

VERMONT VTCAP

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.



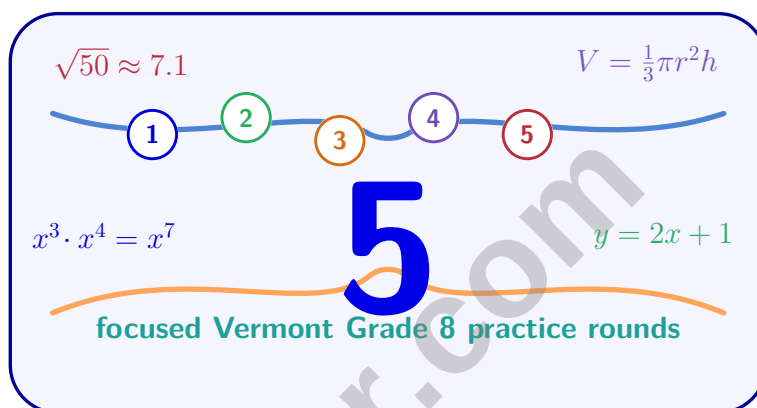
$$a^2 + b^2 = c^2$$



$$y = mx + b$$

5 Vermont VTCAP Grade 8 Math Practice Tests

Steady VTCAP Review for Algebra, Graphs, and Geometry



Five complete 40-question Grade 8 VTCAP 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, Vermont Grade 8 Problem Solver!

Five focused rounds for sharper VTCAP math thinking

This book gives you five full Grade 8 VTCAP 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 Vermont 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.

Vermont 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 VTCAP 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.

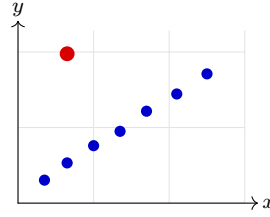
The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.



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For more practice
& answers

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1)

A medical study plots patient age (years) versus cholesterol level (mg/dL). The scatter plot shows a moderate positive correlation with most points clustered near a trend line. However, one 35-year-old has a cholesterol level of 280 mg/dL, while most 35-year-olds in the study have levels near 200 mg/dL. A doctor should:

- | | |
|--|--|
| ☐ A. Investigate this outlier for potential health risks or data errors | ☐ C. Remove it to improve the correlation coefficient |
| ☐ B. Ignore it because the overall trend is clear | ☐ D. Use it to predict all 35-year-olds' cholesterol levels |

2) A bakery produces 50 cookies per hour. After 4 hours, how many cookies have been produced?

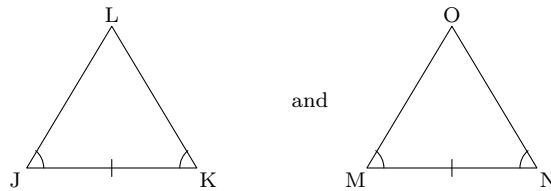
3) A through $(0, 2)$ and $(1, 5)$. B through $(0, -1)$ and $(1, 1)$. Which has greater rate?

- | | |
|--|---|
| ☐ A. Function A | ☐ C. Both same. |
| ☐ B. Function B | ☐ D. Cannot be determined. |



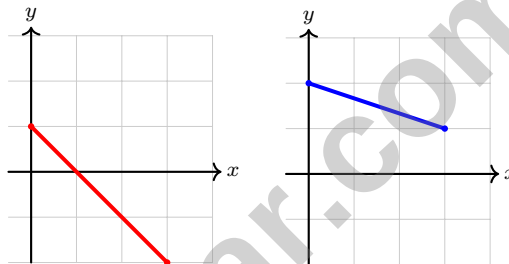
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- 4) Triangle JKL is congruent to triangle MNO. Which congruence statement is correct?



- ☐ A. Triangle $JKL \cong$ Triangle MNO ☐ C. Triangle $JKL \cong$ Triangle NOM
☐ B. Triangle $JKL \cong$ Triangle MON ☐ D. Triangle $JKL \cong$ Triangle ONM

- 5) Which graph best represents a line with slope $-\frac{1}{3}$?



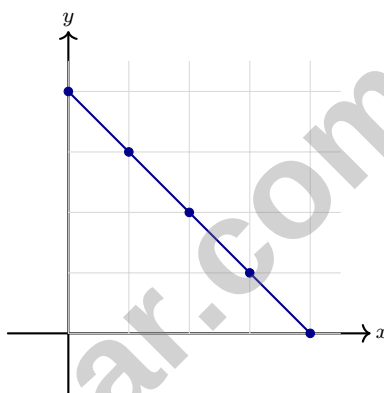
- ☐ A. Red line (left) ☐ C. Both have slope $-\frac{1}{3}$
☐ B. Neither has slope $-\frac{1}{3}$ ☐ D. Blue line (right)
- 6) A water tank contains saltwater at 2% concentration. To reduce the concentration to 1%, how much pure water must be added to 100 liters of the 2% solution?

- ☐ A. 50 L ☐ C. 100 L
☐ B. 75 L ☐ D. 150 L



- 7) Solve the system $\begin{cases} 3x - 2y = 4 \\ x + 2y = 8 \end{cases}$ by elimination.

- 8) The graph shows function $r(x)$. What is $r(0)$?

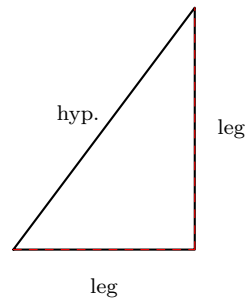


- ☐ A. 0
- ☐ B. 2
- ☐ C. 4
- ☐ D. 1
- 9) Which equation represents a NONLINEAR function?
- ☐ A. $y = 2x + 3$
- ☐ B. $y = -x + 5$
- ☐ C. $y = x^2 + 1$
- ☐ D. $y = \frac{1}{2}x - 7$



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1) Which right triangle dimensions follow the Pythagorean Theorem?



☐ A. 3, 4, 5

☐ C. 2, 3, 4

☐ B. 5, 10, 12

☐ D. 1, 2, 3

2) Which scenario represents a relation that is NOT a function?

☐ A. A car's speed and time (one time, one speed).

☐ C. A product's barcode and all price changes (one barcode, many prices over time).

☐ B. A student's name and age (one person, one age).

☐ D. A city and its mayor (one city, one mayor).

3) Function with slope 2 and y -intercept -5 is?

☐ A. $y = 2x - 5$

☐ C. $y = 2x + 5$

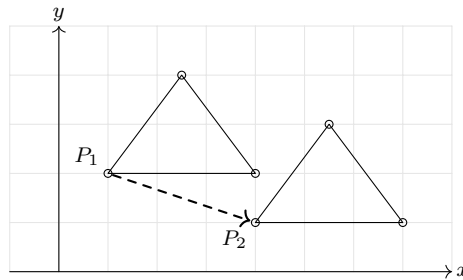
☐ B. $y = -5x + 2$

☐ D. $y = -2x - 5$



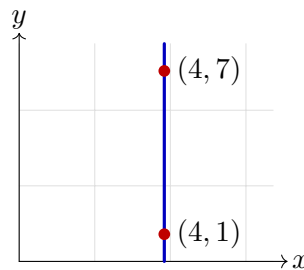
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- 4) Two congruent polygons are positioned on a coordinate grid. Polygon 1 has vertices at $(1, 2)$, $(4, 2)$, and $(2.5, 4)$. Polygon 2 is translated 3 units right and 1 unit down. Which set of coordinates represents Polygon 2?



- ☐ A. $(1, 2)$, $(4, 2)$, $(2.5, 4)$
☐ C. $(4, 1)$, $(7, 1)$, $(5.5, 3)$
☐ B. $(2, 3)$, $(5, 3)$, $(3.5, 5)$
☐ D. $(0, 3)$, $(3, 3)$, $(1.5, 5)$
- 5) Evaluate $(2x^3)^2$ when $x = 1$.

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



- ☐ A. The line is horizontal
 ☐ C. The line has zero slope
☐ B. The line is slanted at 45°
☐ D. The line is vertical



1) Solve for n : $-2(n - 4) = 10$

☐ A. $n = 1$

☐ C. $n = 9$

☐ B. $n = -9$

☐ D. $n = -1$

2) Match the expression to the exponent law it uses:

Expression	Law
$x^5 \cdot x^3 = x^8$	Product rule (add)

Which expression uses the quotient rule?

☐ A. $a^2 \cdot a^4 = a^6$

☐ C. $(2b)^3 = 8b^3$

☐ B. $(y^2)^5 = y^{10}$

☐ D. $\frac{m^9}{m^3} = m^6$

3) What is $\sqrt{400}$?

☐ A. 18

☐ C. 20

☐ B. 19

☐ D. 21

4) What is $\frac{3.6 \times 10^6}{1.2 \times 10^2}$?

☐ A. 3×10^8

☐ C. 0.3×10^4

☐ B. 2.4×10^4

☐ D. 3×10^4

5) Which table represents a function where the output is always greater than the input?

Table A:

x	1	2	3	4
y	3	5	7	9

Table B:

x	0	1	2	3
y	0	2	4	6

☐ A. Neither table.

☐ C. Table B only.

☐ B. Table A only.

☐ D. Both tables.



- 6) $S(m) = 500 + 25m$ and table $(0, \$600)$, $(3, \$675)$, $(6, \$750)$. Which starts with more money?

m	0	3	6
Table function	\$600	\$675	\$750

- ☐ A. S ☐ C. Both same.
☐ B. Table function ☐ D. Cannot be determined.
- 7) In the list 5.2×10^{-2} , 5.2×10^0 , 5.2×10^2 , 5.2×10^{-1} , what is the exponent of the smallest number?

- 8) How many of $\sqrt{5}$, $\sqrt{6}$, and $\sqrt{7}$ are between 2 and 3?



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Vermont VTCAP 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 Vermont VTCAP practice test.

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& answers

Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice A is correct.** (8.SP.A.1) Outliers in health data can indicate genuine health risks or data recording errors. Ignoring (B) or removing (C) the outlier without investigation risks missing important health concerns. The outlier should prompt further examination.
- 2) **The correct answer is 200.** (8.EE.B.5) Compute $50 \times 4 = 200$.
- 3) **Choice A is correct.** (8.F.A.2) Rate of A: $(5 - 2)/(1 - 0) = 3$. Rate of B: $(1 - (-1))/(1 - 0) = 2$. Since $3 > 2$, A is greater.
- 4) **Choice A is correct.** (8.G.A.2) The vertices must be listed in corresponding order. The matching arcs and tick marks show $J \leftrightarrow M$, $K \leftrightarrow N$, and $L \leftrightarrow O$, so the congruence statement is $\triangle JKL \cong \triangle MNO$.
- 5) **Choice D is correct.** (8.EE.B.5) Red line: slope = $\frac{-2 - 1}{3 - 0} = \frac{-3}{3} = -1$. Blue line: slope = $\frac{1 - 2}{3 - 0} = \frac{-1}{3} = -\frac{1}{3}$. The blue line matches the target slope.
- 6) **Choice C is correct.** (8.EE.C.8c) Initial salt amount: $0.02(100) = 2$ L. After adding x liters of pure water, total volume is $100 + x$ and salt amount is still 2 L. Setting concentration to 1%: $\frac{2}{100+x} = 0.01$, so $2 = 0.01(100 + x) = 1 + 0.01x$, giving $0.01x = 1$, thus $x = 100$ L.
- 7) **The correct answer is $(3, \frac{5}{2})$.** (8.EE.C.8a) Add the equations to eliminate y : $(3x - 2y) + (x + 2y) = 4 + 8$, so $4x = 12$, giving $x = 3$. Substitute: $3 + 2y = 8$, so $2y = 5$ and $y = \frac{5}{2}$.
- 8) **Choice C is correct.** (8.F.A.1) At $x = 0$, the point on the graph is at height $y = 4$. Therefore, $r(0) = 4$.
- 9) **Choice C is correct.** (8.F.A.3) A linear function has the form $y = mx + b$ (no powers of x other than 1). $y = x^2 + 1$ has a squared variable, making it nonlinear.
- 10) **Choice A is correct.** (8.F.B.4) Using $y = mx + b$ with $m = 3$ and point $(1, 7)$: $7 = 3(1) + b \Rightarrow b = 4$. Equation: $y = 3x + 4$.
- 11) **Choice A is correct.** (8.F.B.5) The graph rises from $(0, 2)$ to $(4, 5)$, then falls from $(4, 5)$ to $(6, 1)$. Its greatest y -value is 5, and the y -intercept is 2, so choice A is the only correct set.
- 12) **Choice D is correct.** (8.G.A.3) Reverse the translation: $(x, y) \rightarrow (x - 3, y + 5)$. So $(4, -2) \rightarrow (4 - 3, -2 + 5) = (1, 3)$.
- 13) **Choice B is correct.** (8.G.A.5) Sum of angles: $y + 2y + 3y = 180$, so $6y = 180$ and $y = 30^\circ$.
- 14) **Choice B is correct.** (8.G.B.6, 8.G.B.7) From $(\sqrt{32})^2 + (\sqrt{4})^2 = c^2$, we get $32 + 4 = 36$, so $c = \sqrt{36} = 6$.
- 15) **Choice C is correct.** (8.G.B.7) If the angles are $2k$ and $3k$, then $2k + 3k = 90$, so $5k = 90$ and $k = 18^\circ$. The angles are 36° and 54° .
- 16) **Choice C is correct.** (8.G.C.9) $V = \frac{1}{3} \times B \times h \Rightarrow 500 = \frac{1}{3} \times 100 \times h \Rightarrow h = 15$ m.
- 17) **Choice C is correct.** (8.G.B.7) 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.
- 18) **Choice B is correct.** (8.G.A.5) The sum of exterior angles of any convex polygon is always 360° , regardless of shape or number of sides.
- 19) **Choice D is correct.** (8.SP.A.4) D is incorrect: $\frac{32}{80} = 0.40$ is a row-conditional frequency (among teens), not the percentage of all shoppers. The joint relative frequency is $\frac{32}{240} \approx 0.13$. Options A, B, C are correct frequency calculations.
- 20) **Choice B is correct.** (8.G.B.7) There are 4 tens and 13 hearts, but the 10 of hearts is counted in both groups. The number of favorable cards is $4 + 13 - 1 = 16$, so the probability is $\frac{16}{52}$.
- 21) **Choice C is correct.** (8.EE.C.7b) Arrange all 5 cards in sequence: $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$ arrangements.
- 22) **The correct answer is A, B.** (8.EE.A.4) 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.
- 23) **Choice B is correct.** (8.G.B.8) Since both points have $x = -2$, the vertical distance is $|5 - (-3)| = |5 + 3| = 8$.
- 24) **Choice A is correct.** (8.G.B.8) Mean = 10.4. Deviations: 0.4, 0.6, 0.4, 0.6, 0.4. MAD = $(0.4 + 0.6 + 0.4 + 0.6 + 0.4)/5 = 2.4/5 = 0.48 < 1$. Set A clusters within 0.6 of the mean, so small MAD. Other sets are more spread.



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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 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
TESTS



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