

4

New Hampshire

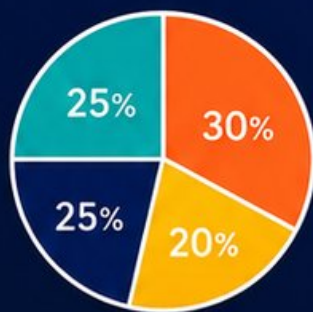
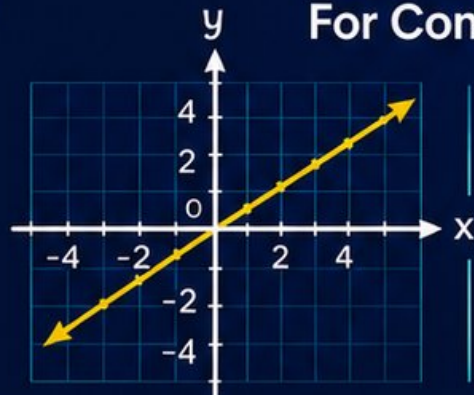
NH SAS

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

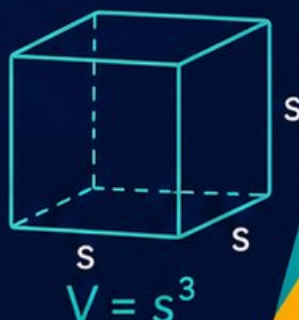


$$y = mx + b$$

$$2x - 3y = 6$$

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

$$A = bh$$



4 PRINTED TESTS



2 ONLINE TESTS

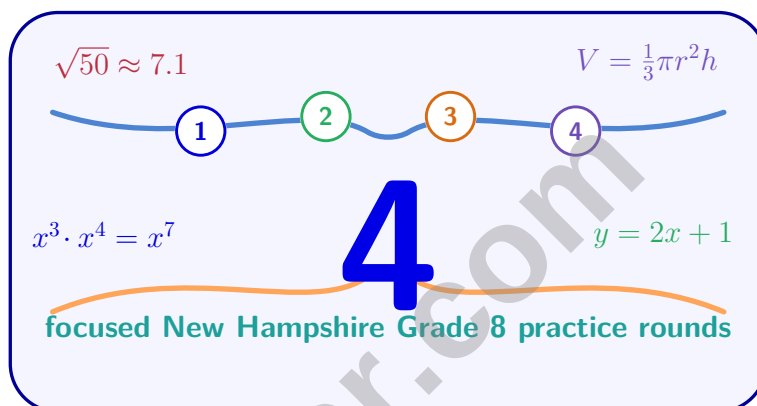


Use these **two additional online practice tests** for extra review after the printed tests in this book.



4 New Hampshire NH SAS Grade 8 Math Practice Tests

Complete NH SAS Practice with Focused Review and Clear Explanations



Four complete 40-question Grade 8 NH SAS 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, New Hampshire Grade 8 Problem Solver!

Four focused rounds for sharper NH SAS math thinking

This book gives you four full Grade 8 NH SAS 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 New Hampshire 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.

New Hampshire 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 NH SAS 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.

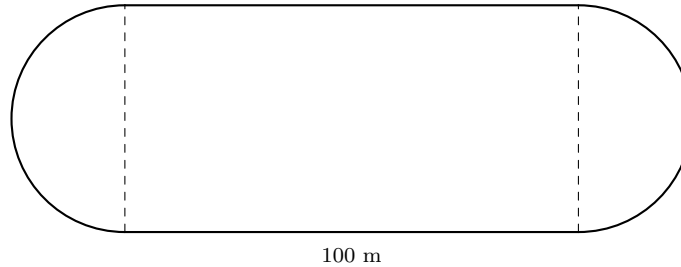


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- 1) A running track is composed of a rectangle (100 m by 50 m) with two semicircles on the short ends (diameter 50 m each). Find the total perimeter of the track.



- ☐ A. 300 m ☐ C. 378.5 m
☐ B. 357 m ☐ D. 400 m
- 2) A line passes through (0, 2) and (4, 10). Find the slope.

- 3) Maria is currently 4 years older than her sister Emma. In 3 years, Maria will be twice Emma's age. How old is Emma now?

- ☐ A. 1 ☐ C. 3
☐ B. 2 ☐ D. 5

- 4) Data sets X and Y both have 4 values and mean = 20.

Set X: {18, 20, 20, 22}

Set Y: {10, 15, 25, 30}

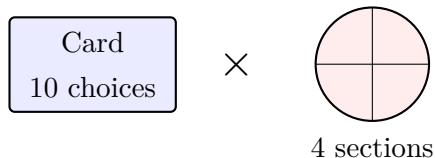
Without calculating, which likely has the larger MAD?

- ☐ A. Set X (more clustered) ☐ C. Exactly equal
☐ B. Set Y (more spread out) ☐ D. Cannot determine



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- 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) Which pair of equations represents lines with the same slope but different y -intercepts?
- ☐ A. $y = 3x + 2$ and $y = 2x + 3$
☐ C. $y = 4x + 1$ and $y = 4x + 1$
- ☐ B. $y = -2x + 5$ and $y = -2x - 3$
☐ D. $y = x + 5$ and $y = 2x + 5$
- 7) A segment has length 20 cm and is dilated by a scale factor of 0.4. What is the new length?
- ☐ A. 8 cm
☐ C. 24 cm
- ☐ B. 20 cm
☐ D. 50 cm
- 8) A phone plan charges based on minutes used. The table shows the cost $C(m)$ for m minutes.

Minutes (m)	100	200	300	400
Cost ($C(m)$)	\$20	\$30	\$40	\$50

What is $C(200)$?

- ☐ A. \$20
☐ C. \$30
- ☐ B. \$40
☐ D. \$50



9) Which set correctly separates rational and irrational numbers?

- ☐ A. Rational: all decimals; Irrational: all square roots
☐ B. Rational: $\sqrt{2}$, $\frac{1}{3}$; Irrational: $0.\bar{3}$, $\sqrt{9}$
☐ C. Rational: π , $0.101001\dots$; Irrational: $\frac{7}{2}$, $\sqrt{16}$
☐ D. Rational: $\sqrt{4}$, 0.5 ; Irrational: π , $\sqrt{10}$

10) Convert $0.\overline{45}$ to a fraction in simplest form.

- ☐ A. $\frac{9}{20}$
☐ B. $\frac{45}{100}$
☐ C. $\frac{45}{90} = \frac{1}{2}$
☐ D. $\frac{45}{99} = \frac{5}{11}$

11) Between which integers does $\sqrt{99}$ lie?

- ☐ A. 8 and 9
☐ B. 7 and 8
☐ C. 10 and 11
☐ D. 9 and 10

12) Is $\sqrt{12}$ greater than or less than 3.5?

- ☐ A. Greater than 3.5
☐ B. Cannot determine
☐ C. Exactly 3.5
☐ D. Less than 3.5

13) What power of 10 completes the conversion $304,000,000 = 3.04 \times ?$

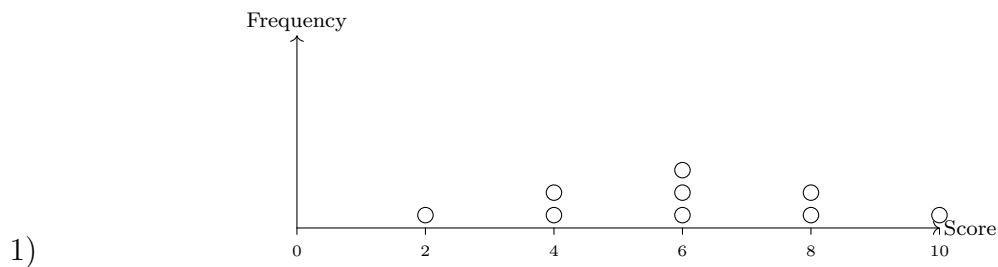
- ☐ A. 10^7
☐ B. 10^6
☐ C. 10^9
☐ D. 10^8

14) A student calculates the lateral surface area of a square pyramid with base side 10 cm and altitude (height) 8 cm as: $\text{Lateral} = 4 \times \frac{1}{2}(10)(8) = 160 \text{ cm}^2$. What is the error?

- ☐ A. Used altitude instead of slant height
☐ B. Forgot to multiply by 4 triangles
☐ C. Used diameter instead of radius
☐ D. The calculation is correct



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Data from dot plot: $\{2, 4, 4, 6, 6, 6, 8, 8, 10\}$ with mean = 6. Find MAD.

- ☐ A. 1.5 ☐ C. 2
☐ B. 1.78 ☐ D. 2.2

- 2) 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
- ☐ B. 2 gallons per minute
- ☐ C. -3 gallons per minute
- ☐ D. 60 gallons per minute

- 3) A concert venue sells adult tickets for \$15 and student tickets for \$8. If 120 total tickets were sold for \$1,520, how many student tickets were sold?

- ☐ A. 40 ☐ C. 80
☐ B. 60 ☐ D. 100



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- 4) A shape consists of a large triangle (base 16 ft, height 10 ft) with a smaller triangle (base 8 ft, height 5 ft) cut out from its center. What is the remaining area?

- ☐ A. 30 ft^2
☐ C. 60 ft^2
☐ B. 40 ft^2
☐ D. 80 ft^2

- 5) Among high-quality products in the table below, what relative frequency are premium-priced?

	Premium	Standard	Total
High Quality	240	80	320
Low Quality	48	112	160
Total	288	192	480

- ☐ A. $\frac{240}{480} = 0.50$
☐ C. $\frac{240}{320} = 0.75$
☐ B. $\frac{240}{288} \approx 0.83$
☐ D. $\frac{240}{480} = 0.60$
- 6) A number is chosen randomly from 1 to 10. What is the probability of choosing a prime number OR an even number?

- ☐ A. $\frac{7}{10}$
☐ C. $\frac{5}{10}$
☐ B. $\frac{4}{5}$
☐ D. $\frac{6}{10}$



1) A sphere has a radius of 3 inches. What is its volume in cubic inches? (Use $\pi \approx 3.14$.)

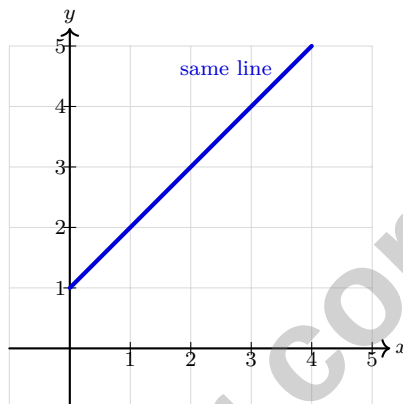
☐ A. 56.52 in^3

☐ C. 169.56 in^3

☐ B. 113.04 in^3

☐ D. 339.12 in^3

2) The graph below shows two lines. Does the system have a solution? If so, is it unique, or are there infinitely many?



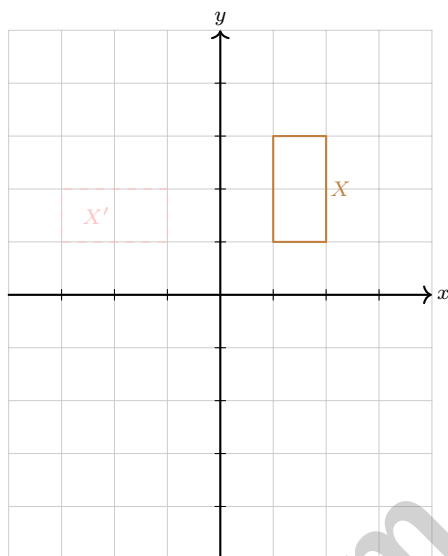
☐ A. No solution

☐ C. Infinitely many solutions

☐ B. Unique solution at (2, 3)

☐ D. Two distinct solutions



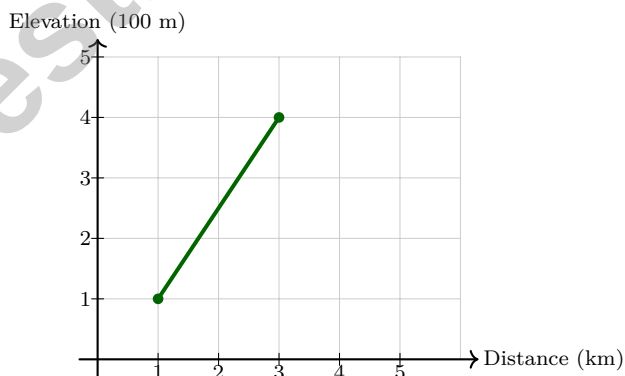


3)

Shape X (brown) is rotated 90° counterclockwise about the origin to produce X' (pink). Which vertex of X' corresponds to the vertex at $(2, 1)$ in X ?

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

4) The graph shows elevation change during a hike.



What is the slope of the line?

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


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New Hampshire NH SAS 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 New Hampshire NH SAS practice test.

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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice B is correct.** **(8.G.B.7)** Decompose the perimeter: two long sides of rectangle plus two semicircles (which form one complete circle). Long sides: $100 + 100 = 200$ m. Circle circumference: $\pi d = 3.14 \times 50 \approx 157$ m. Total = $200 + 157 = 357$ m.
- 2) **The correct answer is 2.** **(8.EE.B.5)** Slope = $\frac{10 - 2}{4 - 0} = \frac{8}{4} = 2$.
- 3) **Choice A is correct.** **(8.EE.C.8c)** Let e = Emma's current age. Then Maria's age is $e + 4$. In 3 years: Emma is $e + 3$, Maria is $e + 7$. The condition gives $e + 7 = 2(e + 3)$, so $e + 7 = 2e + 6$, thus $e = 1$.
- 4) **Choice B is correct.** **(8.G.B.8)** Set X clusters tightly around 20 (values 18–22). Set Y is spread widely (10–30). Larger spread implies larger MAD.
- 5) **Choice B is correct.** **(8.EE.C.7b)** Card pick (10 choices) times spinner section (4 choices): $10 \times 4 = 40$ possible results.
- 6) **Choice B is correct.** **(8.SP.A.2)** Both have slope $m = -2$ but intercepts of 5 and -3 respectively. These are parallel lines.
- 7) **Choice A is correct.** **(8.G.A.4)** $20 \times 0.4 = 8$ cm. A scale factor between 0 and 1 creates a reduction.
- 8) **Choice C is correct.** **(8.F.A.1)** Locate $m = 200$ in the table; the cost is \$30.
- 9) **Choice D is correct.** **(8.NS.A.1)** $\sqrt{4} = 2$ (rational), $0.5 = \frac{1}{2}$ (rational), π (irrational), $\sqrt{10}$ (irrational, non-perfect square). All classifications are correct.
- 10) **Choice D is correct.** **(8.NS.A.1)** Let $x = 0.\overline{45}$. Then $100x = 45.\overline{45}$. Subtracting: $99x = 45$, so $x = \frac{45}{99} = \frac{5}{11}$.
- 11) **Choice D is correct.** **(8.NS.A.2)** $9^2 = 81$ and $10^2 = 100$. Since $81 < 99 < 100$, we have $9 < \sqrt{99} < 10$.
- 12) **Choice D is correct.** **(8.NS.A.2)** $\sqrt{12} = 2\sqrt{3} \approx 3.46 < 3.5$.
- 13) **Choice D is correct.** **(8.EE.A.3)** Moving the decimal 8 places left to get 3.04 gives the exponent 8.
- 14) **Choice A is correct.** **(8.G.C.9)** Lateral surface area requires the slant height (from apex to midpoint of base edge), not the altitude (perpendicular distance from apex to base center). The altitude is 8 cm, but the slant height is $\sqrt{8^2 + 5^2} = \sqrt{89} \approx 9.4$ cm. Using altitude is a common error.
- 15) **Choice D is correct.** **(8.G.A.1)** A full 360° rotation completes one full turn, bringing the figure back unchanged. This is the identity transformation.
- 16) **Choice D is correct.** **(8.EE.B.6)** The correct slope is $\frac{9-3}{4-1} = \frac{6}{3} = 2$. The student computed $\frac{4-1}{9-3} = \frac{3}{6} = \frac{1}{2}$, reversing the roles of Δx and Δy .
- 17) **Choice C is correct.** **(8.EE.C.7)** Expand the left side: $5x + 10 = 5x + 10$. Both sides are identical, so this is an identity and every value of x is a solution.
- 18) **The correct answer is A,C.** **(8.EE.C.8a)** Option A: Lines $y = 3x + 1$ and $y = 3x - 2$ are parallel (same slope 3, different intercepts). Option B: Different slopes (3 and $\frac{1}{3}$), so one intersection. Option C: Both equations have the form $2x + y = k$ with $k = 4$ and $k = 6$ (parallel). Option D: Lines $y = 2x$ and $x + y = 6$ have different slopes, so one intersection. Option E: Lines $y = x$ and $y = -x$ have different slopes, intersecting at the origin.
- 19) **Choice C is correct.** **(8.EE.C.8b)** Multiply by -4 (FLIP): $x > -8$.
- 20) **Choice A is correct.** **(8.EE.C.8b)** Dashed horizontal line at $y = 1$ with shading ABOVE (in the positive y direction) means $y > 1$.
- 21) **Choice B is correct.** **(8.SP.A.3)** Negative slope means as one variable increases, the other decreases. More training leads to fewer errors.
- 22) **Choice D is correct.** **(8.G.B.7)** Net pay = \$2,000 - \$240 - \$160 = \$1,600.
- 23) **Choice D is correct.** **(8.EE.A.1)** Any nonzero number raised to the power 0 equals 1: $8^0 = 1$.
- 24) **The correct answer is $(-6, -4)$.** **(8.G.A.3)** Using $(x, y) \rightarrow (-y, x)$: $(-4, 6) \rightarrow (-6, -4)$.
- 25) **Choice D is correct.** **(8.EE.A.2)** $8^2 = 64$ and $9^2 = 81$. Since $64 < 77 < 81$, we have $8 < \sqrt{77} < 9$.
- 26) **Choice C is correct.** **(8.EE.A.4)** Multiply: $(7 \times 4) \times (10^3 \times 10^2) = 28 \times 10^5 = 2.8 \times 10^6$.
- 27) **Choice C is correct.** **(8.EE.B.5)** Unit rate $k = \frac{110}{2} = 55$ miles per hour. The proportional equation is $d = 55t$.
- 28) **Choice A is correct.** **(8.EE.C.7)** $(x + 5)^2 = (x + 5)(x + 5) = x^2 + 5x + 5x + 25 = x^2 + 10x + 25$.



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Hi, Brave Learner!

◇ No one gets stronger by only doing easy problems. The questions that slowed you down were part of the training. This carefully paced book gave you four steady Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. ◇

★ **Remember this:** Mistakes are not proof that you cannot do math. They are directions. They show what to review, what to ask about, and what to practice next. ★

How to Use Mistakes

- **Name It:** Was it reading, setup, arithmetic, or checking?
- **Fix It:** Correct the work while the question is fresh.
- **Repeat It:** Try one similar problem soon.
- **Remember It:** Write the lesson in your own words.

Grade 8 test-day tip: Treat every corrected error as a point you are preparing to earn next time.

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

Jay Daie

Your Brave-Learning Coach

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.