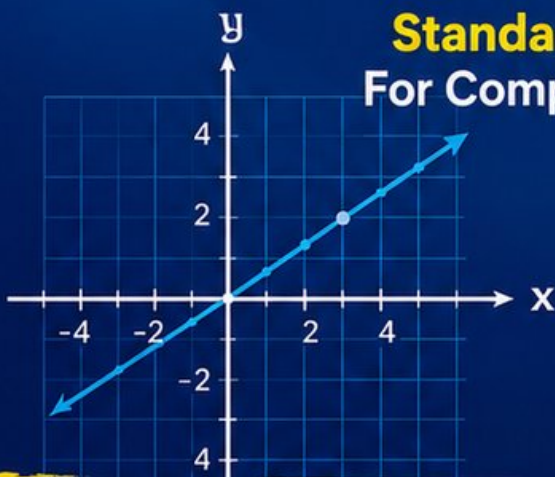
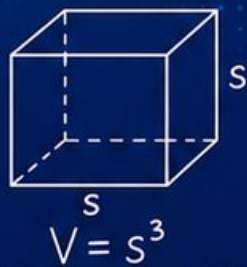


9 Vermont VTCAP Grade 8 MATH PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$$2x + 3y = 12$$
$$y = mx + b$$



**9 PRINTED
TESTS**

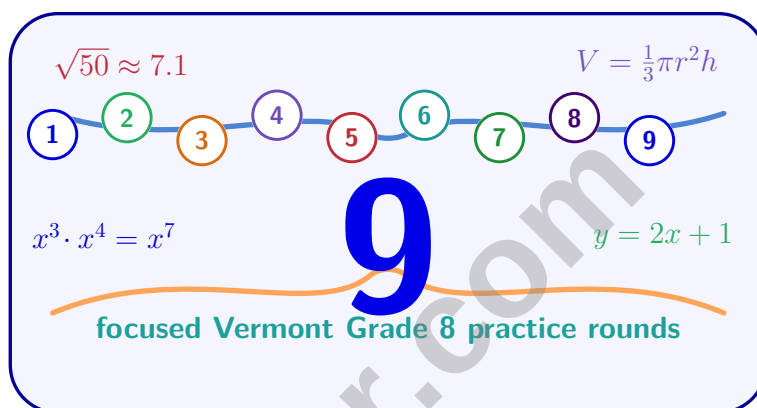


**2 ONLINE
TESTS**

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

9 Vermont VTCAP Grade 8 Math Practice Tests

Vermont Grade 8 Review for Linear Thinking, Geometry, Probability, and Statistics



Nine 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!

Nine focused rounds for sharper VTCAP math thinking

This book gives you nine 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 nine-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?

Nine VTCAP tests, 360 questions, and a complete review path

Part	What You Will Practice
Tests 1–3	Real and irrational numbers, integer exponents, scientific notation, equations, and careful reading.
Tests 4–6	Slope, systems of equations, functions, inequalities, transformations, congruence, and similarity.
Tests 7–9	Pythagorean reasoning, volume, data analysis, linear models, probability, mixed review, and stamina.
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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& answers

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1) Is $y = x^2$ a function?

- ☐ A. No, because it has an exponent. ☐ C. Yes, because every real number
☐ B. No, because negative inputs input produces exactly one output.
produce positive outputs. ☐ D. Yes, only when x is positive.

2) Triangle PQR is congruent to triangle STU. If PQR is transformed to STU by a single reflection, which of the following is different between the two triangles?

- ☐ A. Side lengths ☐ C. Orientation (clockwise vs.
☐ B. Angle measures counterclockwise labeling)
☐ D. Perimeter

3) The line $y = mx + b$ has slope $\frac{2}{3}$ and passes through $(3, 6)$. What is b ?

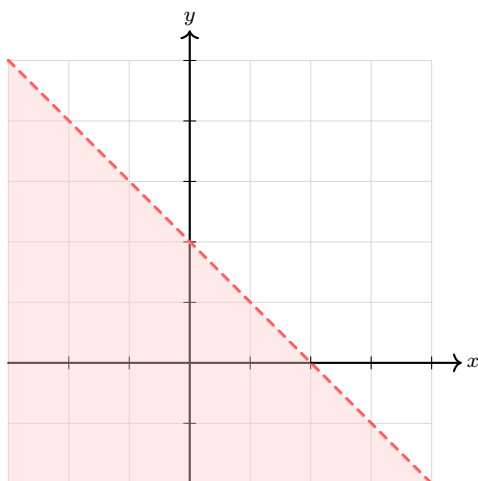
- ☐ A. 4 ☐ C. 6
☐ B. 2 ☐ D. $\frac{2}{3}$

4) Solve for x : $-3(x - 2) = 9$

- ☐ A. $x = -1$ ☐ C. $x = -5$
☐ B. $x = 5$ ☐ D. $x = 1$



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5)

Based on the dashed line and shaded region, what inequality is shown?

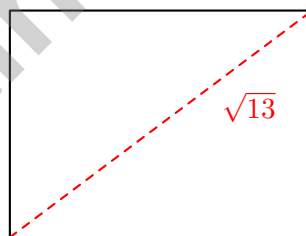
☐ A. $y > -x + 2$

☐ C. $y \geq -x + 2$

☐ B. $y < -x + 2$

☐ D. $y \leq -x + 2$

- 6) A rectangle has dimensions 2 cm by 3 cm. The diagonal is $\sqrt{13}$ cm. What is the best estimate of the diagonal?



3 cm

☐ A. 3.0 cm

☐ C. 4.2 cm

☐ B. 6.5 cm

☐ D. 3.6 cm



7) Simplify $\frac{20x^9}{5x^3}$.

☐ A. x^6

☐ C. $15x^6$

☐ B. $4x^{12}$

☐ D. $4x^6$

8) Which of the following is irrational?

☐ A. $\sqrt{25}$

☐ C. $\sqrt{100}$

☐ B. $\sqrt{144}$

☐ D. $\sqrt{40}$

9) Does the table show values from the equation $y = 5x$?

x	1	2	3
y	5	10	15

☐ A. No, should be $y = 5 + x$

☐ C. Yes, each y -value is 5 times the matching x -value.

☐ B. No, should be $y = x + 5$

☐ D. No, missing $x = 0$

10) Verify: Is $(3, 6)$ a solution to the system $\begin{cases} y = 2x \\ y = x + 3 \end{cases}$?

☐ A. Yes, because $6 = 2(3)$ and $6 = 3 + 3$

☐ C. No; the first equation gives $6 \neq$

☐ B. No; the second equation gives $6 = 2(3) + 1$
 $2 + 3$, which is false

☐ D. No; neither equation is satisfied

11) Solve: $-3(x - 2) \leq 9$

☐ A. $x \leq -1$

☐ C. $x \geq -1$

☐ B. $x \leq 1$

☐ D. $x \geq 1$



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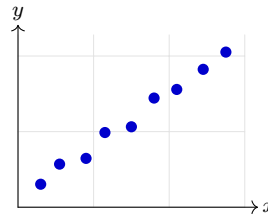
1) Factor $x^2 - 13x + 42$.

☐ A. $(x - 6)(x - 7)$

☐ C. $(x - 21)(x - 2)$

☐ B. $(x - 14)(x + 1)$

☐ D. $(x - 3)(x - 14)$



2)

Consider a scatter plot of students' math test scores versus their previous quiz scores. Most points lie close to an imaginary diagonal line, with only a few outliers. Which statement best describes the strength of correlation?

☐ A. Very weak correlation

☐ C. Strong positive correlation

☐ B. No correlation between the variables

☐ D. Weak negative correlation

3) A two-way table shows 160 athletes:

	Morning	Evening	Total
Track	50	30	80
Swim	35	45	80
Total	85	75	160

What percentage of all athletes train in the morning on the track team?

☐ A. 31.25%

☐ C. 58.8%

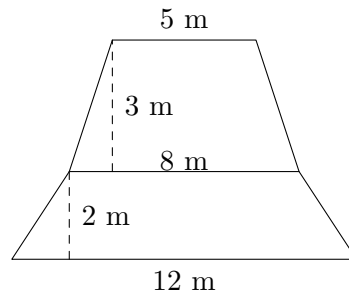
☐ B. 37.5%

☐ D. 62.5%

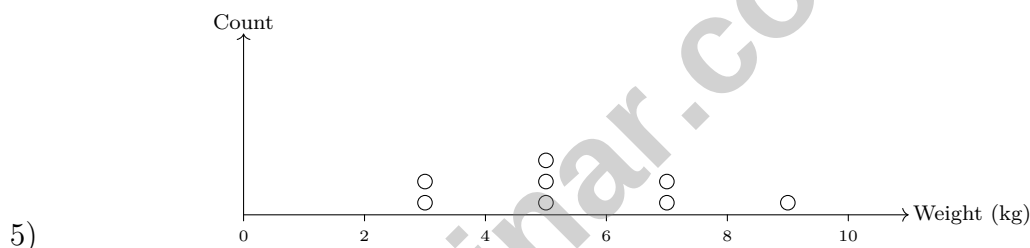


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- 4) A composite figure is an asymmetric shape made of two trapezoids stacked vertically. Top trapezoid: bases 5 m and 8 m, height 3 m. Bottom trapezoid: bases 8 m and 12 m, height 2 m. What is the combined area?



- ☐ A. 15 m^2 ☐ C. 35 m^2
☐ B. 20 m^2 ☐ D. 39.5 m^2



Pet weights: $\{3, 3, 5, 5, 5, 7, 7, 9\}$ kg with mean = 5.5 kg. Find MAD.

- ☐ A. 1.5 ☐ C. 2
☐ B. 1.63 ☐ D. 2.25
- 6) A deck of cards has 4 aces out of 52 cards. If you draw a card, replace it, and draw again, what is the probability that both draws are aces?

- ☐ A. $\frac{4}{52}$ ☐ C. $\frac{1}{152}$
☐ B. $\frac{16}{2704}$ ☐ D. $\frac{8}{52}$



- 1) A schedule allows you to pick a morning activity and an afternoon activity from the list below. Morning: hiking or swimming. Afternoon: painting, music, or reading. How many different schedules are possible?

☐ A. $2 + 3 = 5$

☐ C. $3^2 = 9$

☐ B. $2 \times 3 = 6$

☐ D. $(2 + 3)^2 = 25$

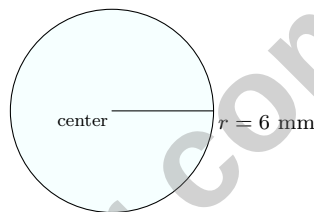
- 2) A cube has an edge length of 5 cm. What is its total surface area?

☐ A. 25 cm^2

☐ C. 125 cm^2

☐ B. 75 cm^2

☐ D. 150 cm^2



3)

A bearing ball (sphere) used in machinery has a radius of 6 mm. Approximately, what is its volume? (Use $\pi \approx 3.14$.)

☐ A. 508.68 mm^3

☐ C. 1017.36 mm^3

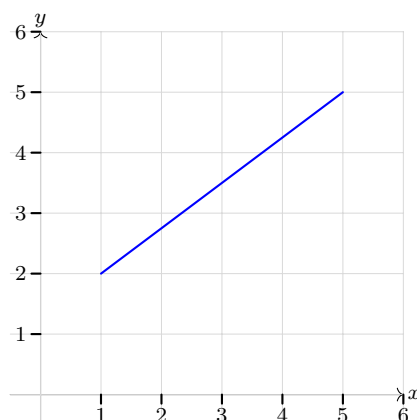
☐ B. 904.32 mm^3

☐ D. 2034.72 mm^3



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4)

What is the equation of the line in the graph?

☐ A. $y = \frac{3}{4}x + \frac{5}{4}$

☐ C. $y = \frac{3}{4}x + 1$

☐ B. $y = \frac{1}{2}x + 1$

☐ D. $y = x + 1$

5) Which of the following CORRECTLY pairs an equation with its type?

☐ A. $y = x + 2$ is nonlinear

☐ C. $y = \frac{1}{2}x$ is linear

☐ B. $y = x^2 + 2$ is linear

☐ D. $y = \sqrt{x - 1}$ is linear



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 C is correct.** (8.F.A.1) For each input x (positive, negative, or zero), there is exactly one output $y = x^2$. For example, both $x = 2$ and $x = -2$ give $y = 4$, but each specific input has one output.
- 2) **Choice C is correct.** (8.G.A.1) Reflections reverse orientation (flip the figure). All side lengths, angles, and perimeter are preserved; only the direction of labeling changes.
- 3) **Choice A is correct.** (8.EE.B.6) Substitute: $6 = \frac{2}{3}(3) + b$, so $6 = 2 + b$, thus $b = 4$.
- 4) **Choice A is correct.** (8.EE.C.7) Distribute: $-3x + 6 = 9$. Subtract 6: $-3x = 3$. Divide by -3 : $x = -1$.
- 5) **Choice B is correct.** (8.EE.C.8b) DASHED line means $>$ or $<$. Shading BELOW means $y <$. Combined: $y < -x + 2$.
- 6) **Choice D is correct.** (8.NS.A.2) By the Pythagorean theorem, diagonal $= \sqrt{2^2 + 3^2} = \sqrt{4 + 9} = \sqrt{13} \approx 3.606 \approx 3.6$ cm.
- 7) **Choice D is correct.** (8.EE.A.1) Simplify coefficients: $\frac{20}{5} = 4$. Simplify variables: $\frac{x^9}{x^3} = x^6$. Result: $4x^6$.
- 8) **Choice D is correct.** (8.EE.A.2) $\sqrt{40}$ is irrational because 40 is not a perfect square. The others equal 5, 10, and 12 respectively.
- 9) **Choice C is correct.** (8.EE.B.5) Each value: $y = 5(1) = 5$, $y = 5(2) = 10$, $y = 5(3) = 15$. All match the equation $y = 5x$.
- 10) **Choice A is correct.** (8.EE.C.8a) Check (3, 6) in both equations: $6 = 2(3) = 6$ ✓ and $6 = 3 + 3 = 6$ ✓. The solution is correct.
- 11) **Choice C is correct.** (8.EE.C.8b) Distribute: $-3x + 6 \leq 9$. Subtract 6: $-3x \leq 3$. Divide by -3 and flip the inequality: $x \geq -1$.
- 12) **Choice B is correct.** (8.F.A.3) Constant second differences indicate a quadratic (degree-2 polynomial) function, which is nonlinear.
- 13) **Choice C is correct.** (8.F.B.4) Proportional functions have form $y = mx$ (intercept = 0). Option C has intercept 1, so it is not proportional.
- 14) **Choice A is correct.** (8.G.A.5) Alternate exterior angles are congruent when lines are parallel.
- 15) **Choice A is correct.** (8.G.A.5) The sum of interior angles is $(n - 2) \times 180$. For a regular polygon, divide by n sides to get each angle.
- 16) **Choice D is correct.** (8.G.B.7) Total installment cost: $250 + 150 \times 12 = 250 + 1800 = \$2,050$. Finance charge: $2050 - 1500 = \$550$.
- 17) **Choice C is correct.** (8.EE.A.4) Same exponents: $(6.5 - 3.2) \times 10^5 = 3.3 \times 10^5$.
- 18) **The correct answer is A, C.** (8.G.B.6, 8.G.B.7) A: $6^2 + 8^2 = 36 + 64 = 100 = 10^2$ ✓. C: $8^2 + 15^2 = 64 + 225 = 289 = 17^2$ ✓. B: $49 + 64 = 113 \neq 81$. D: $100 + 225 = 325 \neq 400$. E: $25 + 49 = 74 \neq 81$.
- 19) **Choice C is correct.** (8.EE.C.7) FOIL: $(x + 3)(x - 5) = x^2 - 5x + 3x - 15 = x^2 - 2x - 15$.
- 20) **The correct answer is 100.** (8.EE.A.3) When dividing powers with the same base, subtract the exponents. $10^{5-3} = 10^2$, and $10^2 = 100$, so 10^5 is 100 times larger than 10^3 .
- 21) **The correct answer is 7.1.** (8.NS.A.1) Since $7^2 = 49$ and $7.1^2 = 50.41$, we have $\sqrt{50}$ between 7.0 and 7.1, closer to 7.1. More precisely, $7.07^2 \approx 49.98 \approx 50$. To the nearest tenth, $\sqrt{50} \approx 7.1$.
- 22) **Choice A is correct.** (8.F.A.2) Slope: $(24 - 9)/(5 - 2) = 15/3 = 5$. From point (2, 9): $9 = 5(2) + b \Rightarrow b = -1$. Equation is $y = 5x - 1$.
- 23) **Choice B is correct.** (8.F.B.5) The graph shows a flat horizontal line from week 3 to week 5 at 4 mph, indicating no change in speed. This is the maintenance phase after rapid early gains.
- 24) **Choice B is correct.** (8.G.A.2) Congruent figures have equal corresponding sides. Kite 2 has the same side lengths as Kite 1: 4 cm, 4 cm, 6 cm, 6 cm.
- 25) **Choice B is correct.** (8.G.A.3) The translation vector is $(4, 5) - (1, 2) = (3, 3)$. So $Q' = Q + (3, 3) = (4, 2) + (3, 3) = (7, 5)$.
- 26) **Choice A is correct.** (8.G.B.8) Map distance is $\sqrt{100} = 10$ units. Actual distance is $10 \times 5 = 50$ miles.
- 27) **Choice B is correct.** (8.G.B.7) Let one angle be x . Its supplement is $180 - x$. Their difference is $(180 - x) - x = 28$, so $180 - 2x = 28$, giving $x = 76^\circ$. The larger is $180 - 76 = 104^\circ$.



Hi, Math Communicator!

◇ Grade 8 math is not only about getting a number. It is about explaining relationships and making your reasoning visible. ◇

★ **Remember this:** When you show steps, label diagrams, and write clear answers, you are joining the conversation that math is trying to have. You practiced across 9 full Grade 8 practice tests, and that repeated effort matters. ★

Communication Skills

- **Use Words:** Explain what the answer means.
- **Use Symbols:** Keep equations accurate.
- **Use Diagrams:** Show relationships visually.
- **Use Units:** Connect math to context.

Grade 8 test-day tip: For open-ended questions, answer in a complete thought: value, unit, and reason.

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

Jay Daie

Your Math Communication Coach

CONFIDENCE TODAY, SUCCESS TOMORROW!

GRADE

8

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With a wide variety of questions and real-world applications, this book builds the skills and confidence students need to achieve their best!



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Engaging problems that connect math to everyday life.



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Strengthen understanding and feel prepared for test day.

COVERS ALL ESSENTIAL TOPICS

- | | |
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| ✓ Expressions & Equations | ✓ Pythagorean Theorem |
| ✓ Ratios & Proportional Relationships | ✓ Volume & Surface Area |
| ✓ Linear Equations | ✓ Transformations |
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Better **Results.**