

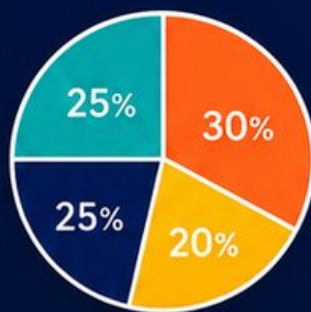
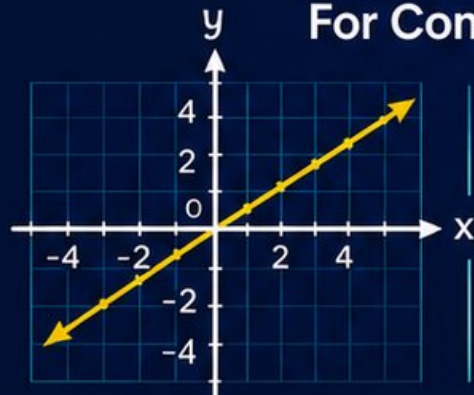
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Alaska
AK STAR

GRADE 8

MATH

PRACTICE TESTS

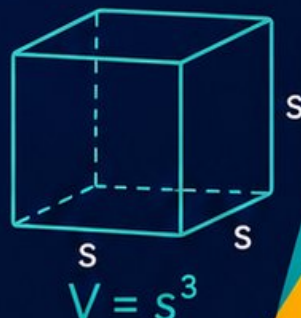
Standards Aligned Problem Solving
For Comprehensive Assessment Programs

$$y = mx + b$$

$$2x - 3y = 6$$

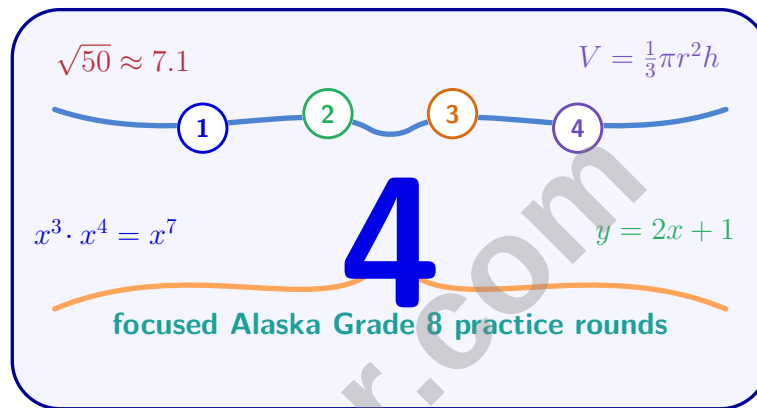
$$\sqrt{x^2 + y^2}$$

$$A = bh$$

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

4 Alaska AK STAR Grade 8 Math Practice Tests

Four AK STAR Rounds for Equations, Functions, Geometry, and Data



Four 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!

Four focused rounds for sharper AK STAR math thinking

This book gives you four 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 four-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?

Four AK STAR tests, 160 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 3–4	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.



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& answers

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1) When rolling two dice, what is the probability of rolling a sum of 10 or higher?

- ☐ A. $\frac{1}{12}$
☐ B. $\frac{5}{36}$

- ☐ C. $\frac{6}{36}$
☐ D. $\frac{7}{36}$

2) If $f(x) = \frac{2x+5}{3}$, what is $f(4)$?

- ☐ A. 3
☐ B. 4

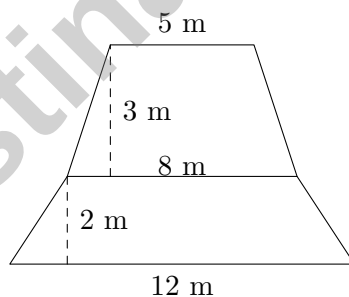
- ☐ C. $\frac{26}{3}$
☐ D. $\frac{13}{3}$

3) A square pyramid has a volume of 343 cm^3 and a height of 7 cm. What is the length of each base edge?

- ☐ A. 7 cm
☐ B. $7\sqrt{3}$ cm

- ☐ C. 14 cm
☐ D. 21 cm

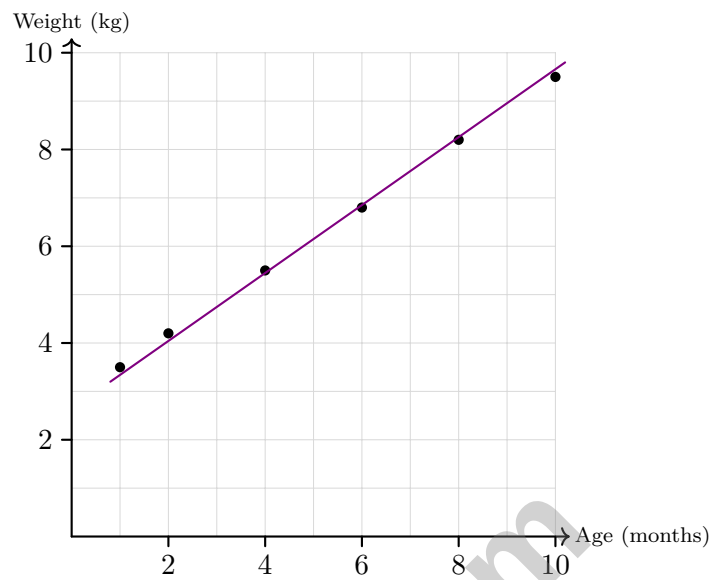
4) A composite figure is an asymmetric shape made of two trapezoids stacked vertically. Top trapezoid: bases 5 m and 8 m, height 3 m. Bottom trapezoid: bases 8 m and 12 m, height 2 m. What is the combined area?



- ☐ A. 15 m^2
☐ B. 20 m^2

- ☐ C. 35 m^2
☐ D. 39.5 m^2





5)

An infant growth chart plots age in months versus weight in kg. If the trend line is $y = 0.65x + 2.5$, how much weight gain is predicted per month?

- ☐ A. 0.65 kg per month ☐ C. 2.5 kg per month
☐ B. 0.50 kg per month ☐ D. 3.15 kg per month

6) How much of a 100% alcohol solution must be mixed with 500 mL of 20% alcohol solution to create a 50% solution?

- ☐ A. 100 mL ☐ C. 300 mL
☐ B. 200 mL ☐ D. 400 mL

7) Two similar trapezoids have parallel sides. In trapezoid T_1 , the bases are 10 cm and 6 cm. In trapezoid T_2 , the longer base is 15 cm. What is the length of the shorter base of T_2 ?

- ☐ A. 8 cm ☐ C. 10 cm
☐ B. 9 cm ☐ D. 12 cm



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- 8) Which decimal representation indicates an irrational number?
- ☐ A. 0.875 ☐ D. 2.718281828... (non-repeating, non-terminating)
- ☐ B. 0.123123123... (repeating pattern) ☐ C. $0.5\overline{3}$ (where 3 repeats)
- 9) Which pair correctly matches the repeating block length to the multiplier used in the conversion method?
- ☐ A. Block length $n \rightarrow$ multiply by $10n$. ☐ C. All blocks $\rightarrow$ multiply by 10 regardless.
- ☐ B. 1-digit block $\rightarrow$ multiply by 100; 2-digit block $\rightarrow$ multiply by 10. ☐ D. 1-digit block $\rightarrow$ multiply by 10; 2-digit block $\rightarrow$ multiply by 100.
- 10) Which is the best estimate of $\sqrt{2}$?
- ☐ A. 1.2 ☐ C. 2.0
- ☐ B. 2.8 ☐ D. 1.4
- 11) A store offers a warranty on a \$600 laptop for \$89. The warranty covers 2 years. Based on historical data, 1 in 10 laptops need repair costing an average of \$300. Is the warranty a good deal?
- ☐ A. Yes; expected repair cost is \$89 ☐ C. No; expected repair cost is \$30
- ☐ B. Yes; warranty costs less than repairs ☐ D. No; warranty should be free
- 12) Which list is in order from smallest to largest?
- ☐ A. $3.2 \times 10^{-5}, 3.2 \times 10^1, 3.2 \times 10^{-3}$ ☐ C. $3.2 \times 10^{-3}, 3.2 \times 10^{-5}, 3.2 \times 10^1$
- ☐ B. $3.2 \times 10^1, 3.2 \times 10^{-3}, 3.2 \times 10^{-5}$ ☐ D. $3.2 \times 10^{-5}, 3.2 \times 10^{-3}, 3.2 \times 10^1$



1) A student claims the line through $(1, 3)$ and $(3, 6)$ has slope $\frac{2}{3}$. What error did the student make?

☐ A. Inverted the slope as $\frac{\Delta x}{\Delta y}$

☐ C. Used $(1, 3)$ twice

☐ B. Subtracted incorrectly

☐ D. Used the y -intercept as the slope

2) A rope's length decreases at a constant rate. After 10 hours, it is 40 meters long. After 30 hours, it is 20 meters long. At what hour will the rope be 0 meters?

☐ A. 40 hours

☐ C. 60 hours

☐ B. 70 hours

☐ D. 50 hours

3) A proportional relationship passes through $(0, 0)$ and $(3, 12)$. What is the constant of proportionality k ? (Give your answer as a simplified fraction or decimal.)

4) A function f shows the distance (in miles) from home after t minutes of driving. Which describes what $f(20)$ means?

☐ A. After driving for 20 miles, you are at some time

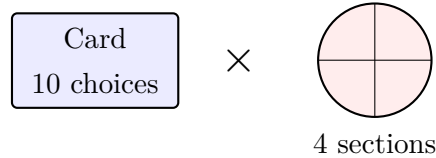
☐ C. The distance from home after 20 minutes of driving

☐ B. After 20 minutes of driving, you are 20 miles from home

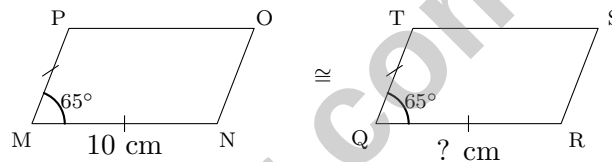
☐ D. It takes 20 minutes to drive some distance



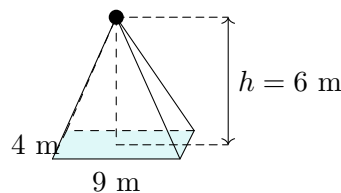
- 5) A game requires picking a card from a deck of 10 cards and then spinning a spinner with 4 sections. How many possible results are there?



- ☐ A. $10 + 4 = 14$
☐ C. $10 - 4 = 6$
☐ B. $10 \times 4 = 40$
☐ D. 4^{10}
- 6) Parallelogram MNOP is congruent to parallelogram QRST. In parallelogram MNOP, $MN = 10$ cm and $\angle M = 65^\circ$. Which statement is true?



- ☐ A. $QR = 10$ cm and $\angle Q = 115^\circ$
☐ C. $QR = 20$ cm and $\angle Q = 65^\circ$
☐ B. $QR = 10$ cm and $\angle Q = 65^\circ$
☐ D. QR cannot be determined
- 7) A pyramid has a rectangular base of 9 m by 4 m and a height of 6 m. What is its volume?

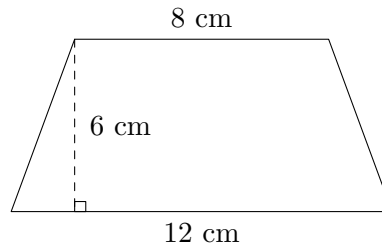


- ☐ A. 36 m^3
☐ C. 216 m^3
☐ B. 72 m^3
☐ D. 432 m^3



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- 1) A trapezoid has parallel sides of 8 cm and 12 cm with a height of 6 cm. This trapezoid is part of a composite figure. What is its area?



- ☐ A. 48 cm^2
☐ C. 72 cm^2
- ☐ B. 60 cm^2
☐ D. 80 cm^2
- 2) A student is given the equation $y = 5x + 8$ and claims the slope is 8 and the y -intercept is 5. What is the student's error?
- ☐ A. The student reversed the slope and intercept.
☐ B. The student added slope and intercept incorrectly.
- ☐ C. The student forgot to simplify the equation.
☐ D. The student mixed up x and y values.
- 3) Does the table show values from the equation $y = 5x$?

x	1	2	3
y	5	10	15

- ☐ A. No, should be $y = 5 + x$
☐ C. Yes, each y -value is 5 times the matching x -value.
- ☐ B. No, should be $y = x + 5$
☐ D. No, missing $x = 0$



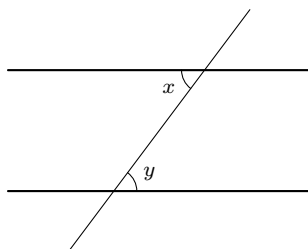
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- 4) A water tank is being drained at a constant rate. The relationship between time and remaining water is shown:

Time (min)	5	15	25
Water (gal)	60	40	20

What is the slope (rate of drainage)?

- ☐ A. -2 gallons per minute ☐ C. -3 gallons per minute
☐ B. 2 gallons per minute ☐ D. 60 gallons per minute
- 5) A river flows at 3 mph. A boat travels 4 hours downstream and 6 hours upstream for the same distance. What is the boat's speed in still water?
- ☐ A. 10 mph ☐ C. 15 mph
☐ B. 12 mph ☐ D. 18 mph
- 6) A business profit function is $P(x) = 50x - 200$, where x is the number of units sold. What is the profit when 10 units are sold?
- ☐ A. \$300 ☐ C. \$200
☐ B. \$250 ☐ D. \$500
- 7) In the diagram, angles x and y are formed by a transversal cutting parallel lines. If $x = 84^\circ$, what is y ?



- ☐ A. 84° ☐ C. 180°
☐ B. 96° ☐ D. 264°



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) Sums of 10, 11, 12: (4,6), (5,5), (6,4), (5,6), (6,5), (6,6). That's 6 outcomes.
- 2) **Choice D is correct.** (8.F.2) Substitute $x = 4$: $f(4) = \frac{2(4)+5}{3} = \frac{8+5}{3} = \frac{13}{3}$.
- 3) **Choice B is correct.** (8.G.9) $343 = \frac{1}{3} \times s^2 \times 7$, so $s^2 = 147$. Therefore $s = \sqrt{147} = 7\sqrt{3}$ cm.
- 4) **Choice D is correct.** (8.G.1) Top trapezoid area is $\frac{1}{2}(5+8) \times 3 = 19.5 \text{ m}^2$. Bottom trapezoid area is $\frac{1}{2}(8+12) \times 2 = 20 \text{ m}^2$. The combined area is $19.5 + 20 = 39.5 \text{ m}^2$.
- 5) **Choice A is correct.** (8.SP.2) The slope of the line $y = 0.65x + 2.5$ is 0.65, representing the predicted weight gain per month.
- 6) **Choice C is correct.** (8.EE.7) Let $x = \text{mL}$ of 100% alcohol solution. The 500 mL of 20% solution contains 100 mL of alcohol. Set up $\frac{x+100}{x+500} = 0.50$. Then $x + 100 = 0.5x + 250$, so $0.5x = 150$ and $x = 300$.
- 7) **Choice B is correct.** (8.G.1) Scale factor is $\frac{15}{10} = 1.5$. Shorter base is $6 \times 1.5 = 9$ cm.
- 8) **Choice D is correct.** (8.NS.2) A decimal that neither terminates nor repeats is irrational. The value 2.718... approximates Euler's number e , which is irrational. The others all terminate or repeat, making them rational.
- 9) **Choice D is correct.** (8.NS.2) The multiplier is 10^n where n is the block length. For $n = 1$: $10^1 = 10$; for $n = 2$: $10^2 = 100$.
- 10) **Choice D is correct.** (8.NS.3) Since $1.4^2 = 1.96 \approx 2$ and $1.5^2 = 2.25$, we have $\sqrt{2} \approx 1.41$.
- 11) **Choice C is correct.** (8.G.9) Expected repair cost $= 0.1 \times 300 = \$30$. Since the warranty costs \$89, it costs more than the expected repair cost.
- 12) **Choice D is correct.** (8.EE.3) With equal coefficients, smaller exponents give smaller values: $-5 < -3 < 1$.
- 13) **The correct answer is 2.** (8.EE.8) Slope $= \frac{10-2}{4-0} = \frac{8}{4} = 2$.
- 14) **Choice C is correct.** (8.NS.2) $(5.2)^2 = 27.04 > 27$, so $5.2 > \sqrt{27}$. Therefore $\sqrt{27} < 5.2$.
- 15) **Choice B is correct.** (8.G.9) $SA = 2\pi r^2 + 2\pi rh = 2\pi(2)^2 + 2\pi(2)(6) = 8\pi + 24\pi \text{ in}^2$.
- 16) **Choice B is correct.** (8.G.1) Two reflections across perpendicular lines (axes) equals a 180° rotation about their intersection (the origin).
- 17) **The correct answer is 5.** (8.F.4) Slope: $\frac{17-9}{3-1} = \frac{8}{2} = 4$. Using (1, 9): $9 = 4(1) + b \Rightarrow b = 5$.
- 18) **Choice D is correct.** (8.EE.6) Slope $= \frac{9-1}{2-(-2)} = \frac{8}{4} = 2$.
- 19) **The correct answer is A,D.** (8.EE.5) The line goes through (0, 0) and (8, 4), so the slope and constant of proportionality are $\frac{4}{8} = 0.5$. A point on the line must have $y = 0.5x$; when $x = 6$, $y = 3$, so (6, 3) is on the line.
- 20) **The correct answer is 20.** (8.G.1) Let s be the length of each equal side. The perimeter is $s + s + 16 = 56$, so $2s + 16 = 56$, which gives $2s = 40$ and $s = 20$ cm.
- 21) **Choice C is correct.** (8.EE.7) Distribute: $8x - 4 = 3x + 9$. Subtract $3x$ from both sides and add 4 to both sides to get $5x = 13$, so $x = \frac{13}{5}$.
- 22) **Choice A is correct.** (8.EE.7) Solving $-x + 2 > 5$ gives $-x > 3$, so $x < -3$. Only $x = -4$ satisfies this (since $-4 < -3$).
- 23) **Choice D is correct.** (8.G.8) Test (3, 2): $3 + 2 = 5 \not\leq 4$ FALSE. The other points all satisfy $x + y \leq 4$.
- 24) **Choice B is correct.** (8.G.9) $V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times 3.14 \times 4^3 = \frac{4}{3} \times 3.14 \times 64 \approx 267.95 \text{ cm}^3$.
- 25) **Choice D is correct.** (8.SP.3) Substitute $x = 4$: $y = 2.5(4) - 8 = 10 - 8 = 2$.
- 26) **Choice D is correct.** (8.EE.1) Apply power to both factors: $(2a)^3 = 2^3 \cdot a^3 = 8a^3$.
- 27) **Choice D is correct.** (8.EE.2) $\sqrt{4} = 2$. The other choices do not equal 2: $\sqrt[3]{9} \neq 2$, $\sqrt{16} = 4$, and $\sqrt[3]{4} \neq 2$.
- 28) **Choice C is correct.** (8.EE.4) Divide coefficients: $7.5 \div 2.5 = 3$. Subtract exponents: $10^{9-5} = 10^4$. Result: 3×10^4 .
- 29) **Choice A is correct.** (8.EE.8) Check (1, 3) in both equations: $3 = -2(1) + 5$ and $3(1) + 3 = 6$. So (1, 3) is the solution.



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Hi, Grade 8 Math Star!

◇ You finished this practice set with real effort. Grade 8 math asks you to connect ideas, explain your thinking, and stay steady through multi-step problems. ◇

★ **Remember this:** Every page you completed helped build stronger habits: reading carefully, choosing a method, showing work, and checking whether the answer makes sense. You practiced across 4 full Grade 8 practice tests, and that repeated effort matters. ★

What You Built

- **Focus:** You stayed with challenging questions.
- **Accuracy:** You learned to slow down when details matter.
- **Reasoning:** You practiced explaining why a method works.
- **Readiness:** You are more prepared than when you started.

Grade 8 test-day tip: Before test day, review the questions that made you pause. Those are the best teachers.

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, ACHIEVE TOMORROW!

Give your child the confidence and skills they need with **4 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!

4



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
- ✓ 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!



4 PRINTED TESTS



2 ONLINE TESTS



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