

10 Vermont VTCAP

GRADE
8
MATH

PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs

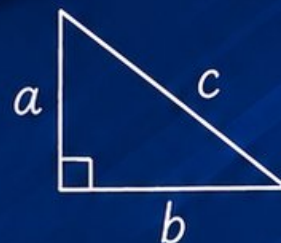
10 PRINTED
TESTS



2 ONLINE
TESTS



- ✓ Build Confidence
- ✓ Master Key Math Skills
- ✓ Answer Explanations for Every Question
- ✓ Test-Taking Strategies That Work



$$y = mx + b$$



$$3x - 7 = 2(x + 5)$$
$$x = 17$$

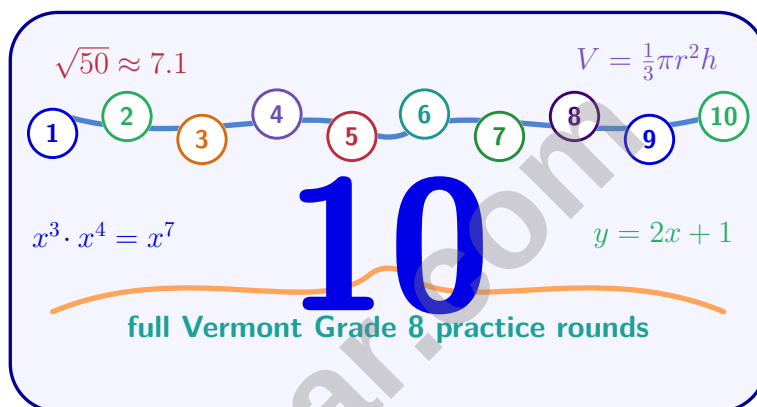


USE THESE TWO
**ADDITIONAL ONLINE
PRACTICE TESTS**

FOR EXTRA REVIEW AFTER
THE PRINTED TESTS
IN THIS BOOK.

10 Vermont VTCAP Grade 8 Math Practice Tests

Vermont Grade 8 VTCAP Practice for calm, careful practice with functions, exponent models, equations, geometry, data, and probability



Ten complete 40-question Grade 8 VTCAP practice rounds with linear relationships, scientific notation, real numbers, equations, functions, 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!

Ten focused rounds for sharper Vermont VTCAP math thinking

This book gives you ten full Grade 8 VTCAP math practice tests. Each round is built to help you notice structure, compare quantities, use linear reasoning, handle real numbers, and explain your thinking with care.

Grade 8 standards focus: This page supports **Surface Area of Prisms, Cylinders, and Pyramids** (8.G.C.9): Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. You will also meet **Estimating Irrational Numbers** (8.NS.A.2): Use rational approximations of irrational numbers to compare their size and locate them approximately on a number line diagram.

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 ten-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 a proportion, equation, diagram, number line, 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.

Grade 8 standards focus: Keep the routine connected to **Interior Angles of Polygons** (8.G.A.5): Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and.... A second useful connection is **Operations with Scientific Notation** (8.EE.A.4): Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.

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?

Ten Vermont VTCAP tests, 400 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Linear relationships, integer exponents, scientific notation, real-number reasoning, and careful reading.
Tests 4–6	Expressions, equations, inequalities, transformations, geometry, and multi-step problem solving.
Tests 7–9	Data analysis, probability, mixed review, stamina, and choosing efficient strategies.
Test 10	A final Vermont round to show growth across the whole book.
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.

Grade 8 standards focus: Use these habits while practicing **Counting Principle and Permutations** (8.EE.C.7b): Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. It also prepares you for **Solving Systems of Two Equations** (8.EE.C.8a): Understand that solutions to a system of two linear equations correspond to points of intersection of their graphs. Solve systems algebraically and by graphing.

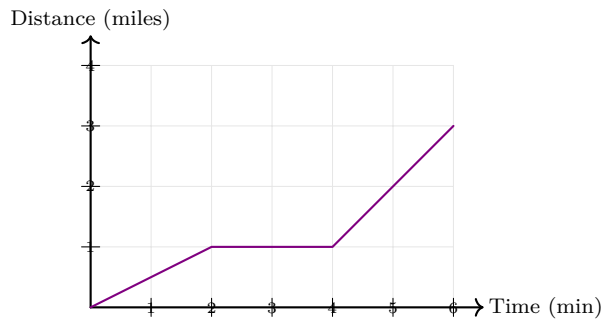


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1)



A runner travels 1 mile in 2 minutes, stops for 2 minutes, then runs 2 more miles in 2 minutes. What is the average speed over the whole journey?

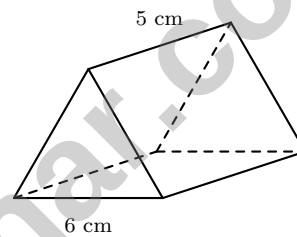
☐ A. 0.75 miles/min

☐ C. 1 mile/min

☐ B. 0.5 miles/min

☐ D. 1.5 miles/min

2)



An equilateral triangular prism has triangular bases with side length 6 cm and prism length (height) 5 cm. The height of each equilateral triangle is approximately 5.2 cm. What is the approximate total surface area?

☐ A. 31.2 cm^2
☐ C. 121.2 cm^2
☐ B. 46.8 cm^2
☐ D. 141 cm^2


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3) A cylinder has volume 628 m^3 and radius 5 m. Approximately, what is its height? (Use $\pi \approx 3.14$.)

☐ A. 4 m

☐ C. 16 m

☐ B. 8 m

☐ D. 20 m

4) A clothing company models its revenue as $R = 45s - 200$, where R is revenue in dollars and s is the number of shirts sold. Below how many shirts is the company operating at a loss?

☐ A. Below 4 shirts

☐ C. Below 44 shirts

☐ B. Below 5 shirts

☐ D. Below 200 shirts

5) Use elimination to solve:
$$\begin{cases} 3x + 4y = 10 \\ 3x - 2y = 4 \end{cases}$$

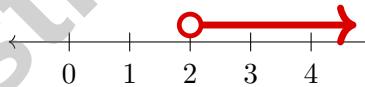
☐ A. $(1, \frac{7}{4})$

☐ C. $(0, \frac{5}{2})$

☐ B. $(3, \frac{1}{4})$

☐ D. $(2, 1)$

6) Solve and graph: $-2x + 3 < -1$. Which describes the graph?



☐ A. $x \geq 2$ with closed circle

☐ C. $x \leq 2$ with closed circle

☐ B. $x < 2$ with open circle

☐ D. $x > 2$ with open circle

7) If $\frac{b^n}{b^4} = b^6$, what is the value of n ?



8) Factor $x^2 - 25$.

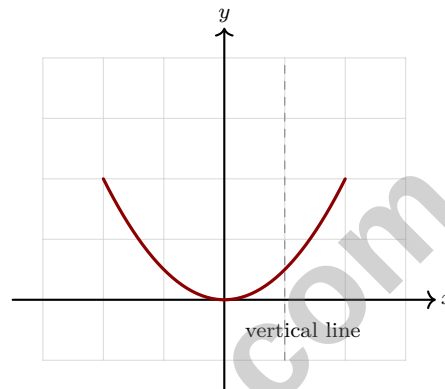
☐ A. $(x - 5)^2$

☐ C. $(x + 5)(x - 5)$

☐ B. $(x + 5)^2$

☐ D. $(x - 25)(x + 1)$

9) A vertical line test is performed on the graph below. How many times does a vertical line intersect the curve?



☐ A. Zero times (the line misses the curve).

☐ C. Twice (the line intersects at two points).

☐ B. Once (the line intersects at one point).

☐ D. More than twice.

10) Which table represents a LINEAR function?

x	0	2	4	6
y	10	16	22	28

☐ A. No, y is always greater than x

☐ C. No, because x increases by 2

☐ B. Yes, the first difference is constant (3 per unit change in x)

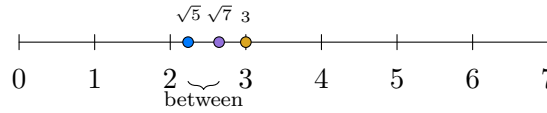
☐ D. Yes, because all points are positive



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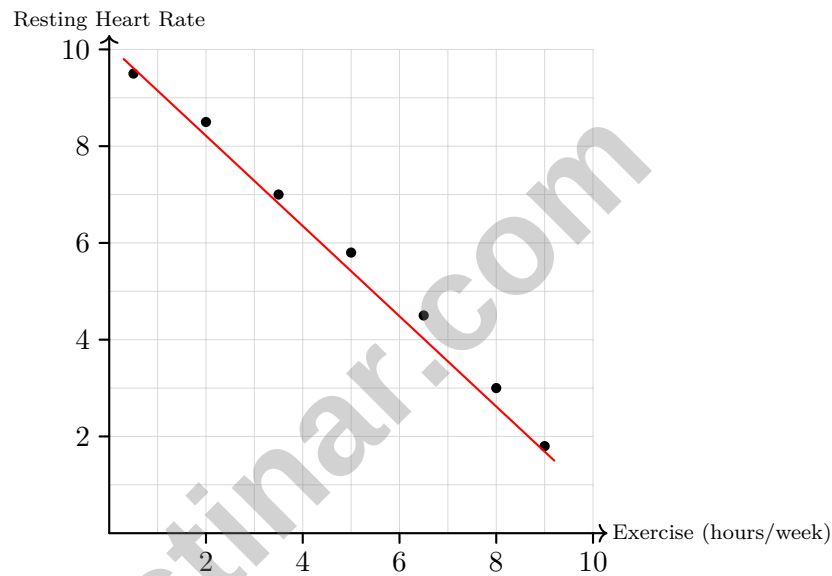
1)



Based on the number line, which statement is correct?

- ☐ A. $\sqrt{5}$ and $\sqrt{7}$ are both less than 1 ☐ C. 3 is irrational
☐ B. $\sqrt{7} > 3$ ☐ D. $2 < \sqrt{5} < \sqrt{7} < 3$

2)



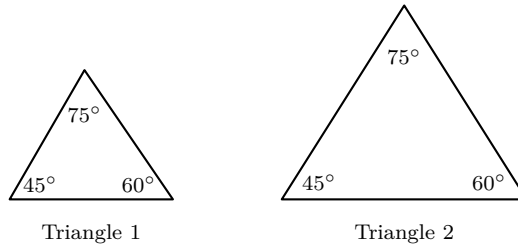
The scatter plot shows a strong negative relationship between exercise and resting heart rate. Which statement is most accurate?

- ☐ A. Lower heart rates prevent people from exercising ☐ C. People with higher heart rates exercise less on average
☐ B. Exercise has no effect on heart rate ☐ D. More exercise causes lower heart rates



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& answers

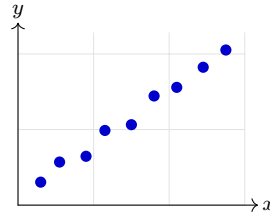
- 3) Two triangles both have angles measuring 45° , 60° , and 75° . Are these triangles necessarily similar?



- ☐ A. No, the sides must also be proportional
☐ B. No, only two angles are given
☐ C. Yes, angles alone determine similarity (AAA)
☐ D. Only if the triangles are congruent
- 4) A chemist combines a 25% salt solution with an 80% salt solution to make 100 mL of a 50% solution. How many mL of the 25% solution are used?

- 5) A savings account has $S(n) = 50 + 10n$ dollars after n weeks. After how many weeks will the account have \$150?
- ☐ A. 5 weeks
☐ B. 10 weeks
☐ C. 15 weeks
☐ D. 20 weeks
- 6) Which is larger: $\sqrt{15}$ or $\sqrt{14}$?
- ☐ A. They are equal
☐ B. Cannot compare
☐ C. $\sqrt{14}$
☐ D. $\sqrt{15}$





1)

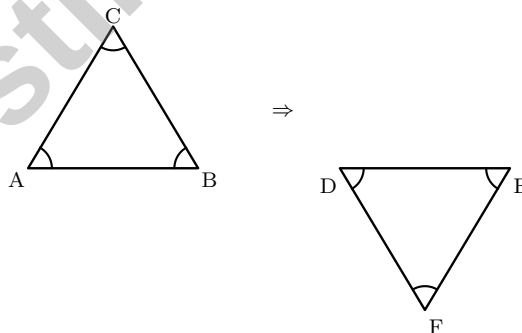
A scatter plot shows the relationship between hours slept and memory test score for 25 students. The points form a clear upward trend with only a few points far from the trend line. This indicates:

- ☐ A. Weak correlation ☐ C. Strong correlation
☐ B. Moderate correlation ☐ D. Perfect correlation

2) Function f : “increases at 1.5 per unit, starts at 20.” Function g : “increases at 2 per unit, starts at 25.” Which function is larger at $t = 10$?

- ☐ A. Function f ☐ C. Both equal at $t = 10$
☐ B. Function g ☐ D. Cannot be determined.

3) Which sequence of rigid motions maps triangle ABC onto triangle DEF?



- ☐ A. Translation only ☐ C. Rotation only
☐ B. Reflection and translation ☐ D. Rotation and reflection



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4) A scientist measures bacterial growth. At time $t = 0$ min, there are 100 bacteria. At $t = 5$ min, there are 300 bacteria. What is the rate of change (slope)?

- ☐ A. 40 bacteria per minute ☐ C. 60 bacteria per minute
☐ B. 200 bacteria per minute ☐ D. 20 bacteria per minute

5) A piggy bank holds 25 coins consisting of nickels (5¢) and dimes (10¢). The total value is \$1.70. How many nickels are in the bank?

- ☐ A. 10 ☐ C. 12
☐ B. 16 ☐ D. 8

6) What two positive integers multiply to 12 and add to 7?

7) Which table represents a linear function?

☐ A.

x	y
1	2
2	4
3	8

☐ B.

x	y
1	5
2	8
3	11

☐ C.

x	y
1	1
2	3
3	6

☐ D.

x	y
1	2
2	5
3	10



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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Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

- 1) **Choice B is correct.** (8.F.B.5) Total distance = 3 miles. Total time = 6 minutes. Average speed = $3 \div 6 = 0.5$ miles/min. The flat segment adds time but no distance.
- 2) **Choice C is correct.** (8.G.C.9) Two triangular bases: $2 \times \frac{1}{2}(6)(5.2) = 31.2 \text{ cm}^2$. Three rectangular sides: $3 \times (6 \times 5) = 90 \text{ cm}^2$. Total $\approx 31.2 + 90 = 121.2 \text{ cm}^2$.
- 3) **Choice B is correct.** (8.G.C.9) From $V = \pi r^2 h$, we get $h = \frac{V}{\pi r^2} = \frac{628}{3.14 \times 25} = \frac{628}{78.5} = 8 \text{ m}$.
- 4) **Choice B is correct.** (8.SP.A.3) Break-even when $R = 0$: $0 = 45s - 200 \Rightarrow s = \frac{200}{45} \approx 4.44$. Loss occurs when $s < 4.44$, or below 5 shirts.
- 5) **Choice D is correct.** (8.EE.C.8a) Subtract the second from the first: $(3x + 4y) - (3x - 2y) = 10 - 4$, so $6y = 6$, giving $y = 1$. Substitute: $3x + 4(1) = 10$, so $x = 2$. Solution: $(2, 1)$.
- 6) **Choice D is correct.** (8.EE.C.8b) Subtract 3: $-2x < -4$. Divide by -2 (FLIP): $x > 2$. Open circle and right ray.
- 7) **The correct answer is 10.** (8.EE.A.1) Using the quotient rule, $n - 4 = 6$, so $n = 10$. Verification: $\frac{b^{10}}{b^4} = b^6$.
- 8) **Choice C is correct.** (8.EE.C.7) Difference of squares: $x^2 - 25 = x^2 - 5^2 = (x + 5)(x - 5)$.
- 9) **Choice B is correct.** (8.F.A.1) The parabola opens upward and any vertical line intersects it at most once (or once in the visible region shown). This confirms it is a function.
- 10) **Choice B is correct.** (8.F.A.3) The y -differences are $16 - 10 = 6$, $22 - 16 = 6$, $28 - 22 = 6$. Since x changes by 2 each time, the rate of change is $\frac{6}{2} = 3$, constant and linear.
- 11) **Choice A is correct.** (8.F.B.4) Slope: $m = \frac{18-9}{5-2} = \frac{9}{3} = 3$. Using point $(2, 9)$: $9 = 3(2) + b \Rightarrow b = 3$. So $y = 3x + 3$.
- 12) **The correct answer is 8.** (8.EE.A.2) $e^3 = 512$, so $e = \sqrt[3]{512} = 8$ feet.
- 13) **Choice B is correct.** (8.G.A.2) Corresponding vertices must be listed in order. From the diagram, $D \leftrightarrow H$, $E \leftrightarrow I$, $F \leftrightarrow J$, and $G \leftrightarrow K$, so the correct statement is $DEFG \cong HIKJ$. The student's order $IJKH$ starts at the wrong corresponding vertex.
- 14) **Choice A is correct.** (8.G.A.3) The points $(0, 2) \rightarrow (0, -2)$ and $(2, 4) \rightarrow (2, -4)$. This is the reflection rule $(x, y) \rightarrow (x, -y)$.
- 15) **Choice C is correct.** (8.G.A.5) $180 - 29 - 71 = 80^\circ$.
- 16) **Choice A is correct.** (8.G.B.6, 8.G.B.7) From $(\sqrt{5})^2 + (\sqrt{20})^2 = c^2$, we get $5 + 20 = 25$, so $c = \sqrt{25} = 5$.
- 17) **Choice B is correct.** (8.G.C.9) Cube: $V_c = 5^3 = 125 \text{ cm}^3$. Pyramid: $V_{py} = \frac{1}{3} \times 25 \times 5 = \frac{125}{3} \approx 41.67 \text{ cm}^3$. Total: $125 + 41.67 \approx 166.67 \text{ cm}^3$, so 166 cm^3 is the closest choice.
- 18) **Choice B is correct.** (8.SP.A.4) Column-conditional frequency among action viewers (156 total): $\frac{72}{156} \approx 0.46$.
- 19) **The correct answer is B,E.** (8.G.B.7) There are 10 marbles total. B is true because $P(\text{blue}) = \frac{3}{10}$. E is true because $P(\text{red or blue}) = \frac{5+3}{10} = \frac{8}{10} = \frac{4}{5}$. A is false because $P(\text{red}) = \frac{1}{2}$. C is false because $P(\text{green}) = \frac{1}{5}$. D is false because $P(\text{yellow}) = 0$.
- 20) **Choice C is correct.** (8.G.B.7) Housing allocation = 35% of \$4,000 = $0.35 \times 4000 = \$1,400$.
- 21) **Choice C is correct.** (8.EE.A.4) Multiply coefficients: $4.5 \times 2 = 9$. Add exponents: $10^{-6+(-4)} = 10^{-10}$. Result: 9×10^{-10} .
- 22) **Choice A is correct.** (8.F.A.2) Slope of r : $(7-3)/(3-1) = 4/2 = 2$. Slope of s : 1. Since $2 > 1$, r increases faster.
- 23) **Choice B is correct.** (8.G.B.8) Distance = $\sqrt{(5-0)^2 + (12-0)^2} = \sqrt{25+144} = \sqrt{169} = 13.0$. (This is a 5-12-13 Pythagorean triple.)
- 24) **Choice C is correct.** (8.G.B.7) The supplement of an angle is found by subtracting from 180° : $180 - 29 = 151^\circ$.
- 25) **Choice B is correct.** (8.G.B.7) Decompose the perimeter: two long sides of rectangle plus two semicircles (which form one complete circle). Long sides: $100 + 100 = 200 \text{ m}$. Circle circumference: $\pi d = 3.14 \times 50 \approx 157 \text{ m}$. Total = $200 + 157 = 357 \text{ m}$.



Hi, Progress Maker!

◇ You have done more than complete a set of tests. You have rehearsed the habits that make Grade 8 math feel less surprising. ◇

★ **Remember this:** Progress is not always loud. Sometimes it looks like fewer careless errors, clearer work, better pacing, and more confidence when a problem is unfamiliar. You practiced across 10 full Grade 8 practice tests, and that repeated effort matters. ★

Signs of Growth

- **Clear Work:** Your steps are easier to follow.
- **Better Pacing:** You know when to move on and return.
- **Stronger Checks:** You catch mistakes earlier.
- **Calmer Thinking:** You know what to try next.

Grade 8 test-day tip: Keep one short list of mistakes you often make, then check that list before each practice session.

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

Jay Daie

Your Growth Coach

PRACTICE TODAY. SUCCEED TOMORROW!

This book includes **10** full-length Math practice tests and **2** online tests to help Grade 8 students build confidence, strengthen skills, and excel on standardized assessments.

Each practice test is carefully crafted to reflect the latest standards and includes a variety of question types, realistic test conditions, and detailed answer explanations.

Perfect for classroom use, homework, test preparation, and extra practice at home.



THIS BOOK INCLUDES:

10

Full-Length
Printed Tests

2

Online
Practice Tests



Detailed Answers
& Explanations



MORE PRACTICE. GREATER RESULTS.

Give your child the tools to build strong math skills, confidence, and a positive attitude toward learning.

WHAT YOU'LL GAIN



Build Confidence

Practice regularly to feel prepared and test-ready.



Master Key Skills

Develop strong math skills and problem solving abilities.



Improve Understanding

Learn with clear explanations and step-by-step solutions.



Test Strategies

Learn proven strategies to approach every question with confidence.



Boost Performance

Apply your knowledge and achieve your best score!

TOPICS COVERED

- | | |
|---------------------------|----------------------------|
| ✓ The Number System | ✓ Statistics & Probability |
| ✓ Expressions & Equations | ✓ Data Analysis |
| ✓ Inequalities | ✓ Measurement |
| ✓ Functions | ✓ Pythagorean Theorem |
| ✓ Geometry | ✓ Surface Area & Volume |
| ✓ Ratios & Proportions | ✓ And More! |



2 ONLINE TESTS

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



2 EXTRA ONLINE TEST ACCESS CODE IS INSIDE THE BOOK!

Don't lose it—your extra practice and success start here!



PRACTICE
REGULARLY



STAY
FOCUSED



SOLVE
CONFIDENTLY



SUCCEED
BRIGHTLY