

3

North Dakota

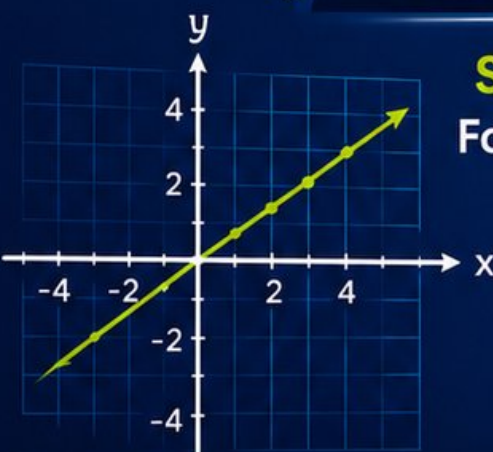
NDSA

GRADE 8

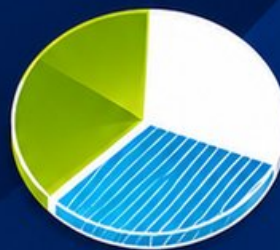
MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$$V = s^3$$



$$y = mx + b$$
$$2x + 5 = 13$$
$$x = 4$$



3 PRINTED TESTS



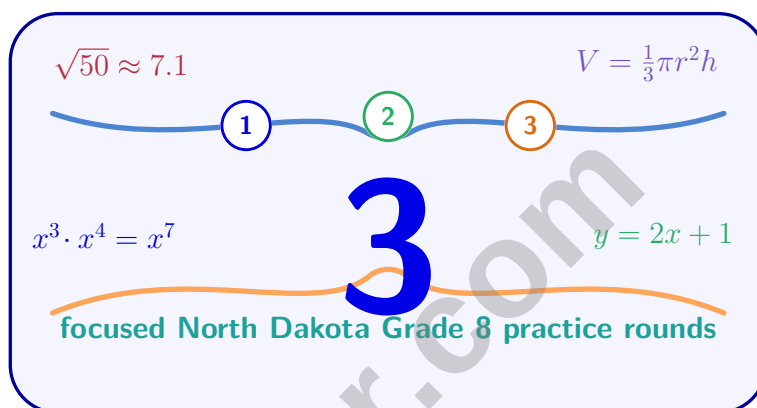
2 ONLINE TESTS



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

3 North Dakota NDSA Grade 8 Math Practice Tests

Standards-Based NDSA Practice with Answer Explanations



Three 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!

Three focused rounds for sharper NDSA math thinking

This book gives you three 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 three-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?

Three NDSA tests, 120 questions, and a focused review path

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



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1) Which pair both simplify to the same value?

☐ A. 3.5×10^2 and 350

☐ C. 1.4×10^5 and 0.14×10^6

☐ B. 7.2×10^{-3} and 0.0072

☐ D. 4.8×10^{-2} and 4.8×10^{-1}

2) Two cylinders have the same height of 10 cm. Cylinder A has radius 3 cm, Cylinder B has radius 6 cm. Which statement is true?

☐ A. Both have the same SA

☐ D. B has greater SA but not exactly twice

☐ B. A has greater SA

☐ C. B has exactly twice the SA of A

3) A parallelogram has a base of 8 inches and a slant side of 6 inches. After a reflection, what are the dimensions of the reflected parallelogram?

☐ A. 4 inches and 3 inches

☐ C. 12 inches and 9 inches

☐ B. 8 inches and 6 inches

☐ D. 16 inches and 12 inches

4) A line passes through $(-2, 1)$ and $(2, 9)$. What is the slope?

☐ A. $\frac{1}{2}$

☐ C. 4

☐ B. 8

☐ D. 2

5) Solve for x : $\frac{x}{4} - 2 = 3$

☐ A. $x = 4$

☐ C. $x = 12$

☐ B. $x = 8$

☐ D. $x = 20$

6) Solve: $\frac{3x-6}{2} < 6$

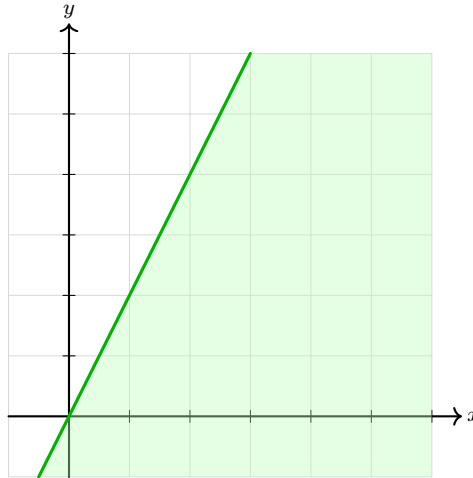
☐ A. $x > 6$

☐ C. $x > 18$

☐ B. $x < 18$

☐ D. $x < 6$





7)

The graph shows which inequality?

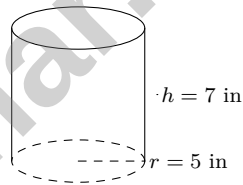
☐ A. $y > 2x$

☐ B. $y < 2x$

☐ C. $y \geq 2x$

☐ D. $y \leq 2x$

8)



A cylinder with radius 5 in and height 7 in is shown. What is its volume? (Use $\pi \approx 3.14$.)

☐ A. 109.9 in^3

☐ B. 219.8 in^3

☐ C. 549.5 in^3

☐ D. 1099 in^3



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9) Simplify $5^0 \cdot n^7 \cdot n^{-7}$.

☐ A. n^{14}

☐ B. n

☐ C. $5n$

☐ D. 1

10) What is $\sqrt{289}$?

☐ A. 16

☐ B. 19

☐ C. 18

☐ D. 17

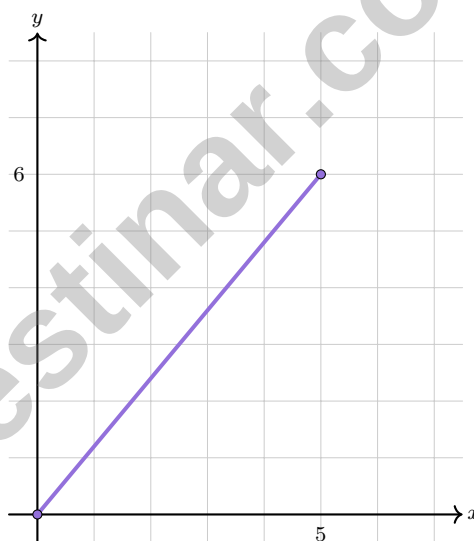
11) If $1.5 \times 10^4 = 15,000$, then $(1.5 \times 10^4) \times 10 = ?$

☐ A. 15×10^5

☐ B. 1.5×10^3

☐ C. 150,000

☐ D. 1.5×10^{40}



12)

What is the slope?

☐ A. $\frac{5}{6}$

☐ B. $\frac{6}{4}$

☐ C. 1.1

☐ D. 1.2



1) Which is the best estimate of $\pi + \sqrt{5}$?

☐ A. 4.6

☐ C. 6.0

☐ B. 7.8

☐ D. 5.4

2) Which statement about the square roots of perfect squares is true?

☐ A. They cannot be classified as rational

☐ C. They never equal an integer

☐ B. They are always irrational

☐ D. They can always be written as whole numbers

3) Convert $0.2\overline{7}$ to a fraction in simplest form.

☐ A. $\frac{27}{100}$

☐ C. $\frac{27}{90}$

☐ B. $\frac{27}{99}$

☐ D. $\frac{5}{18}$

4) If $a < \sqrt{n} < a + 1$ where a is a positive integer, then which statement is true?

☐ A. $n = a^2$

☐ C. $a^2 < n < (a + 1)^2$

☐ B. $n = (a + 1)^2$

☐ D. n is rational

5) If $g(x) = x^2 + 2$ and $g(x) = 11$, find the possible values of x .

6) Juan borrows \$1,200 at 8% simple interest. If he repays the loan in 2 years, what is the total amount he owes?

☐ A. \$1,200

☐ C. \$1,392

☐ B. \$1,292

☐ D. \$1,512



- 7) A triangular prism has a right triangular base with legs 3 cm and 4 cm, and hypotenuse 5 cm. The height (length) of the prism is 7 cm. What is the total surface area?

☐ A. 12 cm^2 ☐ C. 72 cm^2 ☐ B. 60 cm^2 ☐ D. 96 cm^2

- 8) Rectangle A has dimensions $5 \text{ m} \times 3 \text{ m}$. Rectangle B is similar with scale factor 4. What is the area of Rectangle B ?

- 9) A quadrilateral is rotated 270° clockwise about the origin. This is equivalent to a counterclockwise rotation of how many degrees?

☐ A. 90° ☐ C. 270° ☐ B. 180° ☐ D. 360°

- 10) The slope of line ℓ_1 is $\frac{3}{4}$. If line ℓ_2 is perpendicular to ℓ_1 , what is the slope of ℓ_2 ?

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

- 11) A residual plot has residuals 1, -2 , 1, 2, -1 , 0. What is the greatest absolute residual?

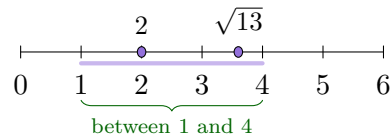


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- 1) A mobile phone plan charges $M = 40 + 0.25x$, where M is monthly cost and x is gigabytes of data used. What does the slope tell you?
- ☐ A. The cost per gigabyte of data ☐ C. The maximum cost possible
- ☐ B. The fixed monthly charge ☐ D. The number of gigabytes included
- 2) Two students sketch different trend lines through the same scatter plot. Student A's line has a gentler slope, while Student B's line has a steeper slope. What could explain this difference?
- ☐ A. One student made a calculation error ☐ C. Only one line can ever be correct
- ☐ B. The students used different data sets ☐ D. Sketching a trend line by eye allows for reasonable variation
- 3) Triangle P has sides 8, 15, 17. Triangle Q has sides 12, 22.5, 25.5. Are they similar?
- ☐ A. No, the sides are not equal ☐ C. Yes, all sides have the same ratio
- ☐ B. No, the ratios are 1.5, 1.5, 1.5 which is not constant ☐ D. Only if corresponding angles equal 90°
- 4) The temperature $T(h)$ in degrees Celsius at height h km above sea level is $T(h) = 25 - 6h$. What is $T(2)$?
- ☐ A. 37 ☐ C. 19
- ☐ B. 13 ☐ D. 50



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5)

The highlighted interval contains many irrational numbers between 1 and 4. Should 2 be classified as irrational?

- ☐ A. Yes, because 2 is plotted between 1 and 4 ☐ C. Yes, because $2 = \sqrt{4}$
☐ B. It cannot be determined ☐ D. No, because 2 is rational, not irrational

6) Convert $0.5\overline{3}$ to a fraction in simplest form.

- ☐ A. $\frac{53}{100}$ ☐ C. $\frac{16}{33}$
☐ B. $\frac{5}{30}$ ☐ D. $\frac{48}{90} = \frac{8}{15}$

7) Is $\sqrt{10}$ greater than or less than 3.1?

- ☐ A. Cannot be determined ☐ C. Equal to
☐ B. Less than ☐ D. Greater than

8) The sum of two people's ages is 35. In 5 years, the older person will be twice the age of the younger person. If the younger person is currently y years old, find y .



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 C is correct.** **(8.GM.GF.3)** Both equal 140,000: $1.4 \times 10^5 = 140,000$ and $0.14 \times 10^6 = 140,000$. Note: While both are mathematically equivalent, only the first form (1.4×10^5) is in correct scientific notation.
- 2) **Choice D is correct.** **(8.GM.AV.1)** Cylinder A: $SA = 2\pi(3)^2 + 2\pi(3)(10) = 18\pi + 60\pi = 78\pi \text{ cm}^2$. Cylinder B: $SA = 2\pi(6)^2 + 2\pi(6)(10) = 72\pi + 120\pi = 192\pi \text{ cm}^2$. Ratio: $192\pi/78\pi \approx 2.46 \neq 2$. So B is greater but not exactly twice.
- 3) **Choice B is correct.** **(8.GM.GF.2)** Reflections are rigid transformations that preserve all side lengths and angle measures. The reflected parallelogram has the same dimensions as the original.
- 4) **Choice D is correct.** **(8.AR.EE.2)** Slope = $\frac{9-1}{2-(-2)} = \frac{8}{4} = 2$.
- 5) **Choice D is correct.** **(8.AR.EE.8)** Add 2: $\frac{x}{4} = 5$. Multiply by 4: $x = 20$. Check: $\frac{20}{4} - 2 = 5 - 2 = 3$ ✓. (Distractor A: not multiplying by 4; C: arithmetic error; D: forgetting to add 2.)
- 6) **Choice D is correct.** **(8.AR.EE.5)** Multiply by 2: $3x - 6 < 12$. Add 6: $3x < 18$. Divide by 3: $x < 6$.
- 7) **Choice D is correct.** **(8.AR.EE.8)** SOLID line (includes boundary) and shading BELOW the line indicates $y \leq 2x$.
- 8) **Choice C is correct.** **(8.GM.AV.1)** $V = \pi r^2 h = 3.14 \times 5^2 \times 7 = 3.14 \times 25 \times 7 = 549.5 \text{ in}^3$.
- 9) **Choice D is correct.** **(8.AR.F.2)** $5^0 = 1$; $n^7 \cdot n^{-7} = n^{7-7} = n^0 = 1$. Product: $1 \cdot 1 = 1$.
- 10) **Choice D is correct.** **(8.AR.EE.2)** $17 \times 17 = 289$, so $\sqrt{289} = 17$.
- 11) **Choice C is correct.** **(8.AR.EE.3)** $1.5 \times 10^4 \times 10 = 1.5 \times 10^{4+1} = 1.5 \times 10^5 = 150,000$.
- 12) **Choice D is correct.** **(8.AR.EE.3)** Slope = $\frac{6}{5} = 1.2$. The line passes through (0,0) and (5,6).
- 13) **Choice D is correct.** **(8.AR.F.2)** Substitute $x = y - 4$ into $2x + 3y = 2$: $2(y - 4) + 3y = 2$, so $2y - 8 + 3y = 2$, giving $5y = 10$ and $y = 2$. Then $x = 2 - 4 = -2$. Solution: $(-2, 2)$.
- 14) **Choice C is correct.** **(8.AR.EE.4)** Difference of squares: $(x+3)^2 - (x-3)^2 = [(x+3) + (x-3)][(x+3) - (x-3)] = (2x)(6) = 12x$.
- 15) **Choice D is correct.** **(8.AR.F.1)** Multiple inputs can map to the same output. Since each distinct input (a, b, c, d) appears exactly once, the relation is a function.
- 16) **Choice A is correct.** **(8.AR.F.2)** Week 1: $20 + 5(1) = 25$. Week 2: $20 + 5(2) = 30$. Week 3: $20 + 5(3) = 35$. Constant difference of 5 per week indicates linear with slope 5.
- 17) **The correct answer is $\frac{37}{300}$.** **(8.NO.NS.1)** Set $x = 0.12\bar{3} = 0.12333\dots$. Then $100x = 12.\bar{3}$ and $1000x = 123.\bar{3}$. Subtracting: $900x = 111$, so $x = \frac{111}{900} = \frac{37}{300}$.
- 18) **The correct answer is A, C.** **(8.NO.NS.1)** Statement A is true because rational numbers are closed under addition. Statement C is true because any terminating decimal, such as $0.75 = \frac{3}{4}$, is rational. Statement B is false because two irrational numbers can multiply to a rational number, for example $\sqrt{2} \times \sqrt{8} = 4$. Statement D is false because integers are rational. Statement E is false because perfect squares have rational square roots, not irrational ones.
- 19) **The correct answer is 8.2.** **(8.NO.NS.2)** $8^2 = 64$ and $9^2 = 81$, so $\sqrt{68}$ is between 8 and 9. A closer estimate is about 8.246, which rounds to 8.2 to the nearest tenth.
- 20) **Choice A is correct.** **(8.AR.F.1)** A straight line represents a linear function. A parabola (curved) represents a nonlinear function.
- 21) **Choice B is correct.** **(8.AR.F.4)** At $h = 0$: $C_X = 10$ and $C_Y = 5$. Plan Y's initial cost (y -intercept = 5) is less than Plan X's (y -intercept = 10).
- 22) **The correct answer is 5.7.** **(8.GM.GF.2)** $\sqrt{32} = 4\sqrt{2} \approx 4 \times 1.41 = 5.66 \approx 5.7$ meters.
- 23) **Choice A is correct.** **(8.AR.F.5)** From $x = -1$ to $x = 1$: the function is constant at $f(x) = 2$ (neither increasing nor decreasing). From $x = 1$ to $x = 3$: the function increases from 2 to 4. From $x = 3$ onward: the function decreases.
- 24) **Choice C is correct.** **(8.GM.AV.1)** Both reflection and rotation are rigid motions that preserve distances and angles. Any sequence of rigid motions produces a congruent figure.
- 25) **Choice B is correct.** **(8.GM.GF.2)** Reflection across the x -axis negates the y -coordinate: $(x, y) \rightarrow (x, -y)$. So $(6, 4) \rightarrow (6, -4)$.
- 26) **Choice B is correct.** **(8.GM.GF.1)** The sum of the angles in a triangle is 180° : $180 - 45 - 75 = 60^\circ$.



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 3 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!

GRADE
8

Give your child the edge they need with **3 full-length** Grade 8 Math practice tests that reflect real test formats and cover all key math standards. Perfect for building skills, boosting confidence, and preparing for 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.



Build Skills & Boost Confidence

Strengthen understanding and feel prepared for test day.

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!



2 Extra Online Practice Tests Included!

Use these two additional online practice tests for extra review after the printed tests.

testinar.com/math8

PRACTICE. PREPARE. SUCCEED.



Testinar

More Practice. More Confidence.
Better **Results**.