

North Dakota

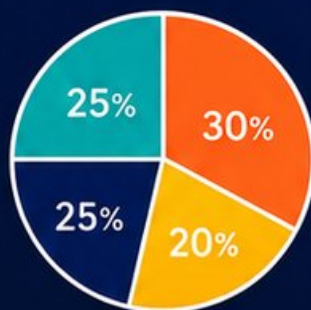
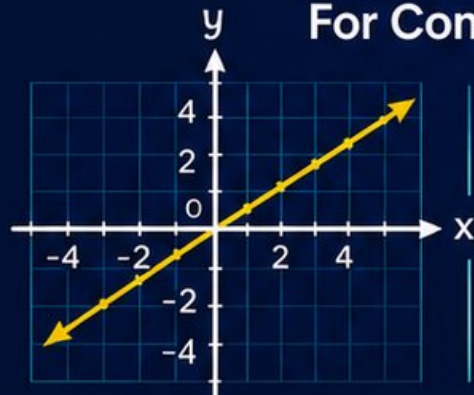
NDSA

GRADE 8

MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

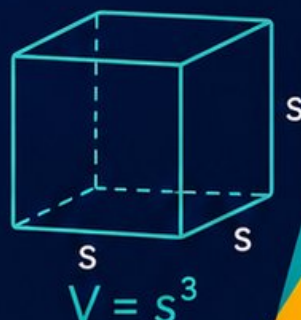


$$y = mx + b$$

$$2x - 3y = 6$$

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

$$A = bh$$



4 PRINTED TESTS



2 ONLINE TESTS

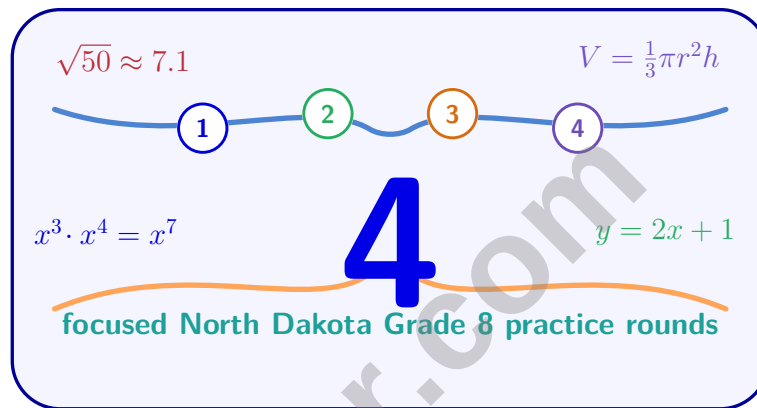


Use these **two additional online practice tests** for extra review after the printed tests in this book.



4 North Dakota NDSA Grade 8 Math Practice Tests

Four NDSA Practice Rounds for Clear Grade 8 Math Growth



Four 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!

Four focused rounds for sharper NDSA math thinking

This book gives you four 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 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.

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?

Four NDSA 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 student finds that their homework scores have a mean of 85 and MAD of 4. Which interval is one MAD from the mean?

☐ A. 81 to 89

☐ C. 80 to 90

☐ B. 75 to 95

☐ D. 70 to 100

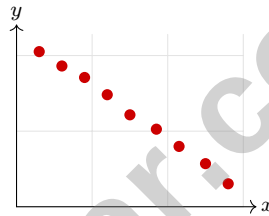
2) A slower cyclist riding 12 mph has a 9-mile head start. A faster cyclist riding 15 mph starts from the same point and rides in the same direction. How long will it take the faster cyclist to catch up?

☐ A. 2 hours

☐ C. 3 hours

☐ B. 2.5 hours

☐ D. 4 hours



3)

A scatter plot shows the relationship between exercise frequency (days per week) and resting heart rate (bpm). The points form a clear downward trend with minimal scatter around the trend line. A student can infer that:

☐ A. Exercise causes higher heart rates

☐ C. Exercise and heart rate are unrelated

☐ B. More exercise is associated with lower resting heart rate

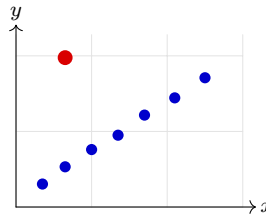
☐ D. Heart rate determines exercise frequency



- 4) A bag has 9 cards: 4 red, 3 blue, 2 green. Three cards are drawn without replacement. What is the probability that all three are red?

☐ A. $\frac{4}{9}$
☐ B. $\frac{24}{504}$

☐ C. $\frac{12}{504}$
☐ D. $\frac{64}{729}$



5)

A scatter plot shows the time spent studying versus quiz grade. One point is far below the trend line, which could indicate:

- ☐ A. The trend line is incorrect
☐ B. That student may have been unprepared despite studying, or the data was recorded incorrectly
☐ C. Studying does not affect quiz grades
☐ D. The student did not study enough

- 6) A triangle is dilated by a scale factor of 4. Which statement is true?

- ☐ A. Each angle is multiplied by 4
☐ B. The angles remain the same
☐ C. Each angle is divided by 4
☐ D. The shape becomes a different type of polygon

- 7) What does $3!$ equal?

- ☐ A. $3 + 2 = 5$
☐ B. $3 \times 2 \times 1 = 6$
☐ C. $3^3 = 27$
☐ D. $\frac{3}{2} = 1.5$



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8)

Decimal Types

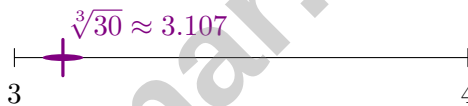
Terminating	Repeating
0.5, 0.75	$0.\overline{12}$

Which decimal is rational?

- ☐ A. 0.123456... (non-repeating) ☐ C. 0.454545... (repeating)
☐ B. π ☐ D. e (Euler's number)

9) Which equals $0.\overline{54}$?

- ☐ A. $\frac{54}{100}$ ☐ C. $\frac{54}{90}$
☐ B. $\frac{27}{50}$ ☐ D. $\frac{54}{99} = \frac{6}{11}$

Cube values: $3^3 = 27$, $4^3 = 64$ 

10)

Between which two consecutive integers does $\sqrt[3]{30}$ lie?

- ☐ A. 1 and 2 ☐ C. 3 and 4
☐ B. 2 and 3 ☐ D. 4 and 5

11) Which is the best estimate of $3\sqrt{5}$?

- ☐ A. 4.5 ☐ C. 6.7
☐ B. 6.0 ☐ D. 9.8



1)

	H	T
1	H1	T1
2	H2	T2

A coin is flipped and a spinner labeled 1, 2 is spun. What is the probability of getting an outcome where the coin is heads?

☐ A. $\frac{1}{4}$

☐ C. $\frac{1}{3}$

☐ B. $\frac{1}{2}$

☐ D. $\frac{3}{4}$

2) A line has slope -2 . Which pair of points could lie on this line?

☐ A. (1, 3) and (2, 5)

☐ C. (1, 1) and (3, 1)

☐ B. (0, 4) and (2, 0)

☐ D. (2, 5) and (3, 4)

3) A point on a coordinate grid is at distance $\sqrt{50}$ from the origin. If one coordinate is 5, what is the other coordinate?

4) To solve the system $y = 2x - 3$ and $y = -x + 6$, which method is most efficient?

☐ A. Elimination

☐ C. Substitution

☐ B. Graphing

☐ D. Guess and check

5) A business profit function is $P(x) = 50x - 200$, where x is the number of units sold. What is the profit when 10 units are sold?

☐ A. \$300

☐ C. \$200

☐ B. \$250

☐ D. \$500


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6) A two-way table with 280 people:

	Owens Phone	No Phone	Total
Age 13–17	175	21	196
Age 18+	78	6	84
Total	253	27	280

Among those who own a phone, what is the relative frequency for ages 13–17, rounded to the nearest hundredth?

☐ A. 0.62

☐ C. 0.78

☐ B. 0.69

☐ D. 0.89

7) Data: $\{5, 5, 5, 5, 5\}$. What is the MAD?

☐ A. 0

☐ C. 5

☐ B. 1

☐ D. 25

8) In a right triangle, one leg is 8 cm and the hypotenuse is 17 cm. Find the other leg.

☐ A. 9 cm

☐ C. 19 cm

☐ B. 15 cm

☐ D. 25 cm

9) An angle is 12° less than three times its supplement. Write and solve an equation to find the angle's measure.



- 1) A vehicle loan of \$25,000 at 6% simple interest for 5 years. What is the total amount to repay?

☐ A. \$25,750 ☐ C. \$30,000
☐ B. \$27,500 ☐ D. \$32,500

- 2) A table of values for a linear relationship is partially filled:

x	2	5	8
y	3	?	15

What is the missing y -value?

☐ A. 8 ☐ C. 10
☐ B. 12 ☐ D. 9

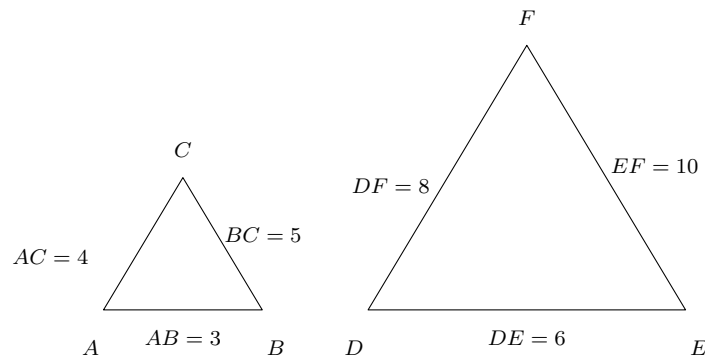
- 3) A recipe calls for 2 parts flour to 1 part sugar. If a baker uses 9 cups total of these two ingredients, how many cups of flour are needed?

☐ A. 3 cups ☐ C. 6 cups
☐ B. 4.5 cups ☐ D. 7 cups



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- 4) Two triangles are shown below. Triangle ABC has sides 3, 4, 5. Triangle DEF has sides 6, 8, 10. Are these triangles similar?



- ☐ A. No, because the sides are different lengths
☐ B. Yes, each side of DEF is twice the corresponding side of ABC
☐ C. No, the angles are not equal
☐ D. Cannot be determined
- 5) Car A travels 240 miles in 4 hours. Car B travels 300 miles in 6 hours. What is the difference in speed?

- 6) The table shows $f(x)$. If $f(x) = 8$, what is x ?

x	1	2	3	4
$f(x)$	4	6	8	10

- ☐ A. 1
☐ B. 2
☐ C. 3
☐ D. 4



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 A is correct.** (8.DPS.D.2) One MAD from the mean means subtract and add the MAD: $85 - 4 = 81$ and $85 + 4 = 89$, so the interval is 81 to 89.
- 2) **Choice C is correct.** (8.AR.EE.2) Let t = the time in hours after the faster cyclist starts. The faster cyclist travels $15t$ miles, and the slower cyclist's distance from the same starting point is $9 + 12t$. Set $15t = 9 + 12t$, so $3t = 9$ and $t = 3$.
- 3) **Choice B is correct.** (8.DPS.D.1) The downward trend shows negative correlation: as exercise increases, resting heart rate decreases. This is a typical physiological response.
- 4) **Choice B is correct.** (8.GM.GF.6) $P = \frac{4}{9} \times \frac{3}{8} \times \frac{2}{7} = \frac{24}{504} = \frac{1}{21}$.
- 5) **Choice B is correct.** (8.DPS.D.2) A point far from the line is an outlier with a large residual. It suggests an unusual circumstance—perhaps the student was ill, didn't study the right material, or a data error occurred.
- 6) **Choice B is correct.** (8.GM.AV.1) Dilation preserves angles (and shape). Only lengths scale, not angle measures.
- 7) **Choice B is correct.** (8.NO.NS.1) The factorial symbol $!$ means multiply all whole numbers from that number down to 1. So $3! = 3 \times 2 \times 1 = 6$.
- 8) **Choice C is correct.** (8.NO.NS.1) The repeating decimal $0.454545\ldots = 0.\overline{45} = \frac{45}{99} = \frac{5}{11}$, which is rational. Non-repeating non-terminating decimals like π and e are irrational.
- 9) **Choice D is correct.** (8.NO.NS.1) Let $x = 0.\overline{54}$. Then $100x = 54.\overline{54}$. Subtracting: $99x = 54$, so $x = \frac{54}{99} = \frac{6}{11}$.
- 10) **Choice C is correct.** (8.NO.NS.2) $3^3 = 27$ and $4^3 = 64$. Since $27 < 30 < 64$, we have $3 < \sqrt[3]{30} < 4$.
- 11) **Choice C is correct.** (8.GM.GF.2) $\sqrt{5} \approx 2.24$, so $3\sqrt{5} \approx 3 \times 2.24 = 6.72$.
- 12) **Choice D is correct.** (8.GM.GF.3) Move the decimal 5 places left: $6.4 \times 10^{-5} = 0.000064$ g.
- 13) **Choice A is correct.** (8.GM.GF.6) Interest costs: A: \$240 (total \$2,240); B: \$320 (total \$2,320); C: \$360 (total \$2,360); D: \$320 (total \$2,320). Option A has the lowest total cost.
- 14) **Choice B is correct.** (8.GM.AV.1) $SA = 2(\frac{3}{2} \times 1 + \frac{3}{2} \times \frac{1}{2} + 1 \times \frac{1}{2}) = 2(\frac{3}{2} + \frac{3}{4} + \frac{1}{2}) = 2(\frac{11}{4}) = \frac{11}{2}$ ft².
- 15) **Choice B is correct.** (8.GM.GF.2) Reflecting across the vertical line $x = 1$: distance from $(0, 2)$ to the line is 1 unit left. The image is 1 unit right of the line at $(2, 2)$.
- 16) **Choice A is correct.** (8.AR.EE.2) Slope = $\frac{3-7}{0-(-2)} = \frac{-4}{2} = -2$. When $x = 0$, $y = 3$, so $b = 3$. Thus $y = -2x + 3$.
- 17) **Choice A is correct.** (8.AR.EE.8) Multiply both sides by 5: $3x - 2 = 10$. Add 2: $3x = 12$. Divide by 3: $x = 4$.
- 18) **The correct answer is $\frac{1}{4}$.** (8.NO.NS.1) Slope = $\frac{500}{2000} = \frac{1}{4} = 0.25$.
- 19) **The correct answer is A,B.** (8.AR.F.1) Verify each value: $f(1) = 3$ and $f(3) = 7$, so A and B are correct. Also, $f(2) = 5$, $f(0) = 1$, and $f(4) = 9$, so C, D, and E are false.
- 20) **Choice A is correct.** (8.AR.EE.5) Subtract 7: $x < 3$. The open circle and left ray match this solution.
- 21) **Choice D is correct.** (8.AR.EE.8) Test $(3, 2)$: $3 + 2 = 5 \not\leq 4$ FALSE. The other points all satisfy $x + y \leq 4$.
- 22) **Choice B is correct.** (8.GM.AV.1) From $V = \pi r^2 h$, we get $h = \frac{V}{\pi r^2} = \frac{628}{3.14 \times 25} = \frac{628}{78.5} = 8$ m.
- 23) **Choice B is correct.** (8.DPS.D.3) Residual = $65 - 62 = 3$. The actual value exceeds the prediction by 3 calories; the model underestimated.
- 24) **Choice C is correct.** (8.AR.F.2) Using the product rule, the missing exponent plus 4 must equal 9. So the missing exponent is $9 - 4 = 5$.
- 25) **Choice C is correct.** (8.AR.EE.2) $7^2 = 49$ and $8^2 = 64$, so $\sqrt{50}$ is a little more than 7. Since $\sqrt{50} \approx 7.07$, it is closest to 7.1.
- 26) **Choice D is correct.** (8.AR.EE.3) Divide coefficients: $1.8 \div 9 = 0.2 = 2 \times 10^{-1}$. Subtract exponents: $10^{-2} - (-8) = 10^6$. Combine: $2 \times 10^{-1} \times 10^6 = 2 \times 10^5$.
- 27) **Choice C is correct.** (8.AR.EE.3) Substitute $x = 7$ into $y = 2x$: $y = 2(7) = 14$. The cost is \$14.
- 28) **Choice A is correct.** (8.AR.F.2) Add the equations: $(5x + 2y) + (3x - 2y) = 16 + 0$, so $8x = 16$, giving $x = 2$. Substitute: $5(2) + 2y = 16$, so $10 + 2y = 16$ and $y = 3$. Solution: $(2, 3)$.
- 29) **Choice A is correct.** (8.AR.EE.4) Find two numbers that multiply to 42 and add to -13 : -6 and -7 . Verify: $(-6)(-7) = 42$ and $-6 - 7 = -13$.



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Hi, Persistent Problem Solver!

◇ Some Grade 8 questions ask you to hold several ideas in your mind at once. That can feel hard, and that is exactly why practice matters. ◇

★ **Remember this:** You showed persistence by continuing through the set. That habit is powerful because difficult problems often open after one more good attempt. You practiced across 4 full Grade 8 practice tests, and that repeated effort matters. ★

Persistence Tools

- **Try a Smaller Case:** Use an easier number to see the pattern.
- **Draw It:** Make the situation visible.
- **Restate It:** Say the question in your own words.
- **Check One Step:** Fix the first unclear place.

Grade 8 test-day tip: When stuck, do not restart everything. Find the first step you trust, then rebuild from there.

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

Jay Daie

Your Persistence 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



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