

6 Vermont VTCAP

GRADE 8 MATH PRACTICE TESTS

Standards Aligned Problem Solving For
Comprehensive Assessment Programs



6 PRINTED
TESTS



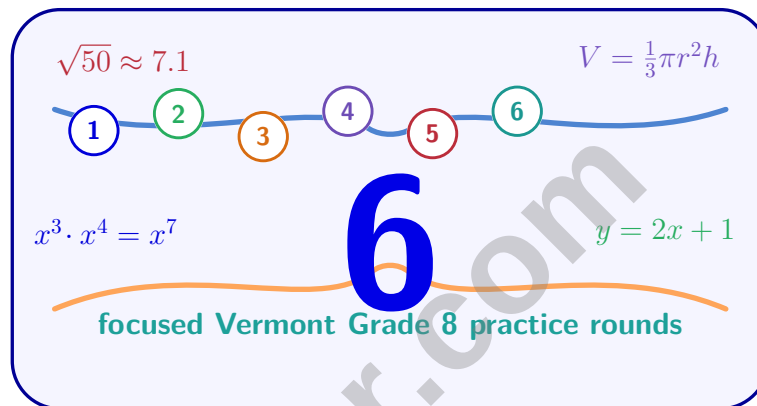
2 ONLINE
TESTS



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

6 Vermont VTCAP Grade 8 Math Practice Tests

Targeted Grade 8 Math Review for Test Practice and Skill Growth



Six 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



Copyright ©

Testinar Inc



Published by Testinar Inc

Testinar.com

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the author, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law, including Section 107 or 108 of the 1976 United States Copyright Act.

This publication is independently produced and has no official connection to any state, district, or national testing program.

Test names and organizational names used herein are the property of their respective trademark holders.



Copyright ©

Welcome, Vermont Grade 8 Problem Solver!

Six focused rounds for sharper VTCAP math thinking

This book gives you six 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 six-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?

Six VTCAP tests, 240 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Real numbers, exponents, scientific notation, equations, and careful reading.
Tests 4–6	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

Table of Contents

★ Practice Test 1	_____	15
★ Practice Test 2	_____	29
★ Practice Test 3	_____	45
★ Practice Test 4	_____	59
★ Practice Test 5	_____	74
★ Practice Test 6	_____	89
Practice Test Answer Keys	_____	105
Practice Test Answers and Explanations	_____	109

1) Two points on a line are $(-3, 2)$ and $(3, -4)$. What is the slope?

☐ A. -1

☐ C. $-\frac{1}{6}$

☐ B. 1

☐ D. 6

2) Which number can be expressed as a fraction?

☐ A. $\sqrt{11}$

☐ C. $\frac{8}{3}$

☐ B. 2π

☐ D. $\sqrt{2} + 1$

3) A scatter plot shows the number of hours a student studies versus their test score. The trend line has equation $y = 5x + 60$. If a student studies for 6 hours, what is the predicted test score?

4) Convert $0.\overline{13}$ to a fraction.

☐ A. $\frac{1}{13}$

☐ C. $\frac{13}{99}$

☐ B. $\frac{13}{100}$

☐ D. $\frac{2}{15}$

5) Which is the best estimate of $\sqrt{30}$?

☐ A. 4.5

☐ C. 6.0

☐ B. 15.0

☐ D. 5.5



Scan me!
For more practice
& answers

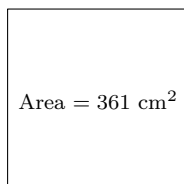
6) Rewrite 6^{-3} using only positive exponents.

☐ A. $\frac{6}{3}$
☐ B. -6^3

☐ C. 6^3
☐ D. $\frac{1}{6^3}$

7) A square has an area of 361 square cm. What is its perimeter?

$s = ?$



$s = ?$

☐ A. 38 cm

☐ B. 57 cm

☐ C. 76 cm

☐ D. 152 cm

8) Convert 42,000 to scientific notation.

☐ A. 4.2×10^3

☐ B. 4.2×10^5

☐ C. 42×10^2

☐ D. 4.2×10^4

9) Divide: $\frac{8 \times 10^8}{2 \times 10^3}$

☐ A. 10×10^5

☐ B. 6×10^5

☐ C. 4×10^{11}

☐ D. 4×10^5

10) Which set of ordered pairs does NOT represent a function?

☐ A. $\{(0, 5), (1, 6), (2, 7), (3, 8)\}$

☐ B. $\{(1, 1), (2, 4), (3, 9), (4, 16)\}$

☐ C. $\{(1, 3), (2, 3), (3, 3), (4, 3)\}$

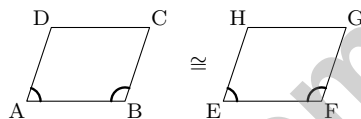
☐ D. $\{(2, 4), (2, 5), (3, 6), (4, 7)\}$



- 11) Temperature functions: Oven $T_{\text{oven}}(m) = 15m + 70$ (degrees, starting at 70). Freezer T_{freeze} shown in table: $(0, -5)$, $(2, -15)$, $(4, -25)$. At 10 minutes, which is warmer?

m	0	2	4
T_{freeze}	-5	-15	-25

- ☐ A. Oven is warmer
☐ B. Freezer is warmer
☐ C. Same temperature
☐ D. Cannot be determined
- 12) Two congruent quadrilaterals are shown. A student reasons: "Since two angles are equal, the quadrilaterals must be congruent." What is wrong with this reasoning?



- ☐ A. Two equal angles alone do NOT guarantee congruence
☐ B. Equal angles guarantee equal side lengths
☐ C. The student's reasoning is correct; angle equality proves congruence
☐ D. Congruent figures never have equal angles
- 13) A concert sells premium tickets at \$60 and economy tickets at \$20. A total of 300 tickets sold for \$12,000. How many premium tickets were sold?

- ☐ A. 75
☐ B. 100
☐ C. 125
☐ D. 150
- 14) If $f(x) = \begin{cases} 2x & \text{if } x < 2 \\ 5 & \text{if } x \geq 2 \end{cases}$, what is $f(3)$?

- ☐ A. 6
☐ B. 3
☐ C. 5
☐ D. 8



Scan me!
For more practice
& answers

1) Which pair of equations represents perpendicular lines?

☐ A. $y = 3x + 1$ and $y = 3x - 5$

☐ C. $y = 4x - 2$ and $y = 4x + 6$

☐ B. $y = -\frac{3}{5}x + 2$ and $y = \frac{3}{5}x - 1$

☐ D. $y = 2x + 4$ and $y = -\frac{1}{2}x + 1$

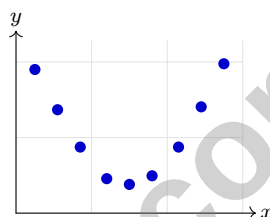
2) A segment from $(2, 1)$ to $(4, 3)$ is dilated by scale factor 2 from the point $(2, 1)$. Where does $(4, 3)$ map to?

☐ A. $(6, 5)$

☐ C. $(8, 6)$

☐ B. $(4, 3)$

☐ D. $(2, 1)$



3)

A scatter plot of outdoor temperature ($^{\circ}\text{C}$) versus energy consumption (kWh) for a city shows a U-shaped curve: energy use is high on very cold days, lower on mild days, and high again on very hot days. This pattern violates the assumption of:

☐ A. Random data collection

☐ C. Positive correlation always

☐ B. Linear (straight-line) relationship

☐ D. No outliers in the data

4) A two-way table tracks 400 students by extracurricular activity:

	Sports	No Sports	Total
Music	120	80	200
No Music	100	100	200
Total	220	180	400

What is the marginal relative frequency for students who do sports, as a decimal?

☐ A. 0.27

☐ C. 0.55

☐ B. 0.45

☐ D. 0.73



Scan me!
For more practice
& answers

5) Consider the data: $\{3, 6, 9, 12\}$ (mean = 7.5). What is the MAD?

☐ A. 2

☐ C. 3.75

☐ B. 3

☐ D. 4.5

6)

	1	2	3
Red	R1	R2	R3
Blue	B1	B2	B3

The table above shows all possible outcomes when selecting a color and a number. How many total outcomes are there?

☐ A. 5

☐ C. 8

☐ B. 6

☐ D. 9

7) A menu has 4 drink types and 5 snack types. A customer orders one drink and one snack. How many different orders are possible?

☐ A. $4 + 5 = 9$

☐ C. $5^4 = 625$

☐ B. $4 \times 5 = 20$

☐ D. $4^5 = 1,024$

8) 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

9) Which pair of numbers are both irrational?

☐ A. $\sqrt{121}$ and π

☐ C. $-\frac{3}{7}$ and $\sqrt{15}$

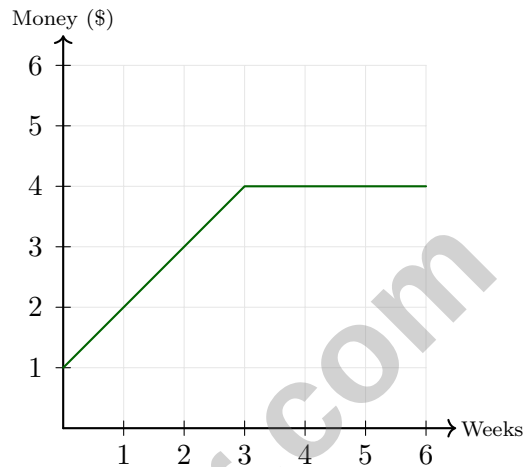
☐ B. 0.505005... (non-repeating) and $\sqrt{16}$

☐ D. $\sqrt{15}$ and $\sqrt{24}$



1) A student claims that sides 5, 10, and $\sqrt{125}$ form a right triangle. Is this correct?

- ☐ A. Yes, because $5^2 + 10^2 = (\sqrt{125})^2$ ☐ C. Yes, because 5 and 10 are factors of $\sqrt{125}$
- ☐ B. No, because $\sqrt{125} \approx 11.2$, which is too large ☐ D. No, because $5 + 10 \neq \sqrt{125}$



2)

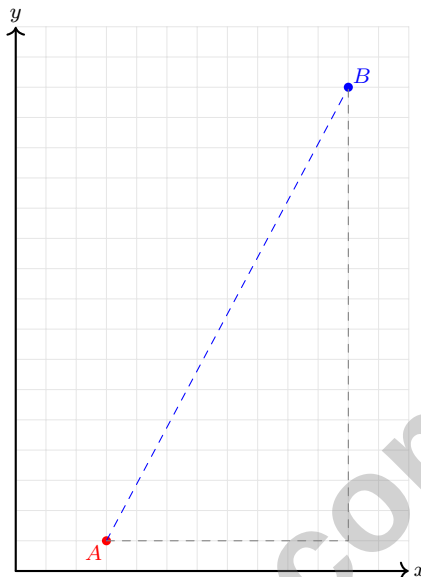
A student saves money over time. The graph shows: increases for 3 weeks, then constant for 3 weeks. The y -intercept is 1. Which is true?

- ☐ A. The student had \$0 at the start ☐ C. The student spends money after week 3
- ☐ B. The student had \$1 initially and saves \$1 per week, then stops ☐ D. The function is linear over all 6 weeks



Scan me!
For more practice
& answers

- 3) An airplane flies from airport $A = (3, 1)$ to airport $B = (11, 16)$. Both coordinates are in hundreds of kilometers. What is the flight distance in hundreds of kilometers?



- ☐ A. 17 (hundred km) ☐ C. $\sqrt{300}$ (hundred km)
☐ B. 24 (hundred km) ☐ D. 25 (hundred km)
- 4) If 5 kilograms of rice cost \$15, what is the unit price (constant of proportionality) in dollars per kilogram?



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.



Scan me!
For more practice
& answers

Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice A is correct.** **(8.EE.B.5)** Slope = $\frac{-4-2}{3-(-3)} = \frac{-6}{6} = -1$.
- 2) **Choice C is correct.** **(8.NS.A.1)** $\frac{8}{3}$ is already expressed as a fraction, so it is rational. All other options are irrational: $\sqrt{11}$ is a non-perfect-square root, 2π is an irrational multiple of π , and $\sqrt{2} + 1$ is an irrational plus a rational (still irrational).
- 3) **The correct answer is 90.** **(8.SP.A.2)** Substitute $x = 6$: $y = 5(6) + 60 = 30 + 60 = 90$.
- 4) **Choice D is correct.** **(8.NS.A.1)** Let $x = 0.\overline{13} = 0.1333\dots$. Then $10x = 1.\overline{3}$ and $100x = 13.\overline{3}$. Subtracting: $100x - 10x = 12$, so $90x = 12$ and $x = \frac{12}{90} = \frac{2}{15}$.
- 5) **Choice D is correct.** **(8.NS.A.2)** Since $5.5^2 = 30.25 \approx 30$, we have $\sqrt{30} \approx 5.48$.
- 6) **Choice D is correct.** **(8.EE.A.1)** Negative exponent rule: $6^{-3} = \frac{1}{6^3}$.
- 7) **Choice C is correct.** **(8.EE.A.2)** Area = 361, so $s = \sqrt{361} = 19$ cm. Perimeter = $4s = 4 \times 19 = 76$ cm.
- 8) **Choice D is correct.** **(8.EE.A.3)** Move the decimal 4 places left to get 4.2; the exponent is positive 4. Thus $42,000 = 4.2 \times 10^4$.
- 9) **Choice D is correct.** **(8.EE.A.4)** Divide coefficients: $8 \div 2 = 4$. Subtract exponents: $10^{8-3} = 10^5$. Result: 4×10^5 .
- 10) **Choice D is correct.** **(8.F.A.1)** Input 2 appears with outputs 4 and 5, which violates the function definition. Options A, B, and C are all functions.
- 11) **Choice A is correct.** **(8.F.A.2)** $T_{\text{oven}}(10) = 15(10) + 70 = 220$ degrees. Slope of freezer: $(-15 - (-5))/2 = -5$, so $T_{\text{freeze}}(10) = -5 - 5(10) = -55$ degrees. Oven at 220 is much warmer.
- 12) **Choice A is correct.** **(8.G.A.2)** For quadrilaterals, having two equal angles is not sufficient to prove congruence. Many quadrilaterals can share two angles but have different side lengths and shapes. Congruence requires all corresponding sides and angles to be equal.
- 13) **Choice D is correct.** **(8.EE.C.8c)** Let p = premium tickets and e = economy tickets. Then $p + e = 300$ and $60p + 20e = 12000$. From the first: $e = 300 - p$. Substituting: $60p + 20(300 - p) = 12000$, so $60p + 6000 - 20p = 12000$, giving $40p = 6000$ and $p = 150$.
- 14) **Choice C is correct.** **(8.F.A.1)** Since $3 \geq 2$, use the second rule: $f(3) = 5$.
- 15) **Choice B is correct.** **(8.G.C.9)** $SA = 2\pi r^2 + 2\pi rh = 2\pi(2)^2 + 2\pi(2)(6) = 8\pi + 24\pi$ in².
- 16) **Choice A is correct.** **(8.EE.C.7)** Subtract 8 from both sides: $2x = 12$. Divide by 2: $x = 6$. Check: $2(6) + 8 = 12 + 8 = 20$ ✓.
- 17) **Choice A is correct.** **(8.G.A.1)** Find the difference: $(3, 5) - (1, 2) = (2, 3)$. Verify with the second point: $(5, 6) + (2, 3) = (7, 9)$ ✓.
- 18) **Choice D is correct.** **(8.SP.A.3)** Extrapolation means predicting outside the observed data range. Since data covers weeks 1–10, week 15 requires extrapolation.
- 19) **Choice C is correct.** **(8.EE.B.6)** The slope of the given line is 2. The perpendicular slope is $-\frac{1}{2}$ (negative reciprocal).
- 20) **The correct answer is A,C.** **(8.G.A.4)** Correct: (A) All linear measurements (sides, perimeter) are multiplied by 2.5. (C) Area is multiplied by $(2.5)^2 = 6.25$. Incorrect: (B) Angles are congruent in dilation, not scaled. (D) Perimeter is multiplied, not divided, by 2.5. (E) Dilation preserves shape; polygon type does not change.
- 21) **Choice A is correct.** **(8.EE.C.8b)** Add 8 to both sides: $x \leq -2 + 8 = 6$.
- 22) **Choice C is correct.** **(8.EE.C.8b)** Dashed lines correspond to STRICT inequalities ($<$ and $>$), which do not include the boundary. The symbols $\leq$ and $\geq$ use solid lines.
- 23) **Choice D is correct.** **(8.G.C.9)** From $V = \frac{1}{3}\pi r^2 h$: $150\pi = \frac{1}{3}\pi \times 25 \times h \Rightarrow 450 = 25h \Rightarrow h = 18$ cm.
- 24) **Choice D is correct.** **(8.G.B.7)** After 3 years: $A = 2000 + 2000 \times 0.05 \times 3 = \$2,300$. Another 3 years of simple interest on \$2,000: $I = 2000 \times 0.05 \times 3 = \300 . Total: $\$2,300 + \$300 = \$2,600$. (Note: Simple interest, not compound, means the same principal earns the same amount each 3-year period.)
- 25) **Choice C is correct.** **(8.EE.B.5)** In $y = kx$, the constant of proportionality k is the unit rate. Here $k = 4$, so the unit rate is 4 units of y per 1 unit of x .



Scan me!
For more practice
& answers

Hi, Thoughtful Reader!

◇ A strong Grade 8 test taker is also a strong reader. You practiced turning words, tables, graphs, and diagrams into math decisions. ◇

★ **Remember this:** That skill grows each time you slow down enough to ask what the problem is really telling you and what it is really asking for. This version gave you 6 opportunities to rehearse test-day habits. ★

Reader-to-Solver Skills

- **Circle the Ask:** Make the target visible.
- **Sort Information:** Separate useful facts from extra words.
- **Match Units:** Keep quantities connected.
- **Answer Fully:** Include the value and what it means.

Grade 8 test-day tip: After solving, reread only the final question. Make sure your answer matches it exactly.

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

Jay Daie

Your Reading-and-Math Helper

PRACTICE TODAY. ACHIEVE TOMORROW.

6

Give your child the confidence and skills they need with **6 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 |
| | ✓ And More! |



6 PRINTED TESTS



2 ONLINE TESTS



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