

North Dakota

NDSA

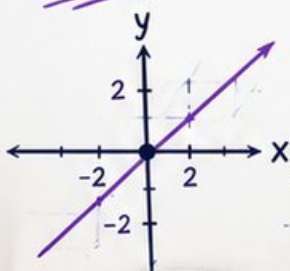
GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

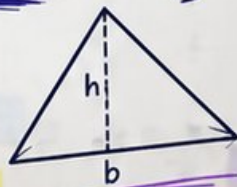
$$y = mx + b$$



**BUILD
CONFIDENCE.
SHARPEN SKILLS.
ACE YOUR
EXAM!**

Practice
Today
Succeed
Tomorrow!

$$A = \frac{1}{2}bh$$



7 PRINTED
TESTS



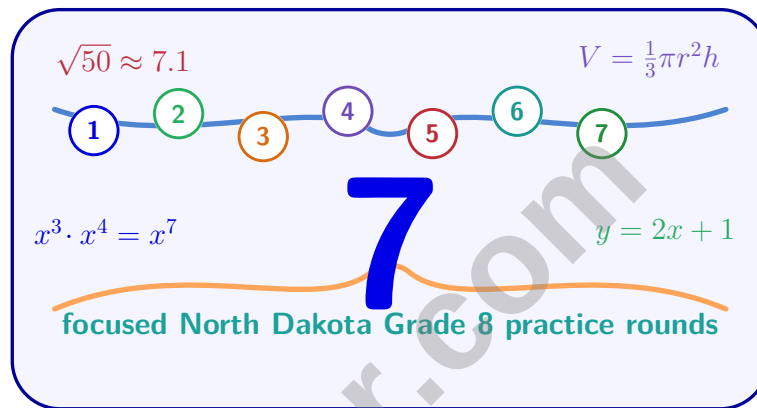
2 ONLINE
TESTS



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

7 North Dakota NDSA Grade 8 Math Practice Tests

Balanced NDSA Review for Grade 8 Equations, Graphs, and Data



Seven 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!

Seven focused rounds for sharper NDSA math thinking

This book gives you seven 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 seven-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?

Seven NDSA tests, 280 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.
Test 7	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.

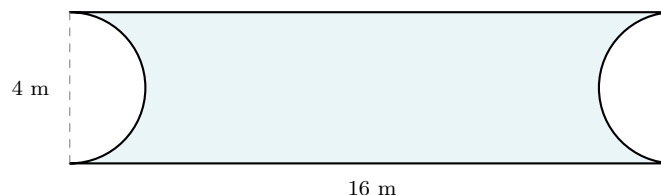


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- 1) A line passes through $(1, 3)$ and has slope -1 . What is the y -intercept?
- ☐ A. 2 ☐ C. -1
☐ B. 3 ☐ D. 4
- 2) Which system below can be solved by the elimination shown: adding the two equations to eliminate y ?
- ☐ A. $3x + y = 10$ and $2x + y = 7$ ☐ C. $x - 2y = 3$ and $2x + y = 5$
☐ B. $4x + 3y = 12$ and $2x - 3y = 6$ ☐ D. $5x + 2y = 11$ and $3x + y = 6$
- 3) Interest earned: Account X : $I(m) = 0.8m$ (monthly interest in dollars). Account Y at month 0: \$0, month 12: \$10. Which earns more annually (12 months)?
- ☐ A. Account X ☐ C. Both earn equal
☐ B. Account Y ☐ D. Cannot be determined
- 4) A student claims that a triangle with sides 4, 5, and 6 is a right triangle. What is wrong with this claim?
- ☐ A. The sides are too small ☐ C. A triangle cannot have sides that are consecutive
☐ B. $4^2 + 5^2 = 41 \neq 36 = 6^2$ ☐ D. The longest side must be even
- 5) A composite figure has a rectangle (16 m by 4 m) with a semicircle (diameter 4 m) removed from each short end. Find the perimeter of the resulting outline.



- ☐ A. 32 m ☐ C. 44.56 m
☐ B. 40 m ☐ D. 52.56 m



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- 6) 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

- 7) A residual is the vertical distance between a data point and the trend line. Which set of residuals indicates the BEST fit?

- ☐ A. Residuals of 15, -12, 18, -14, 20 ☐ C. Residuals of -20, -18, 22, 25, 19
☐ B. Residuals of -1, 0, 1, 0, -1 ☐ D. Residuals of -5, -4, 3, 4, 2

- 8) The line $x = -2$ is the boundary for which inequality?

- ☐ A. $x < -2$ only ☐ D. Any inequality comparing x with -2
☐ B. $x > -2$ only
☐ C. Only the strict inequalities $x < -2$ and $x > -2$

- 9) Polygon ABCD is translated 4 units left and 3 units down to form polygon A'B'C'D'. If angle A measures 85° , what is the measure of angle A'?

- ☐ A. 42.5° ☐ C. 85°
☐ B. 75° ☐ D. 95°

- 10) In triangle PQR, angle $P = (4x)^\circ$, angle $Q = (2x + 10)^\circ$, and angle $R = (3x - 10)^\circ$. Find angle P.

- ☐ A. 40° ☐ C. 80°
☐ B. 60° ☐ D. 100°



11) A point is distance $\sqrt{13}$ from the origin $(0, 0)$. Which of these could be the point's coordinates?

☐ A. $(2, 3)$

☐ C. $(2, 2)$

☐ B. $(3, 3)$

☐ D. $(4, 1)$

12) A survey measured the relationship between study time (hours) and test score. The best-fit line is $S = 5t + 60$, where S is the score and t is study time in hours. What is the predicted score if a student studies for 8 hours?

☐ A. 68

☐ C. 120

☐ B. 85

☐ D. 100

13) How many ways can 4 books be arranged on a shelf?

☐ A. $4 + 3 + 2 + 1 = 10$

☐ C. $4! = 24$

☐ B. $4^4 = 256$

☐ D. $\binom{4}{2} = 6$

14) Multiply: $(3x + 4)(2x - 1)$

☐ A. $5x^2 + 5x - 4$

☐ C. $6x^2 + 5x - 4$

☐ B. $6x^2 + 11x - 4$

☐ D. $6x^2 - 3x - 4$

15) Which table represents a LINEAR function?

x	1	2	3	4
y	3	7	11	15

☐ A. Yes, the first differences are constant

☐ C. Yes, all y -values are positive

☐ D. No, the x -values increase

☐ B. No, the y -values are not all even



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1) Which equation is NONLINEAR?

☐ A. $y = \frac{5}{2}x - \frac{3}{4}$

☐ C. $y = 4x^{-1}$

☐ B. $y = 10 + 0.5x$

☐ D. $y = -8x + 11$

2) If 6 pounds of almonds cost \$30, what is the constant of proportionality (unit price)?

☐ A. \$4 per pound☐ C. \$6 per pound☐ B. \$8 per pound☐ D. \$5 per pound

3) A phone plan costs \$30 per month plus \$0.15 per text message. If Marcus paid \$45 last month, which equation represents the situation, where t is the number of texts?

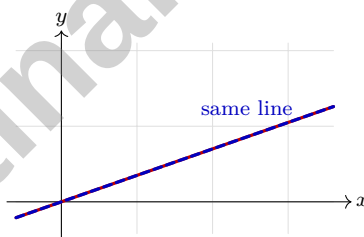
☐ A. $30 + 0.15t = 45$

☐ C. $45 + 30t = 0.15$

☐ B. $30t + 0.15 = 45$

☐ D. $0.15t - 30 = 45$

4) Two lines on a coordinate plane are identical (the same line). How many solutions does the system have?

☐ A. No solution☐ C. Exactly two solutions☐ B. Exactly one solution☐ D. Infinitely many solutions

5) Comparison of graphs: Line A passes through origin with slope 2. Line B crosses y -axis at -3 with slope 1. At $x = 4$, which is higher?

☐ A. Line A ☐ C. Both equal☐ B. Line B ☐ D. Cannot determine

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6) A right triangle has legs of $\sqrt{2}$ and $\sqrt{6}$. Simplify the hypotenuse.

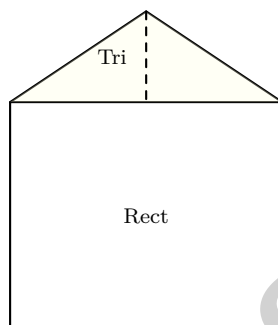
☐ A. $\sqrt{8}$ (which is $2\sqrt{2}$)

☐ C. $\sqrt{3}$

☐ B. $\sqrt{4}$ (which is 2)

☐ D. 4

7) A composite figure consists of a rectangle (6 m by 5 m) with a triangle on top (base 6 m, height 2 m). Find the total area.



☐ A. 30 m^2

☐ C. 39 m^2

☐ B. 36 m^2

☐ D. 42 m^2

8) Calculate $(8.5 \times 10^4) - (3.7 \times 10^4)$ in scientific notation.

9) A student incorrectly calculated the MAD and used the range instead. Data: $\{5, 8, 12, 15\}$, mean = 10. If the student found range = 10, what is the actual MAD?

☐ A. 2.5

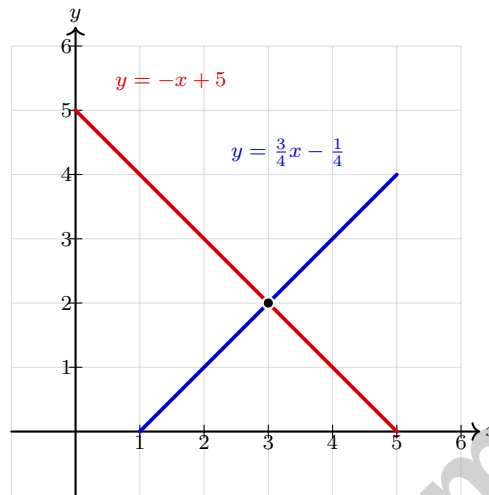
☐ C. 4

☐ B. 3.5

☐ D. 5



- 1) Use the graph to identify the solution to the system: $y = -x + 5$ and $y = \frac{3}{4}x - \frac{1}{4}$.



- ☐ A. (2, 3)
 ☐ C. (4, 1)
- ☐ B. (5, 0)
 ☐ D. (3, 2)
- 2) A segment has endpoints at $G(2, 5)$ and $H(8, 5)$. The segment is reflected across the line $y = x$. What is the length of the reflected segment $G'H'$?

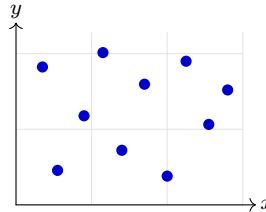
- 3) A bakery's two-way table shows 300 purchases by time and product type. Morning purchases: 120 bread, 80 pastries. Afternoon purchases: 60 bread, 40 pastries. What is the marginal relative frequency for pastries, rounded to the nearest hundredth?

	Bread	Pastries	Total
Morning	120	80	200
Afternoon	60	40	100
Total	180	120	300

- ☐ A. 0.27
 ☐ C. 0.40
- ☐ B. 0.33
 ☐ D. 0.47



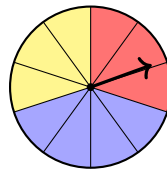
- 4) Two lines intersect. One angle is 82° . What is the measure of an adjacent angle?



5)

A scatter plot shows two variables with points scattered randomly in all directions with absolutely no visible trend or pattern. What does this indicate about the relationship between the variables?

- ☐ A. No correlation
 ☐ C. Strong negative correlation
☐ B. Strong positive correlation
 ☐ D. Perfect linear relationship
- 6) A spinner has 10 equal sections: 3 red, 4 blue, and 3 yellow. What is the probability of landing on red OR blue?



3 red, 4 blue, 3 yellow

- ☐ A. $\frac{4}{10}$
☐ C. $\frac{7}{10}$
☐ B. $\frac{12}{10}$
☐ D. $\frac{3}{10}$



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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.AR.EE.2) Using $y = mx + b$: $3 = -1(1) + b$, so $3 = -1 + b$, thus $b = 4$.
- 2) **Choice B is correct.** (8.AR.F.2) In option B, the y coefficients are $+3$ and -3 . Adding these equations eliminates y : $(4x + 3y) + (2x - 3y) = 12 + 6 \Rightarrow 6x = 18$.
- 3) **Choice B is correct.** (8.AR.F.2) $I_X(12) = 0.8(12) = 9.60$ dollars. Slope of Y : $(10 - 0)/12 \approx 0.833$ per month, so $I_Y(12) = 10$ dollars. Since $10 > 9.60$, Account Y earns more.
- 4) **Choice B is correct.** (8.GM.GF.6) Error analysis: Verify using the converse. $16 + 25 = 41$ but $36 \neq 41$, so this is NOT a right triangle.
- 5) **Choice C is correct.** (8.GM.GF.6) The perimeter includes two straight sides of 16 m and two semicircles that make one full circle with diameter 4 m. So $P = 16 + 16 + 3.14(4) = 44.56$ m.
- 6) **Choice B is correct.** (8.DPS.D.2) Set X clusters tightly around 20 (values 18–22). Set Y is spread widely (10–30). Larger spread implies larger MAD.
- 7) **Choice B is correct.** (8.DPS.D.2) Smaller residuals indicate better fit. A set of small residuals close to zero suggests the line passes near all data points.
- 8) **Choice D is correct.** (8.AR.EE.8) The line $x = -2$ is the boundary for any inequality involving x and -2 . For $\leq$ and $\geq$, the line is included; for $<$ and $>$, use a dashed line.
- 9) **Choice C is correct.** (8.GM.AV.1) Translation is a rigid motion that preserves all angles. Since polygon $A'B'C'D'$ is congruent to $ABCD$, angle $A' =$ angle $A = 85^\circ$.
- 10) **Choice C is correct.** (8.GM.GF.1) The angles sum to 180° : $4x + (2x + 10) + (3x - 10) = 180$, so $9x = 180$ and $x = 20$. Therefore angle $P = 4x = 80^\circ$.
- 11) **Choice A is correct.** (8.GM.GF.6) $d = \sqrt{2^2 + 3^2} = \sqrt{4 + 9} = \sqrt{13}$. Check: (B) $\sqrt{9 + 9} = \sqrt{18}$; (C) $\sqrt{4 + 4} = \sqrt{8}$; (D) $\sqrt{16 + 1} = \sqrt{17}$.
- 12) **Choice D is correct.** (8.DPS.D.3) Substitute $t = 8$: $S = 5(8) + 60 = 40 + 60 = 100$.
- 13) **Choice C is correct.** (8.NO.NS.1) Arrange all 4 books in order: $4! = 4 \times 3 \times 2 \times 1 = 24$.
- 14) **Choice C is correct.** (8.AR.EE.4) FOIL: $(3x + 4)(2x - 1) = 6x^2 - 3x + 8x - 4 = 6x^2 + 5x - 4$.
- 15) **Choice A is correct.** (8.AR.F.1) For a linear function, the differences between consecutive y -values are constant. Here: $7 - 3 = 4$, $11 - 7 = 4$, $15 - 11 = 4$. A constant first difference indicates linearity.
- 16) **The correct answer is 200.** (8.AR.EE.3) Compute $50 \times 4 = 200$.
- 17) **Choice A is correct.** (8.AR.F.4) Using $y = mx + b$ with $m = 3$ and point $(1, 7)$: $7 = 3(1) + b \Rightarrow b = 4$. Equation: $y = 3x + 4$.
- 18) **Choice A is correct.** (8.GM.GF.2) The y -coordinate stays the same while the x -coordinate negates. This is reflection across the y -axis: $(x, y) \rightarrow (-x, y)$.
- 19) **Choice B is correct.** (8.GM.GF.4) Alternate interior angles are congruent when a transversal cuts parallel lines. So $m = 55^\circ$.
- 20) **Choice D is correct.** (8.GM.AV.1) $500 = \frac{1}{3} \times 75 \times h \Rightarrow h = \frac{500 \times 3}{75} = \frac{1500}{75} = 20$ ft.
- 21) **The correct answer is B,D.** (8.AR.EE.8) A: $5x + 2 = 5x - 3 \Rightarrow 2 = -3$ (no solution). B: $2x + 4 = x + 8 \Rightarrow x = 4$ (one solution). C: $3x - 5 = 3x - 5$ (identity, infinitely many). D: $4x + 1 = 2x + 9 \Rightarrow 2x = 8 \Rightarrow x = 4$ (one solution). E: $x = x$ (identity, infinitely many). Correct answers: B and D.
- 22) **Choice B is correct.** (8.GM.GF.4) A hexagon's interior angles add to 720° . The known angles add to $68 + 118 + 102 + 150 + 106 = 544^\circ$, so the sixth angle is $720 - 544 = 176^\circ$.
- 23) **Choice C is correct.** (8.DPS.D.1) Negative correlation between temperature and cost means as temperature increases, cost decreases, which is logical for heating costs.
- 24) **The correct answer is 6.** (8.AR.EE.5) Add 5 and divide by 2: $x \geq 6$. The boundary value is 6.
- 25) **Choice D is correct.** (8.DPS.D.4) The marginal frequency for middle school is the row total: $55 + 70 = 125$.
- 26) **Choice C is correct.** (8.GM.GF.6) $P(\text{white first}) = \frac{3}{8}$; $P(\text{black second} \mid \text{white first}) = \frac{5}{7}$. Product: $\frac{3}{8} \times \frac{5}{7} = \frac{15}{56}$.
- 27) **Choice D is correct.** (8.NO.NS.1) This is false. π is irrational; it cannot be written as a fraction of two integers and has a non-terminating, non-repeating decimal expansion. All other statements are true.



You Are Building Test Stamina

Hi, Stamina Builder!

◇ This broad and demanding book gave you seven strong Grade 8 practice tests, so you had repeated chances to build accuracy, pacing, and confidence. Completing practice tests builds more than math knowledge. It builds the focus needed to think clearly for a long stretch. ◇

★ **Remember this:** That stamina matters. On real test day, calm pacing can be just as important as remembering a formula. ★

Stamina Skills

- **Breathe:** Reset before a difficult page.
- **Pace:** Do not spend too long in one place.
- **Return:** Come back to skipped questions with fresh eyes.
- **Finish Strong:** Use the last minutes to check.

Grade 8 test-day tip: Practice a simple reset: pause, breathe, reread, then choose your next step.

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

Jay Daie

Your Test-Stamina Coach

PRACTICE TODAY SUCCEED TOMORROW!

Give your child the confidence and skills they need with **7 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!

GRADE 8

Practice
Today
Succeed
Tomorrow!

Algebra

Geometry

Statistics

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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