

8

North Dakota

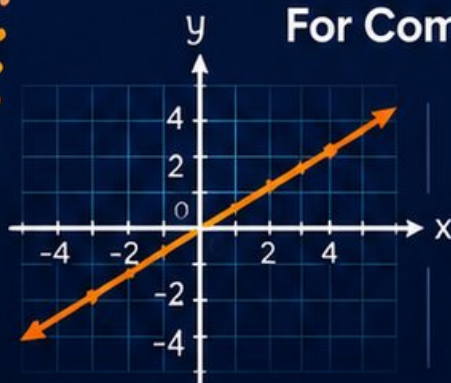
NDSA

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$$A = \pi r^2$$

$$C = 2\pi r$$

$$V = \frac{1}{3}\pi r^2 h$$



$$V = \frac{1}{3}b^2 h$$



8 PRINTED TESTS



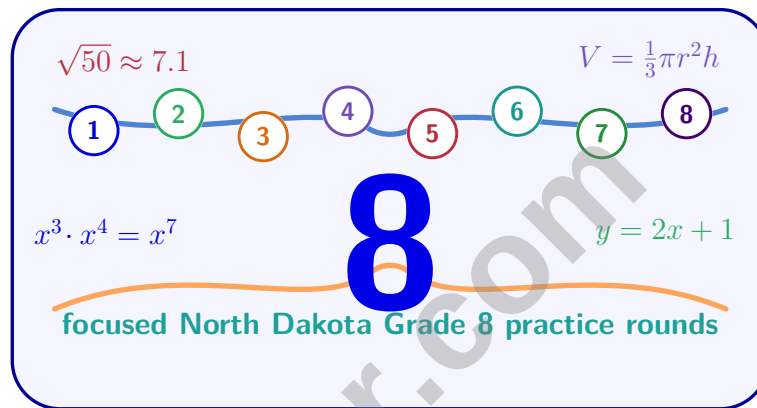
2 ONLINE TESTS



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

8 North Dakota NDSA Grade 8 Math Practice Tests

North Dakota Review for Grade 8 Functions, Geometry, and Data



Eight 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!

Eight focused rounds for sharper NDSA math thinking

This book gives you eight 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

An eight-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?

Eight NDSA tests, 320 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 7–8	Pythagorean reasoning, volume, data analysis, linear models, probability, mixed review, and stamina.
Answer Pages	Compact keys and explanations that show why each answer works.

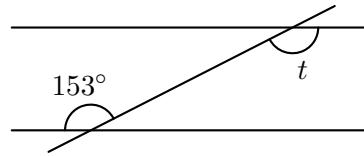
The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.



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1)

Two parallel lines are cut by a transversal. One angle is 153° and angle t is an alternate interior angle. What is t ?

☐ A. 27° ☐ C. 153° ☐ B. 77° ☐ D. 180°

2) If each interior angle of a regular polygon is 144° , how many sides does it have?

☐ A. 8☐ C. 10☐ B. 9☐ D. 12

3) A point Q is at the origin and undergoes three transformations: first a translation right 2, then a rotation 90° counterclockwise about the origin, then a reflection across the x -axis. Where does the point end up?

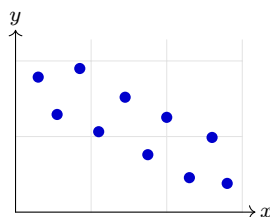
☐ A. $(0, 2)$ ☐ C. $(2, 0)$ ☐ B. $(0, -2)$ ☐ D. $(-2, 0)$

4) A square pyramid has a base edge of 2.5 m and a height of 9.6 m. What is its volume? (Use $2.5^2 = 6.25$.)

☐ A. 20 m^3 ☐ C. 40 m^3 ☐ B. 30 m^3 ☐ D. 50 m^3 

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5)

A researcher studies the relationship between screen time (hours/day) and grade point average (GPA 0–4.0) for high school students. The scatter plot shows weak negative correlation ($r = -0.35$) with substantial scatter. The researcher writes: **“The data show that screen time weakly causes lower GPAs.”** Which phrase in this statement is incorrect?

☐ A. *screen time*
☐ C. *weakly*
☐ B. *lower GPAs*
☐ D. *causes*

6)

	Fiction	Science
Hardcover	8	5
Paperback	4	3

A library shelf has the books shown. If two books are selected without replacement, what is the probability both are hardcover fiction?

☐ A. $\frac{8}{20}$
☐ C. $\frac{28}{400}$
☐ B. $\frac{64}{400}$
☐ D. $\frac{14}{95}$

7) A balloon starts at 300 meters and descends at 2 meters per second. What is the slope of the height model?



- 8) Which statement best explains why $\sqrt{2}$ cannot equal a fraction?
- ☐ A. Because it is too large to fit in a fraction
- ☐ B. Because 2 is not a perfect square
- ☐ C. Because there is no pair of integers whose ratio equals exactly $\sqrt{2}$
- ☐ D. Because the numerator cannot be 2
- 9) If $x = 0.\overline{36}$, which shows the first equation in the standard method?
- ☐ A. $10x = 0.36$
- ☐ B. $1000x = 360.\overline{36}$
- ☐ C. $36x = 0.\overline{36}$
- ☐ D. $100x = 36.\overline{36}$
- 10) Which loan has the lowest total repayment cost for \$3,000 principal?
- ☐ A. 6% for 2 years
- ☐ B. 5% for 3 years
- ☐ C. 4% for 4 years
- ☐ D. 3% for 5 years
- 11) Which number is equivalent to 2.9×10^1 ?
- ☐ A. 2.9
- ☐ B. 2,900
- ☐ C. 290
- ☐ D. 29
- 12) How many ways can you arrange 3 different books chosen from a shelf of 7 books?
- ☐ A. $7^3 = 343$
- ☐ B. $7 + 6 + 5 = 18$
- ☐ C. $7 \times 6 \times 5 = 210$
- ☐ D. $\binom{7}{3} = 35$
- 13) Which equation represents a line with slope 4 and y -intercept 6?
- ☐ A. $y = 6x + 4$
- ☐ B. $y = -4x + 6$
- ☐ C. $y = 4x - 6$
- ☐ D. $y = 4x + 6$



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1) Which statement is true?

☐ A. $\sqrt[3]{8} = 2$ and $\sqrt[3]{27} = 3$

☐ B. $\sqrt{36} = 6$ and $\sqrt{64} = 7$

☐ C. $\sqrt{100} = 5$ and $\sqrt[3]{125} = 25$

☐ D. $\sqrt[3]{64} = 8$ and $\sqrt{144} = 11$

2) The function $y = 2 - 5x$ is linear. What are its slope and y -intercept?

☐ A. Slope = -5 , y -intercept = -2

☐ B. Slope = 2 , y -intercept = -5

☐ C. Slope = -5 , y -intercept = 2

☐ D. Slope = 5 , y -intercept = 2

3) A bicycle rental costs \$20 per day plus a \$15 deposit. Which equation gives total cost C for d days?

☐ A. $C = 20d + 15$

☐ B. $C = 15d + 20$

☐ C. $C = 35d$

☐ D. $C = 20d - 15$

4) Of 320 patients at a clinic, 200 were prescribed medication and 120 were not. Among those prescribed medication, 160 showed improvement. What is the relative frequency of patients showing improvement among those prescribed medication?

☐ A. 0.50

☐ B. 0.80

☐ C. 0.67

☐ D. 0.75

5) Multiply: $(x - 4)(x - 3)$

☐ A. $x^2 - 7x + 12$

☐ B. $x^2 - 12$

☐ C. $x^2 + 7x + 12$

☐ D. $x^2 - x - 12$

6) Each interior angle of a regular polygon is 108° . How many sides does the polygon have?

☐ A. 5

☐ B. 6

☐ C. 7

☐ D. 8



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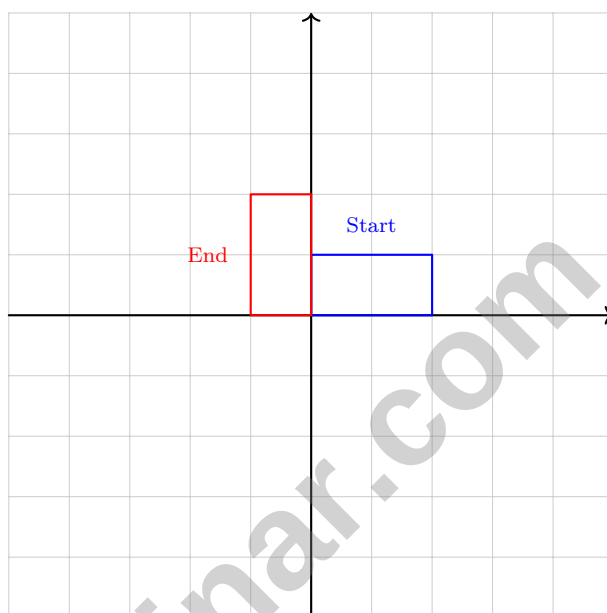
7) A cylinder has radius 1.5 inches and height 8 inches. What is the surface area? (Use $\pi \approx 3.14$.)

☐ A. 28.3 in^2

☐ C. 75.4 in^2

☐ B. 47.1 in^2

☐ D. 89.5 in^2



8)

What transformation maps the blue figure (Start) to the red figure (End)?

☐ A. Reflection across the y -axis

☐ D. 90° clockwise rotation about the origin

☐ B. Reflection across the x -axis

☐ C. 90° counterclockwise rotation about the origin



1) A cone and a cylinder have the same radius r and height h . How do their volumes compare?

- ☐ A. Cone volume = Cylinder volume ☐ D. Cone volume = $3 \times$ Cylinder volume
☐ B. Cone volume = $\frac{1}{3}$ Cylinder volume
☐ C. Cone volume = $\frac{1}{2}$ Cylinder volume

2) If $x - 8 \leq -2$, what is the solution?

- ☐ A. $x \leq 6$ ☐ C. $x \leq -10$
☐ B. $x \geq 6$ ☐ D. $x \geq -10$

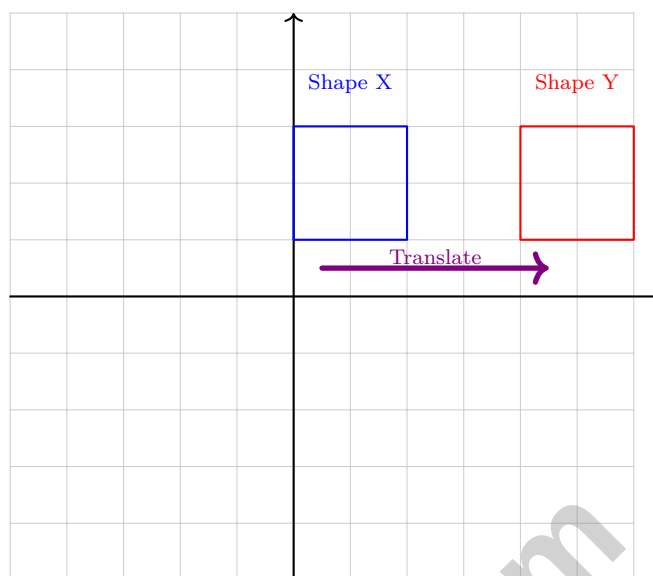
3) A student graphs $y < x + 2$ and shades ABOVE the line. What error did they make?

- ☐ A. The line should be solid, not dashed ☐ C. The y -intercept should be -2
☐ B. The shading should be BELOW, not above ☐ D. The slope should be positive

4) Evaluate 2^{-3} and express it as a decimal.

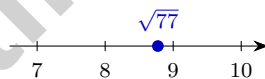


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5)

Based on the arrow shown, what is the translation vector from Shape X to Shape Y?

☐ A. (2, 0)☐ C. (4, 2)☐ B. (4, 0)☐ D. (2, 2)6) Where on a number line would $\sqrt{77}$ be located?☐ A. At 9☐ C. Between 8 and 9☐ B. Between 9 and 10☐ D. Between 7 and 8

7) A cube-shaped storage container has a volume of 512 cubic feet. What is the side length of the cube?



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.4) Alternate interior angles are congruent when a transversal cuts parallel lines. So $t = 153^\circ$.
- 2) **Choice C is correct.** (8.GM.GF.4) For a regular polygon, each interior angle is $\frac{(n-2) \times 180}{n} = 144$. Solving: $(n-2) \times 180 = 144n \Rightarrow 180n - 360 = 144n \Rightarrow 36n = 360 \Rightarrow n = 10$.
- 3) **Choice B is correct.** (8.GM.GF.2) Start at $(0, 0)$. After translation right 2: $(2, 0)$. After rotation 90° counterclockwise: $(-0, 2) = (0, 2)$. After reflection across x -axis: $(0, -2)$.
- 4) **Choice A is correct.** (8.GM.AV.1) $V = \frac{1}{3} \times 6.25 \times 9.6 = \frac{60}{3} = 20 \text{ m}^3$.
- 5) **Choice D is correct.** (8.DPS.D.1) Correlation (weak or strong) never proves causation. The phrase “causes” is incorrect. The statement should say “correlates with” or “is associated with” lower GPAs. Other factors (parental involvement, motivation, socioeconomic factors) may drive both variables.
- 6) **Choice D is correct.** (8.GM.GF.6) Total: 20 books. Hardcover fiction: 8. $P = \frac{8}{20} \times \frac{7}{19} = \frac{56}{380} = \frac{14}{95}$.
- 7) **The correct answer is -2 .** (8.AR.F.4) A descent means the rate of change is negative, so the slope is -2 .
- 8) **Choice C is correct.** (8.NO.NS.1) An irrational number, by definition, cannot be expressed as $\frac{a}{b}$ where a and b are integers. $\sqrt{2}$ is irrational because no such pair of integers exists. The fact that 2 is not a perfect square ensures $\sqrt{2}$ is not a whole number, but the deeper reason it is irrational is the impossibility of the fractional representation.
- 9) **Choice D is correct.** (8.NO.NS.1) Since the block has 2 digits, multiply x by $10^2 = 100$. This gives $100x = 36.363636 \dots = 36.36$.
- 10) **Choice A is correct.** (8.GM.GF.6) A: \$360 interest. B: \$450 interest. C: \$480 interest. D: \$450 interest. Option A has the lowest total cost.
- 11) **Choice D is correct.** (8.GM.GF.3) Move the decimal 1 place right: $2.9 \times 10^1 = 29$.
- 12) **Choice C is correct.** (8.NO.NS.1) Select the 1st book (7 choices), 2nd (6 remaining), 3rd (5 remaining). Total: $7 \times 6 \times 5 = 210$. (This is $P(7, 3) = \frac{7!}{4!}$)
- 13) **Choice D is correct.** (8.AR.EE.2) Using $y = mx + b$ where m is slope and b is y -intercept: $y = 4x + 6$.
- 14) **The correct answer is 3.** (8.GM.AV.1) $h = \frac{942}{3.14 \times 10^2} = \frac{942}{3.14 \times 100} = \frac{942}{314} = 3 \text{ m}$.
- 15) **Choice D is correct.** (8.AR.F.2) Numerator: $g^8 \cdot g^{-2} = g^6$. Then $\frac{g^6}{g^3} = g^3$.
- 16) **Choice D is correct.** (8.AR.EE.3) A proportional equation has the form $y = kx$ (passes through origin, no constant term). Only $y = -5x$ fits this form.
- 17) **Choice A is correct.** (8.AR.EE.8) Distribute: $-3x + 6 = 9$. Subtract 6: $-3x = 3$. Divide by -3 : $x = -1$.
- 18) **The correct answer is 55.** (8.DPS.D.3) Substitute $n = 500$: $C = 0.08(500) + 15 = 40 + 15 = \55 .
- 19) **Choice D is correct.** (8.AR.F.2) Subtract the second from the first: $(2x + 3y) - (2x - y) = 11 - 3$, so $4y = 8$, giving $y = 2$. Substitute: $2x - 2 = 3$, so $2x = 5$ and $x = \frac{5}{2}$. Solution: $(\frac{5}{2}, 2)$.
- 20) **Choice C is correct.** (8.AR.F.1) Constant functions are functions. For every x , the output is always 7, satisfying the one-input-one-output requirement.
- 21) **Choice D is correct.** (8.NO.NS.2) $7^2 = 49$ and $8^2 = 64$. Since $49 < 53 < 64$, we have $7 < \sqrt{53} < 8$.
- 22) **The correct answer is A,D.** (8.AR.EE.4) Choice A: $x^2 - 25 = (x+5)(x-5)$ includes $(x-5)$. Choice D: $x^2 - 7x + 10 = (x-5)(x-2)$ includes $(x-5)$. Choice B: $x^2 + 10x + 25 = (x+5)^2$, which does not include $(x-5)$. Choice C: $x^2 + 2x - 15 = (x+5)(x-3)$ does not include $(x-5)$. Choice E: $x^2 + 3x - 10 = (x+5)(x-2)$ does not include $(x-5)$.
- 23) **Choice D is correct.** (8.GM.GF.2) Since $2.6^2 = 6.76 \approx 7$ and $2.65^2 \approx 7.02$, we estimate $\sqrt{7} \approx 2.65$.
- 24) **Choice C is correct.** (8.AR.EE.2) $10 \times 10 = 100$, so $x = 10$ (taking the positive root).
- 25) **Choice C is correct.** (8.AR.EE.3) Divide: $\frac{5 \times 10^6}{2.5 \times 10^3} = \frac{5}{2.5} \times 10^{6-3} = 2 \times 10^3$.
- 26) **Choice A is correct.** (8.AR.F.2) Slope: $(24 - 9)/(5 - 2) = 15/3 = 5$. From point $(2, 9)$: $9 = 5(2) + b \Rightarrow b = -1$. Equation is $y = 5x - 1$.



The Power of Showing Work

Hi, Organized Solver!

◇ You practiced Grade 8 skills that often require more than one step. That means your written work matters. ◇

★ **Remember this:** Showing work is not extra. It is how you track your thinking, find errors, and prove that your answer did not happen by luck. You practiced across 8 full Grade 8 practice tests, and that repeated effort matters. ★

Organized Work Habits

- **One Line Per Step:** Keep the path readable.
- **Box the Answer:** Make the final result easy to find.
- **Use Labels:** Tell what each value represents.
- **Check the Path:** Follow your steps backward if needed.

Grade 8 test-day tip: When a problem has several steps, write less on each line. Space makes checking easier.

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

Jay Daie

Your Organized-Work Coach

PRACTICE TODAY, SUCCEED TOMORROW!

Give your child the confidence and skills they need with **8 full-length Grade 8** Math practice tests that mirror real test formats and cover all key math standards. Perfect for building skills, strengthening problem-solving abilities, and achieving 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!

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Better Results.