

9

North Dakota

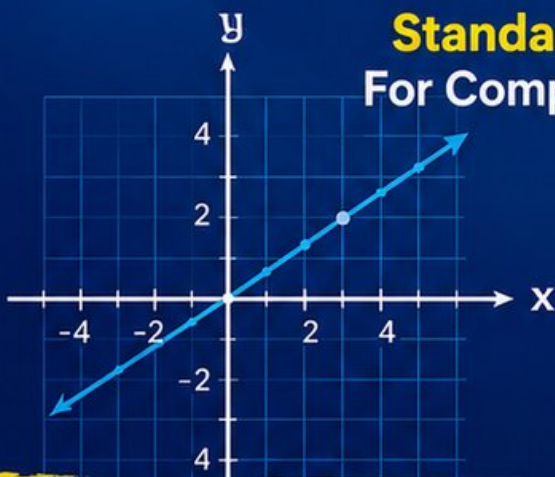
NDSA

Grade 8

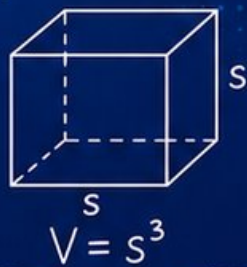
MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



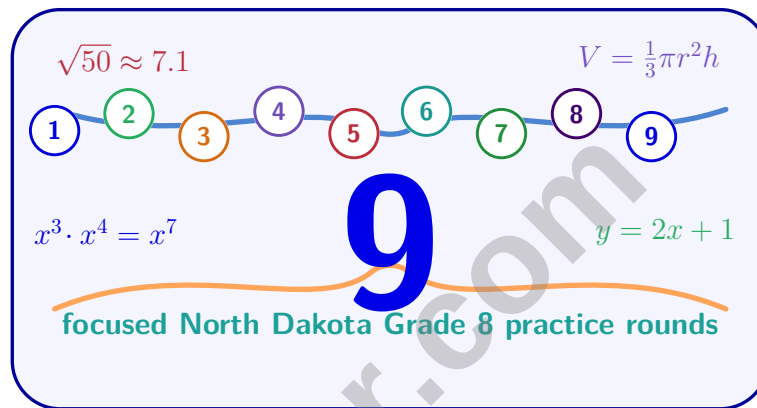
$$2x + 3y = 12$$
$$y = mx + b$$

**9** PRINTED
TESTS**2** ONLINE
TESTS

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

9 North Dakota NDSA Grade 8 Math Practice Tests

Targeted North Dakota Test Prep for Real Numbers, Functions, Geometry, and Probability



Nine complete 40-question Grade 8 NDSA 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, North Dakota Grade 8 Problem Solver!

Nine focused rounds for sharper NDSA math thinking

This book gives you nine full Grade 8 NDSA 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 North Dakota 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.

North Dakota 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 NDSA 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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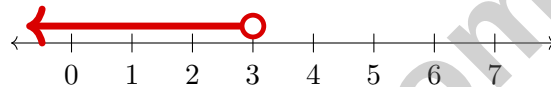
1) A student claims that $0.\overline{3}$ is less than $\frac{1}{3}$. Which is true?

- ☐ A. The student is correct; $0.\overline{3} < \frac{1}{3}$. ☐ C. The student is incorrect; $0.\overline{3} > \frac{1}{3}$.
☐ B. We cannot compare them without a calculator. ☐ D. The student is incorrect; $0.\overline{3} = \frac{1}{3}$.

2) Which lines are parallel (have the same slope)?

- ☐ A. $y = 2x + 1$ and $y = 2x - 5$ ☐ C. $y = \frac{1}{2}x + 3$ and $y = 2x + 3$
☐ B. $y = 3x + 2$ and $y = -3x + 2$ ☐ D. $y = -x + 4$ and $y = x - 4$

3) Graph the solution to $x + 4 < 7$ on a number line.



The inequality is:

- ☐ A. $x < 3$ ☐ C. $x \leq 3$
☐ B. $x > 3$ ☐ D. $x \geq 3$
- 4) To find the solution region of $5x + 2y < 10$, rewrite as $y < -\frac{5}{2}x + 5$. Where should the shading be?
- ☐ A. Below a dashed line ☐ C. Below a solid line
☐ B. Above a dashed line ☐ D. Above a solid line
- 5) A rectangle has vertices at $(1, 1)$, $(4, 1)$, $(4, 3)$, and $(1, 3)$. If the rectangle is translated 3 units right and 2 units down, what are the coordinates of the new vertex that corresponds to the original $(1, 3)$?
- ☐ A. $(3, 5)$ ☐ C. $(4, 3)$
☐ B. $(4, 1)$ ☐ D. $(5, 5)$



6) Rewrite 6^{-3} using only positive exponents.

- ☐ A. $\frac{6}{3}$
☐ B. -6^3

- ☐ C. 6^3
☐ D. $\frac{1}{6^3}$

7) What is $\sqrt{400}$?

- ☐ A. 18
☐ B. 19

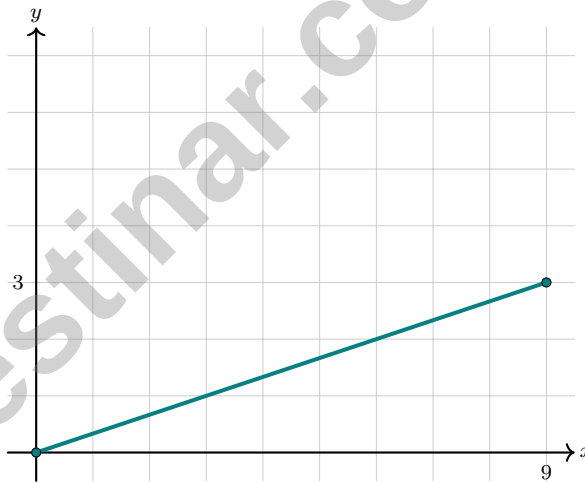
- ☐ C. 20
☐ D. 21

8) $(7.8 \times 10^7) - (2.3 \times 10^6) = ?$

- ☐ A. 5.5×10^7
☐ B. 5.5×10^1

- ☐ C. 5.5×10^6
☐ D. 7.57×10^7

9)



The graph shows a proportional relationship. Find the equation.

- ☐ A. $y = 9x$
☐ B. $y = 3x$

- ☐ C. $y = \frac{1}{3}x$
☐ D. $y = x + 3$



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- 10) The mass of the Sun is approximately 2×10^{30} kg. How many times more massive is the Sun than Earth, which has mass 6×10^{24} kg?

- 11) Two students solve $2x + 5 = 11$ and get different answers: Student A gets $x = 3$ and Student B gets $x = 4$. Without solving, how can you determine which student is correct?

- ☐ A. Substitute each value into the original equation to check which one works
- ☐ B. Solve the equation and see who matched your answer
- ☐ C. Check which value is smaller
- ☐ D. Divide 11 by 2 to see which is closer

- 12) Solve:
$$\begin{cases} y = 3x + 2 \\ 6x - 2y = 4 \end{cases}$$

- ☐ A. No solution
- ☐ B. (0, 2)
- ☐ C. Infinitely many solutions
- ☐ D. (1, 5)

- 13) A student claims: "If input 5 appears three times in a table, it cannot be a function." Is the student correct?

- ☐ A. Yes, any repeated input means it is not a function.
- ☐ B. No, repeated inputs are never a problem.
- ☐ C. No, repeated inputs are only a problem if outputs differ.
- ☐ D. Yes, the domain cannot have repeated values.



1) Solve for x : $2(x + 3) = 3(x - 1)$

☐ A. $x = 9$

☐ C. $x = -3$

☐ B. $x = 3$

☐ D. $x = 1$

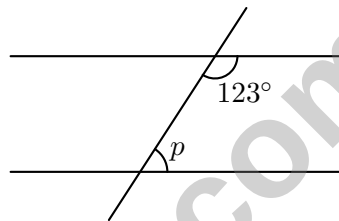
2) A square pyramid has a base edge of 1.5 m and a height of 10 m. What is its volume?
(Use $1.5^2 = 2.25$.)

☐ A. 7.5 m^3

☐ C. 22.5 m^3

☐ B. 11.25 m^3

☐ D. 33.75 m^3



3)

Two parallel lines are cut by a transversal. The angle p and the 123° angle are co-interior angles. What is p ?

☐ A. 57°

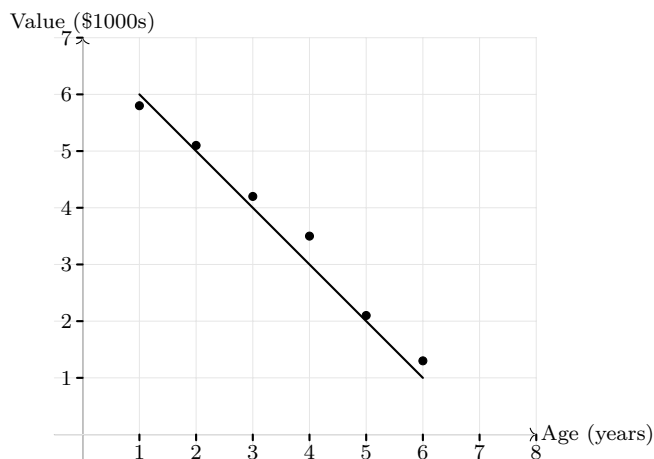
☐ C. 147°

☐ B. 123°

☐ D. 180°



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4)

A scatter plot shows vehicle age vs. value. Which best describes the relationship?

- ☐ A. Positive linear relationship ☐ C. No relationship
☐ B. Negative linear relationship ☐ D. Exponential growth

5) A restaurant offers 10 appetizers, 12 mains, 5 sides, and 6 desserts. A complete meal includes one appetizer, one side, and one dessert. How many different complete meals can be ordered?

- ☐ A. $10 + 5 + 6 = 21$ ☐ C. $10 \times 5 \times 6 = 300$
☐ B. $10 \times 12 \times 5 \times 6 = 3,600$ ☐ D. $(10 + 12) \times 5 \times 6 = 660$

6) Given $f(x) = 4x - 3$, find $f(5)$.



1) A regular polygon has an interior angle of 162° . How many sides does it have?

☐ A. 18

☐ C. 22

☐ B. 20

☐ D. 25

2) A square pyramid has base side length 6 m. The altitude (height from apex perpendicular to base) is 4 m. The slant height (from apex to midpoint of base edge) is approximately 5 m. Which formula gives the lateral surface area?

☐ A. $\frac{1}{2}(6)(4) \times 4 = 48 \text{ m}^2$
☐ C. $4 \times \frac{1}{2}(6)(5) = 60 \text{ m}^2$
☐ B. $\frac{1}{2}(6)(5) \times 3 = 45 \text{ m}^2$
☐ D. $4 \times \frac{1}{2}(6)(4) = 48 \text{ m}^2$

3) A cone has a height of 15 cm. When the volume is 392.5 cm^3 , what is the radius? (Use $\pi \approx 3.14$.)

☐ A. 2 cm

☐ C. 4 cm

☐ B. 3 cm

☐ D. 5 cm

4) Which expression expands to $x^2 + 20x + 100$?

☐ A. $2(x + 10)^2$
☐ C. $(x + 10)(x + 100)$
☐ B. $(x + 10)^2$
☐ D. $(x + 50)^2$

5) Function $f(x) = \frac{3}{4}x + 2$ and g shown in table: (0, 3), (4, 5), (8, 7). Which has steeper slope?

x	0	4	8
$g(x)$	3	5	7

☐ A. $f(x)$ is steeper

☐ C. Equal slopes

☐ B. $g(x)$ is steeper

☐ D. Cannot compare


6) Which of these functions is LINEAR?

☐ A. $y = 4x^2 - 1$

☐ C. $y = \frac{2}{x+3}$

☐ B. $y = 10x - 6$

☐ D. $y = 3^x$

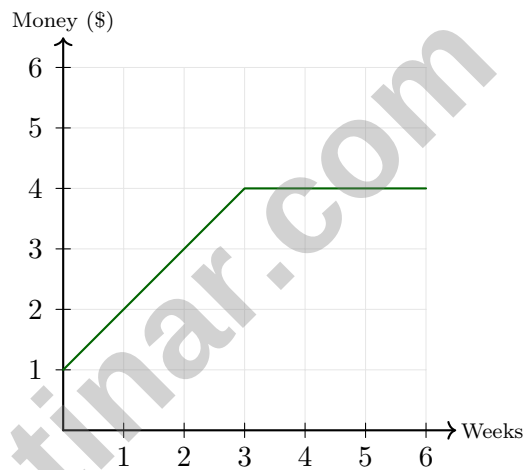
7) A car depreciates \$2000 per year. It is worth \$18,000 now. Which equation gives its value V after t years?

☐ A. $V = 2000t + 18000$

☐ C. $V = 18000t - 2000$

☐ B. $V = -2000t + 18000$

☐ D. $V = 18000 - t$



8)

A student saves money over time. The graph shows: increases for 3 weeks, then constant for 3 weeks. The y -intercept is 1. Which is true?

☐ A. The student had \$0 at the start

☐ C. The student spends money after week 3

☐ B. The student had \$1 initially and saves \$1 per week, then stops

☐ D. The function is linear over all 6 weeks



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North Dakota NDSA 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 North Dakota NDSA practice test.



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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice D is correct.** (8.NO.NS.1) Let $x = 0.\bar{3}$. Then $10x = 3.\bar{3}$. Subtracting: $9x = 3$, so $x = \frac{1}{3}$. The student confused the notation with a terminating decimal.
- 2) **Choice A is correct.** (8.AR.EE.2) Parallel lines have equal slopes. Both equations have slope 2.
- 3) **Choice A is correct.** (8.AR.EE.5) Subtract 4: $x < 3$. The open circle and left-pointing ray show all numbers less than 3.
- 4) **Choice A is correct.** (8.AR.EE.8) The strict inequality $<$ uses a DASHED line. Since $y <$ the expression, shade BELOW.
- 5) **Choice B is correct.** (8.GM.GF.2) Apply the translation rule: $(x, y) \rightarrow (x + 3, y - 2)$. So $(1, 3) \rightarrow (1 + 3, 3 - 2) = (4, 1)$. Distractor E tests adding instead of subtracting the vertical shift.
- 6) **Choice D is correct.** (8.AR.F.2) Negative exponent rule: $6^{-3} = \frac{1}{6^3}$.
- 7) **Choice C is correct.** (8.AR.EE.2) $20 \times 20 = 400$, so $\sqrt{400} = 20$.
- 8) **Choice D is correct.** (8.AR.EE.3) Rewrite with common exponent: $7.8 \times 10^7 - 0.23 \times 10^7 = (7.8 - 0.23) \times 10^7 = 7.57 \times 10^7$.
- 9) **Choice C is correct.** (8.AR.EE.3) Slope $k = \frac{3}{9} = \frac{1}{3}$. Equation: $y = \frac{1}{3}x$.
- 10) **The correct answer is 3.33×10^5 .** (8.GM.GF.3) Divide: $\frac{2 \times 10^{30}}{6 \times 10^{24}} = \frac{2}{6} \times 10^6 = \frac{1}{3} \times 10^6 \approx 3.33 \times 10^5$.
- 11) **Choice A is correct.** (8.AR.EE.8) Substitution is the definitive test: $2(3) + 5 = 11$ ✓ and $2(4) + 5 = 13 \neq 11$ ✗. Student A is correct.
- 12) **Choice A is correct.** (8.AR.F.2) Rewrite $6x - 2y = 4$ as $y = 3x - 2$. The system has lines $y = 3x + 2$ and $y = 3x - 2$, which have the same slope and different y -intercepts. Therefore, the system has no solution.
- 13) **Choice C is correct.** (8.AR.F.1) A relation is a function only if each input has exactly one output. If input 5 appears three times but with the same output, it is still a function (just redundantly listed).
- 14) **The correct answer is $\frac{5}{11}$.** (8.NO.NS.1) Let $x = 0.454545\dots$. Then $100x = 45.454545\dots$, so $99x = 45$ and $x = \frac{45}{99} = \frac{5}{11}$.
- 15) **Choice A is correct.** (8.AR.F.2) Slope of r : $(7 - 3)/(3 - 1) = 4/2 = 2$. Slope of s : 1. Since $2 > 1$, r increases faster.
- 16) **Choice B is correct.** (8.AR.F.1) The differences are $120 - 60 = 60$, $180 - 120 = 60$, $240 - 180 = 60$. Constant differences mean this is a linear relationship with a speed of 60 mi/h.
- 17) **Choice B is correct.** (8.AR.F.4) Equation: $C = 35h + 50$. Set $C = 225$: $225 = 35h + 50 \Rightarrow 175 = 35h \Rightarrow h = 5$ hours.
- 18) **Choice B is correct.** (8.GM.AV.1) Both reflection and rotation are rigid motions that preserve area. A sequence of rigid motions preserves the original area, so the final triangle has area 35 sq cm.
- 19) **Choice C is correct.** (8.GM.GF.6) Trapezoid area = $\frac{1}{2}(5 + 9) \times 4 = 28 \text{ m}^2$. Rectangle area = $9 \times 2 = 18 \text{ m}^2$. Total = $28 + 18 = 46 \text{ m}^2$.
- 20) **Choice C is correct.** (8.DPS.D.4) Relative frequency of mobile-app users among online shoppers: $\frac{108}{180} = 0.60 = 60\%$.
- 21) **Choice D is correct.** (8.GM.GF.6) Option 1: $I = 800 \times 0.10 \times 1 = \80 . Option 2: \$0 interest. Difference: $\$80 - \$0 = \$80$.
- 22) **The correct answer is A,D.** (8.GM.GF.2) Reflection across the x -axis maps (x, y) to $(x, -y)$, so $(0, 1) \rightarrow (0, -1)$ and $(2, 3) \rightarrow (2, -3)$. A dilation by scale factor 1 does not change the figure, so option D also results in the same reflection. Reflection across $y = 1$ would not map the whole rectangle to the purple image.
- 23) **Choice B is correct.** (8.AR.EE.4) These two numbers multiply to -12 and add to 1 (the middle coefficient). So $x^2 + x - 12 = (x - 3)(x + 4)$.
- 24) **Choice D is correct.** (8.AR.F.5) Option D shows increasing returns that diminish: steep early growth then gradual improvement. A is constant, B accelerates, C has a flat section.
- 25) **The correct answer is 9.4.** (8.NO.NS.2) The side length is $\sqrt{88}$. Since $9^2 = 81$ and $10^2 = 100$, and 88 is closer to 81, we estimate $\sqrt{88} \approx 9.38 \approx 9.4$.
- 26) **Choice B is correct.** (8.GM.GF.6) From $(\sqrt{24})^2 + 1^2 = c^2$, we get $24 + 1 = 25$, so $c = \sqrt{25} = 5$.



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Hi, Calm Solver!

◇ This high-stamina book gave you nine substantial Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. A calm mind can see choices more clearly. That matters in Grade 8, where one problem may have several possible entry points. ◇

★ **Remember this:** You practiced building calm by doing full tests. Each completed page is rehearsal for staying steady when the real test feels serious. ★

Calm-Test Moves

- **Pause:** Give your brain one quiet second.
- **Choose:** Pick the first useful step.
- **Continue:** Do not demand perfection immediately.
- **Check:** Use review time wisely.

Grade 8 test-day tip: If you feel rushed, slow your reading for one sentence. Clear reading saves time.

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

Jay Daie

Your Calm-Test Coach

CONFIDENCE TODAY, SUCCESS TOMORROW!

GRADE

8

Help your child excel in math with **9 full-length Grade 8 practice tests** designed to reflect real test formats and cover all key math standards.

With a wide variety of questions and real-world applications, this book builds the skills and confidence students need to achieve their best!



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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