

NORTH DAKOTA

NDSA

GRADE 8 MATH

PRACTICE TESTS

5

PRINTED
TESTS



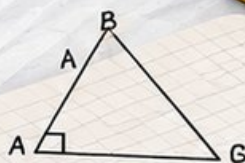
2

 ONLINE
TESTS

**Standards Aligned
Problem Solving For
Comprehensive Assessment Programs**



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



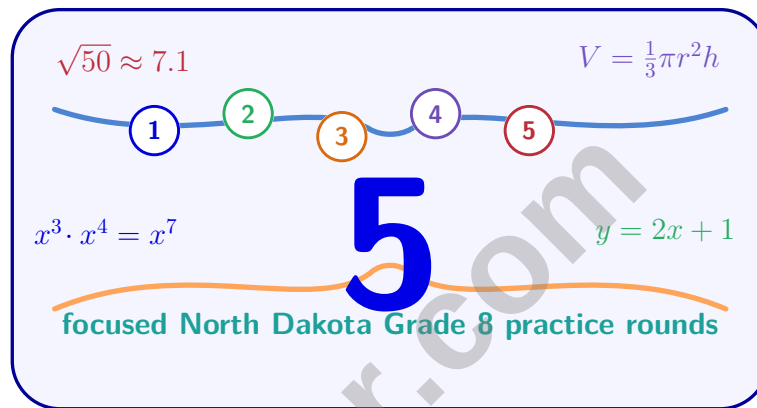
$$a^2 + b^2 = c^2$$



$$y = mx + b$$

5 North Dakota NDSA Grade 8 Math Practice Tests

Five NDSA Tests for Grade 8 Math Growth



Five 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!

Five focused rounds for sharper NDSA math thinking

This book gives you five 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 five-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?

Five NDSA tests, 200 questions, and a focused review path

Part	What You Will Practice
Tests 1–2	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 3–5	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.



Scan me!
For more practice
& answers

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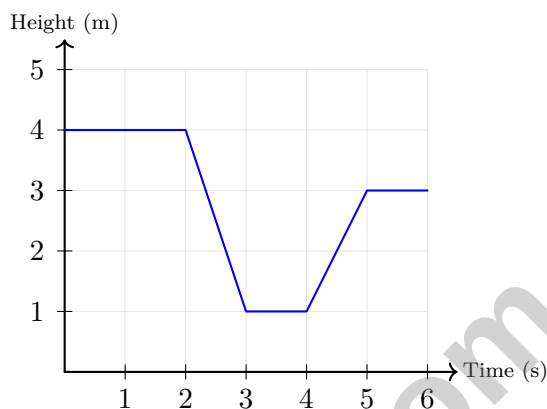
1) Which set of side lengths forms a right triangle?

☐ A. 7, 10, 12

☐ C. 4, 5, 10

☐ B. 6, 8, 10

☐ D. 1, 2, 4



2)

A toy platform follows the height-time graph shown. Which description is accurate?

☐ A. The object goes up constantly, then down, then flat

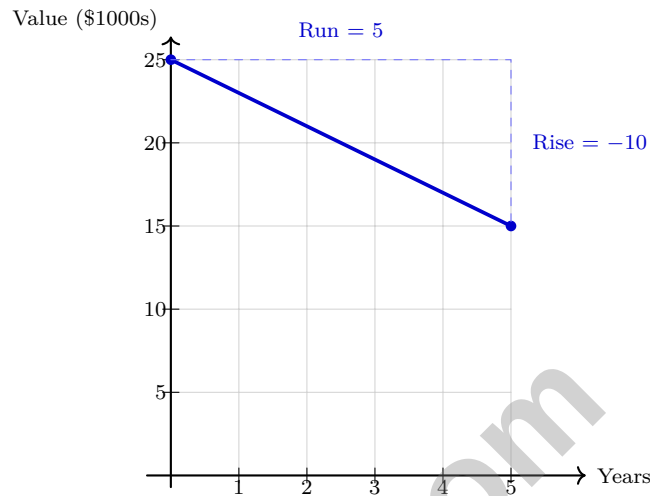
☐ C. The object increases, then decreases throughout

☐ B. The object stays level, drops, stays level, rises, stays level

☐ D. The object decreases in height initially



- 3) A graph shows the value of a car (in \$1000s) depreciating over years. The line passes through $(0, 25)$ and $(5, 15)$.

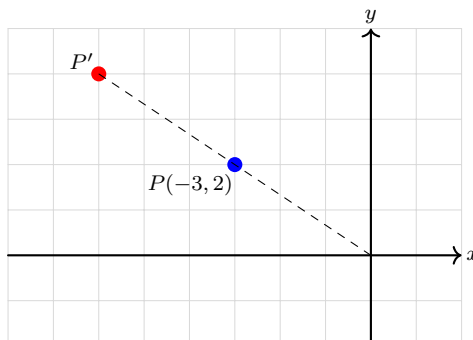


- ☐ A. -\$2000 per year ☐ C. \$2000 per year
☐ B. -\$1000 per year ☐ D. 5 years per \$1000
- 4) Which system best models: "The sum of two numbers is 20. Their difference is 4"?
- ☐ A. $x + y = 20$; $x - y = 4$ ☐ C. $x \cdot y = 20$; $x/y = 4$
☐ B. $x + y = 20$; $x + y = 4$ ☐ D. $x = 20$; $y = 4$



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- 5) Point $P(-3, 2)$ is dilated by scale factor 2 from the origin. What are the coordinates of P' ?



- ☐ A. $(-6, 4)$
☐ C. $(6, -4)$
☐ B. $(-3, 4)$
☐ D. $(-6, -4)$
- 6) A phone plan charges based on minutes used. The table shows the cost $C(m)$ for m minutes.

Minutes (m)	100	200	300	400
Cost ($C(m)$)	\$20	\$30	\$40	\$50

What is $C(200)$?

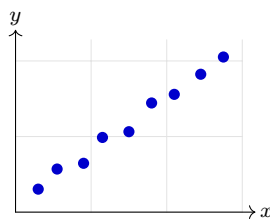
- ☐ A. \$20
 ☐ C. \$30
☐ B. \$40
 ☐ D. \$50
- 7) Table 1: $(0, 1)$, $(2, 5)$, $(4, 9)$. Table 2: $(0, -2)$, $(1, -1)$, $(2, 0)$. Which table represents a function with steeper rate of change?

x	0	2	4
Table 1	1	5	9

x	0	1	2
Table 2	-2	-1	0

- ☐ A. Table 1
 ☐ C. Both have same rate.
☐ B. Table 2
 ☐ D. Cannot be determined.





1)

A scatter plot shows hours of sleep (x) versus cognitive test score (y) for a sample of college students. The relationship is strong and positive ($r = 0.88$). An advertisement claims: “**Buy our mattress; it will increase your test scores by 20 points!**” What is the logical flaw?

- | | |
|---|--|
| ☐ A. Correlation coefficients cannot be negative | ☐ C. Strong correlation does not prove that the mattress causes better scores |
| ☐ B. College students do not sleep enough | ☐ D. Sleep has no effect on test scores |

2) A function machine applies the rule: “Divide the input by 2 and subtract 1.” What is the output when the input is 10?

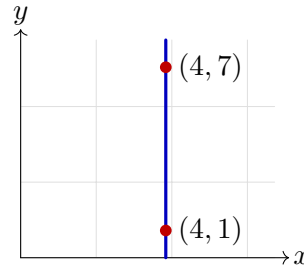
- | | |
|-------------------------------|-------------------------------|
| ☐ A. 5 | ☐ C. 3 |
| ☐ B. 9 | ☐ D. 4 |

3) A function has both a zero and an x -intercept at the same point. Which statement is true?

- | | |
|---|--|
| ☐ A. This is impossible; a zero and x -intercept are different | ☐ C. They are related but occur at different points |
| ☐ B. They are the same thing; a zero occurs where $f(x) = 0$, which is the x -intercept | ☐ D. Only nonlinear functions can have both |



- 4) A graph shows a line with an undefined slope passing through $(4, 1)$ and $(4, 7)$. Which description fits?



- ☐ A. The line is horizontal
- ☐ B. The line is slanted at 45°
- ☐ C. The line has zero slope
- ☐ D. The line is vertical
- 5) How much of a 100% alcohol solution must be mixed with 500 mL of 20% alcohol solution to create a 50% solution?
- ☐ A. 100 mL
- ☐ B. 200 mL
- ☐ C. 300 mL
- ☐ D. 400 mL
- 6) A square park has an area of 169 square yards. What is the length of one side of the park?

- 7) A cube is dilated by a scale factor of 2. If the original cube has volume 27 cm^3 , what is the volume of the dilated cube?
- ☐ A. 54 cm^3
- ☐ B. 108 cm^3
- ☐ C. 216 cm^3
- ☐ D. 81 cm^3



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1) A teacher records the height (in cm) of each student. Does the height function have more inputs or more outputs?

- ☐ A. More inputs, because each student maps to a height.
- ☐ B. More outputs, because height can vary.
- ☐ C. Equal numbers, since the domain and range must match.
- ☐ D. It depends on the specific students in the class.

2) An online retailer offers a \$500 item at \$45/month for 12 months with financing. What is the implicit interest charge?

- ☐ A. \$640
- ☐ B. \$45
- ☐ C. \$540
- ☐ D. \$40

3) What is the value of 8^0 ?

- ☐ A. 0
- ☐ B. Undefined
- ☐ C. 8
- ☐ D. 1

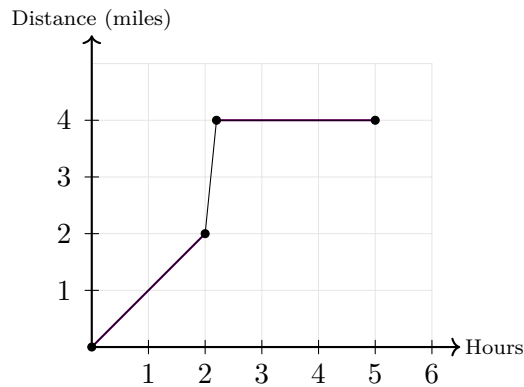
4) If $x^3 = 512$, what is x ?

- ☐ A. 7
- ☐ B. 10
- ☐ C. 9
- ☐ D. 8

5) Which quotient is the largest?

- ☐ A. $\frac{8 \times 10^6}{4 \times 10^2}$
- ☐ B. $\frac{6 \times 10^5}{2 \times 10^1}$
- ☐ C. $\frac{9 \times 10^4}{3 \times 10^{-2}}$
- ☐ D. $\frac{4 \times 10^7}{2 \times 10^3}$



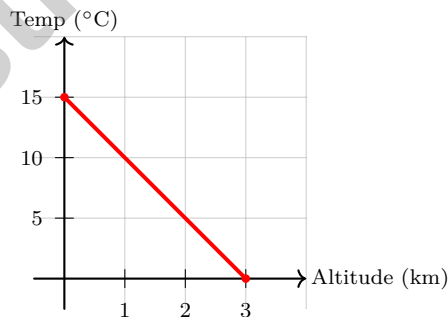


6)

A traveler's distance graph shows: 0 to 2 hours rising, then a jump, then flat. What does the jump represent?

- ☐ A. The traveler rested without moving ☐ C. This graph cannot represent a real physical scenario (discontinuity)
☐ B. The traveler waited at the same distance ☐ D. The traveler went backward in distance

7) A graph shows temperature (in $^{\circ}\text{C}$) versus altitude (in km). The line passes through (0, 15) and (3, 0).



What is the slope?

- ☐ A. -5°C per km ☐ C. $-\frac{1}{5}^{\circ}\text{C}$ per km
☐ B. 5°C per km ☐ D. 3°C per km



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& answers

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

- Choice B is correct.** (8.GM.GF.6) Check: $6^2 + 8^2 = 36 + 64 = 100 = 10^2$. This is a scaled 3-4-5 triple (all multiplied by 2).
- Choice B is correct.** (8.AR.F.5) From 0 to 2s: flat (height constant at 4m). From 2 to 3s: the height drops to 1m. From 3 to 4s: flat at 1m. From 4 to 5s: the height rises to 3m. From 5 to 6s: flat at 3m.
- Choice A is correct.** (8.NO.NS.1) Slope = $\frac{15 - 25}{5 - 0} = \frac{-10}{5} = -2$ (in \$1000 units). In dollars: $-2 \times 1000 = -\$2000$ per year.
- Choice A is correct.** (8.AR.EE.2) "Sum" translates to $x + y = 20$. "Difference" translates to $x - y = 4$ (or $y - x = 4$, depending on order). Options B, C, and D do not match these descriptions.
- Choice A is correct.** (8.GM.AV.1) Multiply both coordinates by 2: $(-3 \times 2, 2 \times 2) = (-6, 4)$.
- Choice C is correct.** (8.AR.F.1) Locate $m = 200$ in the table; the cost is \$30.
- Choice A is correct.** (8.AR.F.2) Rate for Table 1: $(5 - 1)/(2 - 0) = 2$. Rate for Table 2: $(-1 - (-2))/(1 - 0) = 1$. Since $2 > 1$, Table 1 is steeper.
- Choice B is correct.** (8.AR.F.1) The differences between consecutive y -values are $1 - 0 = 1$, $4 - 1 = 3$, $9 - 4 = 5$, which are not constant, indicating a nonlinear (quadratic) function.
- Choice A is correct.** (8.AR.F.4) Slope is $\frac{\Delta P}{\Delta t} = \frac{6}{3} = 2$ thousand per year from $t = 0$ to $t = 3$ (or any consecutive pair).
- Choice B is correct.** (8.GM.AV.1) From the diagram, quadrilateral ABCD (left) is congruent to EFGH (right) with vertices labeled in order: $A \rightarrow E$, $B \rightarrow F$, $C \rightarrow G$, $D \rightarrow H$. The tick marks on sides confirm this correspondence. Since congruent figures have equal corresponding angles, $\angle A = \angle E$, $\angle B = \angle F$, and so on.
- Choice B is correct.** (8.GM.GF.2) Translation right 4, down 2: $(x, y) \rightarrow (x + 4, y - 2)$. So $M(5, 1) \rightarrow M'(9, -1)$.
- Choice D is correct.** (8.GM.GF.1) Use the triangle angle sum: $50 + 30 + \angle ACB = 180$. So $\angle ACB = 180 - 50 - 30 = 100^\circ$.
- Choice A is correct.** (8.GM.GF.6) $d = \sqrt{(2 - (-4))^2 + (7 - (-1))^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$.
- Choice C is correct.** (8.GM.GF.4) Angles on a straight line sum to 180° . The third angle is $180 - 42 - 85 = 53^\circ$.
- Choice A is correct.** (8.GM.AV.1) Original: $V = \frac{1}{3}Bh$. New: $V' = \frac{1}{3}(2B) \times \frac{h}{2} = \frac{1}{3}Bh = V$. Volume is unchanged.
- Choice B is correct.** (8.GM.GF.6) Trapezoid area = $\frac{1}{2}(b_1 + b_2) \times h = \frac{1}{2}(4 + 6) \times 2 = 10 \text{ m}^2$.
- Choice C is correct.** (8.GM.GF.4) Each exterior angle of a regular hexagon: $\frac{360}{6} = 60^\circ$.
- Choice B is correct.** (8.DPS.D.4) Among high-income households (total 60), those without internet = 5. Relative frequency = $\frac{5}{60} \approx 0.083$.
- The correct answer is A, B.** (8.AR.EE.3) Division rule: divide coefficients ($6.4 \div 1.6 = 4$, choice A) and subtract exponents ($-3 - (-5) = 2$, choice B). This gives 4×10^2 . Choice C is wrong, choice D incorrectly adds exponents, and choice E has the wrong exponent sign.
- Choice C is correct.** (8.DPS.D.2) The new mean is $\frac{9(100) + 120}{10} = 102$. The nine values of 100 are each 2 from the mean, and 120 is 18 from the mean. The MAD is $\frac{9(2) + 18}{10} = 3.6$.
- The correct answer is 4.** (8.AR.EE.3) The constant is $k = 12 \div 3 = 4$.
- Choice A is correct.** (8.GM.GF.6) Each section is equal, so each has probability $\frac{1}{4}$.
- The correct answer is no solution.** (8.AR.F.2) The two equations represent lines with the same slope $\frac{1}{2}$ but different y -intercepts (1 and 4), making them parallel. Parallel lines never intersect, so the system has no solution.
- Choice B is correct.** (8.NO.NS.1) Multiply the number of choices at each step: $3 \times 2 \times 4 = 24$ different outfits.
- Choice B is correct.** (8.DPS.D.1) A U-shaped curve represents a nonlinear relationship. The direction changes, so it is not a simple linear correlation.
- Choice A is correct.** (8.DPS.D.2) A poor fit means the line fails to capture the pattern in the data. Large gaps (residuals) between points and the line indicate a weak relationship. A good fit minimizes these distances.



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 5 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. Succeed Tomorrow!

Give your child the confidence and skills they need with **5 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!



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 | ✓ 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! |

5
PRINTED
TESTS



2 ONLINE
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