8.G.9) $B = x \times 3x = 3x^2$. $500 = \frac{1}{3} \times 3x^2 \times 5 \Rightarrow 500 = 5x^2 \Rightarrow x^2 = 100 \Rightarrow x = 10$ m.
- 20) **Choice A is correct.** (8.G.1) Rectangle area is $9 \times 4 = 36$ m². Triangle area is $\frac{1}{2} \times 9 \times 3 = 13.5$ m². The total area is $36 + 13.5 = 49.5$ m².
- 21) **Choice A is correct.** (8.SP.1) The rate of change is not constant, showing a curved or leveling pattern rather than a straight line. This indicates a nonlinear association.
- 22) **The correct answer is A,B.** (8.EE.6) Options A and B both have slope 4, making them parallel. Option C has slope -4 , option D has slope $\frac{1}{4}$, and option E has slope 2, so none of these match.
- 23) **Choice D is correct.** (8.SP.3) Marginal relative frequency for takeout: $\frac{325}{500} = 0.65$.
- 24) **Choice D is correct.** (8.G.7) $P(\text{not } 7) = 1 - P(7) = 1 - \frac{1}{12} = \frac{11}{12}$.
- 25) **Choice B is correct.** (8.NS.2) Choose a main leader (6 choices) then an assistant from the remaining 5 students: $6 \times 5 = 30$.
- 26) **Choice A is correct.** (8.SP.2) At cost \$60, the trend line is a little below the \$80 mark and clearly above \$60. The closest choice is about \$80.
- 27) **Choice D is correct.** (8.NS.2) This is false. π is irrational; it cannot be written as a fraction of two integers and has a non-terminating, non-repeating decimal expansion. All other statements are true.



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Hi, Momentum Builder!

◇ Finishing a Grade 8 practice book is not a small thing. It means you practiced persistence, patience, and flexible problem solving. ◇

★ **Remember this:** Some questions were quick. Others probably made you stop and think. Both kinds helped you grow because practice turns effort into confidence. This version gave you 7 opportunities to rehearse test-day habits. ★

Momentum Habits

- **Start Clean:** Write down what the problem gives you.
- **Pick a Tool:** Use a table, model, equation, or graph.
- **Keep Moving:** Skip and return when needed.
- **Review Smart:** Study mistakes without judging yourself.

Grade 8 test-day tip: If a problem feels stuck, change tools. A graph, table, or sketch can make the same idea clearer.

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

Jay Daie

Your Math Momentum Partner

PRACTICE TODAY SUCCEED TOMORROW!

Give your child the confidence and skills they need with **7 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!

GRADE 8

Practice
Today
Succeed
Tomorrow!

Algebra

Geometry

Statistics

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 | ✓ 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! |



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