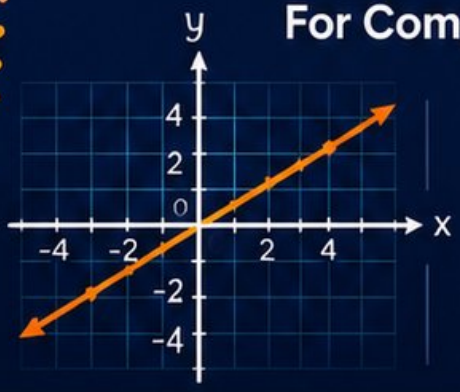
8 Vermont VTCAP GRADE 8 MATH PRACTICE TESTS

Standards Aligned Problem Solving
For Comprehensive Assessment Programs



$A = \pi r^2$
$C = 2\pi r$
$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3} b^2 h$

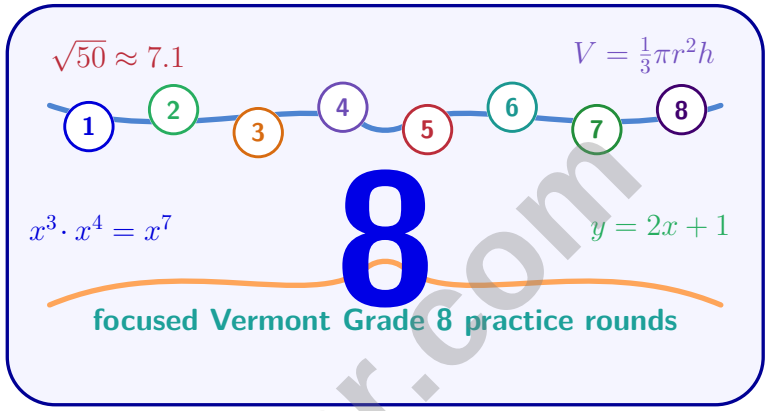
8 PRINTED TESTS

2 ONLINE TESTS

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

8 Vermont VTCAP Grade 8 Math Practice Tests

Vermont Practice for Functions, Geometry, Data, and Probability



Eight 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!

Eight focused rounds for sharper VTCAP math thinking

This book gives you eight 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.

How to Use This Book

An eight-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?

Eight VTCAP tests, 320 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 7–8	Pythagorean reasoning, volume, data analysis, linear models, probability, mixed review, and stamina.
Answer Pages	Compact keys and explanations that show why each answer works.

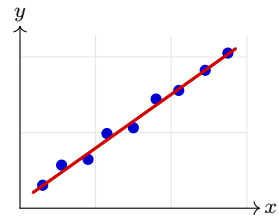
The tests are mixed on purpose. Grade 8 success means recognizing which idea is being tested even when the next question changes format.

Table of Contents

1) Which value of x satisfies $x^2 = 100$?

☐ A. 8
☐ B. 9
☐ C. 10
☐ D. 11

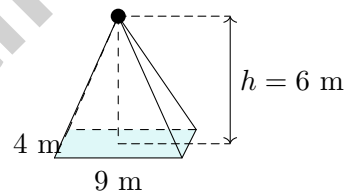
2)



Which is the BEST description of a "line of best fit" on a scatter plot?

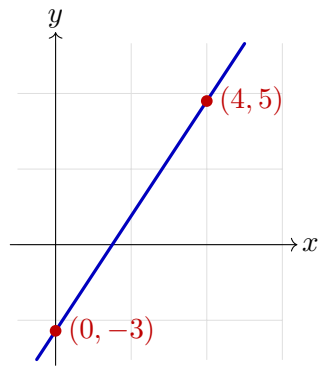
☐ A. A line that passes through every data point
☐ B. A line that passes through no data points
☐ C. A line that generally shows the overall trend of the data
☐ D. A line that only passes through the outliers

3) A pyramid has a rectangular base of 9 m by 4 m and a height of 6 m. What is its volume?

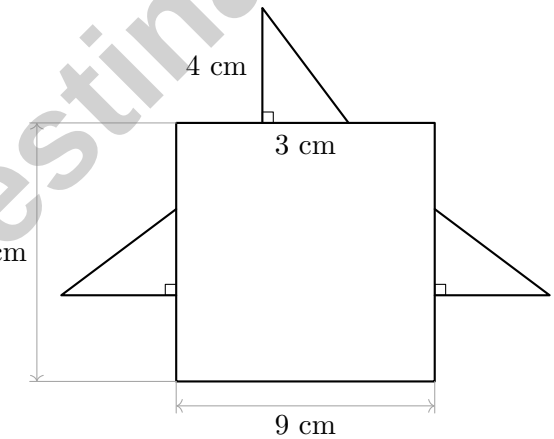


☐ A. 36 m^3
☐ B. 72 m^3
☐ C. 216 m^3
☐ D. 432 m^3

4) The graph shows a line through $(0, -3)$ and $(4, 5)$. Find the slope of the line.

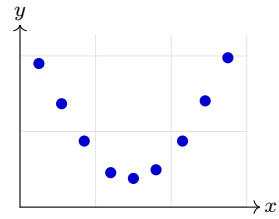


5) A composite figure has a square base (9 cm by 9 cm) with three congruent right triangles on three sides (base 3 cm, height 4 cm each). What is the total area?



☐ A. 81 cm^2
☐ B. 99 cm^2
☐ C. 117 cm^2
☐ D. 126 cm^2

6)



Consider a scatter plot where points form a U-shaped curve. As x increases from left to right, y first decreases, then increases. This pattern is an example of:

☐ A. Negative linear correlation
☐ B. Nonlinear association
☐ C. Perfect positive correlation
☐ D. No correlation

7) A rectangle has dimensions 6 units by 4 units. If the rectangle is dilated by scale factor 2.5 centered at the origin, what is the perimeter of the dilated rectangle?

8) A student finds that their homework scores have a mean of 85 and MAD of 4. Which interval is one MAD from the mean?

☐ A. 81 to 89
☐ B. 75 to 95
☐ C. 80 to 90
☐ D. 70 to 100

9) A fair coin is flipped and a standard six-sided die is rolled. What is the probability of getting heads AND a 4?

☐ A. $\frac{1}{12}$
☐ B. $\frac{1}{6}$
☐ C. $\frac{1}{8}$
☐ D. $\frac{2}{3}$

1) A scale factor of 0.75 applied to a figure means the new figure is:

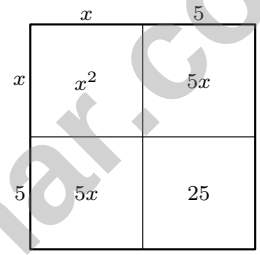
☐ A. Larger than the original
☐ B. 75% of the original size
☐ C. 25% of the original size
☐ D. 75% larger than the original

2) Which table represents a NONLINEAR function?

x	0	1	2	3
y	1	2	4	8

☐ A. No, y increases
☐ B. Yes, the first differences are not constant
☐ C. Yes, the y-values are doubling
☐ D. No, the x-values are equally spaced

3) The area model represents $(x+5)^2$:



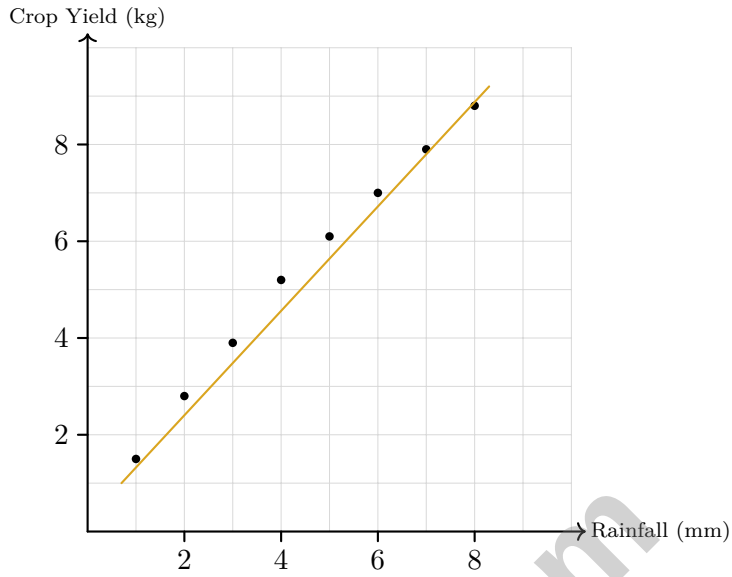
What is the sum of all areas?

☐ A. $x^2+10x+25$
☐ B. x^2+25
☐ C. x^2+5x+5
☐ D. $2x^2+10x$

4) Two lines intersect and form four angles. If one angle measures 72°, what are the measures of the other three angles?

☐ A. $72°, 72°, 72°$
☐ B. $72°, 108°, 108°$
☐ C. $108°, 108°, 108°$
☐ D. $90°, 90°, 90°$

5)



In a study of rainfall and crop yield, the trend line shows a positive relationship. How much would yield increase for every 1 mm increase in rainfall?

☐ A. Between 1 and 2 kg
☐ B. Less than 1 kg
☐ C. Between 2 and 3 kg
☐ D. More than 3 kg

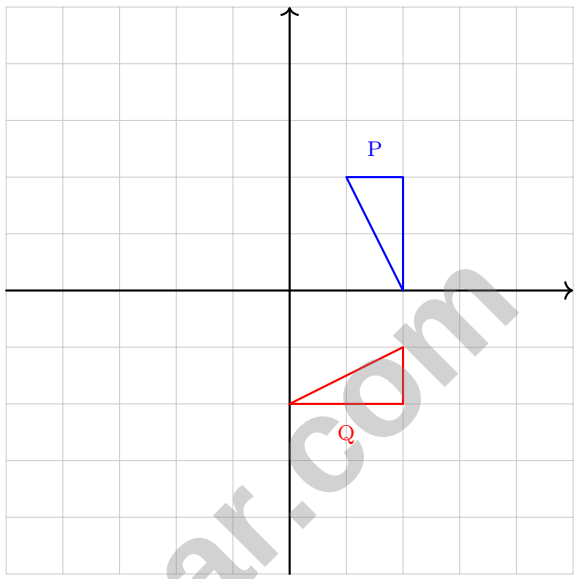
6) A student claims that reflecting a point across the x-axis and then across the y-axis gives the same result as rotating 180° about the origin. Is this claim correct?

☐ A. No, reflections never equal rotations
☐ B. Yes, both transformations map $(x, y) \to (-x, -y)$
☐ C. Only if the point is on an axis
☐ D. Only for points in Quadrant I

1) Simplify $\frac{a^{-3}}{a^2}$.

☐ A. a^6
☐ B. a^{-1}
☐ C. a^1
☐ D. a^{-5}

2)



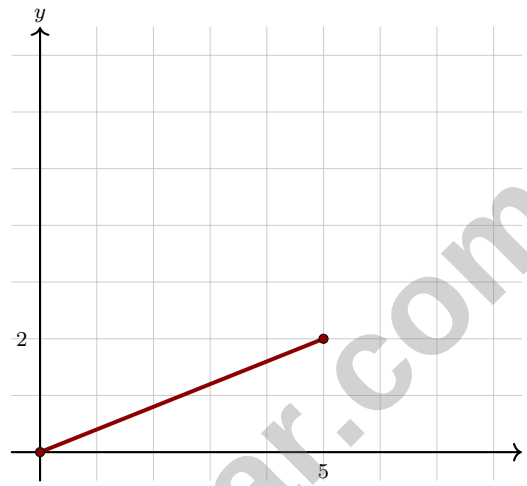
Triangle P is rotated 90° clockwise about the origin to produce triangle Q. Is this correct?

☐ A. Yes, the rotation is correct
☐ B. No, a 90° counterclockwise rotation would be needed
☐ C. No, a 270° counterclockwise rotation would be needed
☐ D. No, a 180° rotation would be needed

3) To determine the solution region of an inequality, you can use a test point. Which is the most efficient test point to select?

☐ A. A point on the boundary line
☐ B. The origin $(0, 0)$, provided it is not on the boundary
☐ C. Any point with negative coordinates
☐ D. A point in Quadrant III

4)



Using the graph, find the equation of the proportional relationship.

☐ A. $y = 5x$
☐ B. $y = \frac{5}{2}x$
☐ C. $y = \frac{2}{5}x$
☐ D. $y = 2x$

5) For what value of c does the system $\begin{cases} y = 2x + 3 \\ y = 2x + c \end{cases}$ have no solution?

☐ A. $c = 3$ only
☐ B. $c = 0$ only
☐ C. Any $c \neq 3$
☐ D. c can be any value

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.

Practice Test Answers and Explanations

Practice Test 1 Answers and Explanations

1) **Choice C is correct.** 8.EE.A.2 $10 \times 10 = 100$, so $x = 10$ (taking the positive root).
2) **Choice C is correct.** 8.SP.A.2 A line of best fit minimizes the overall distance between itself and the data points, capturing the general trend. It rarely passes through every point.
3) **Choice B is correct.** 8.G.C.9 $B = 9 \times 4 = 36$ m^2. $V = \frac{1}{3} \times 36 \times 6 = 72$ m^3.
4) **The correct answer is 2 .** 8.F.B.4 Slope: $m = \frac{5-(-3)}{4-0} = \frac{8}{4} = 2$.
5) **Choice B is correct.** 8.G.B.7 Decompose: square plus triangles. Square area $= 9 \times 9 = 81$ cm^2. Each right triangle area $= \frac{1}{2} \times 3 \times 4 = 6$ cm^2. Three triangles total $= 18$ cm^2. Total area $= 81 + 18 = 99$ cm^2.
6) **Choice B is correct.** 8.SP.A.1 A U-shaped curve represents a nonlinear relationship. The direction changes, so it is not a simple linear correlation.
7) **The correct answer is 50 .** 8.G.A.3 Original perimeter: $2(6 + 4) = 20$. Dilated perimeter: $20 \times 2.5 = 50$.
8) **Choice A is correct.** 8.G.B.8 One MAD from the mean means subtract and add the MAD: $85 - 4 = 81$ and $85 + 4 = 89$, so the interval is 81 to 89.
9) **Choice A is correct.** 8.G.B.7 Independent events: $P(H \text{ and } 4) = P(H) \times P(4) = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$.
10) **Choice B is correct.** 8.EE.C.7b Each of the 3 initial branches splits into 2 outcomes: $3 \times 2 = 6$ final outcomes.
11) **Choice C is correct.** 8.NS.A.2 If $a < \sqrt{n} < a + 1$, then squaring all parts gives $a^2 < n < (a + 1)^2$.
12) **Choice D is correct.** 8.NS.A.2 Since $2.6^2 = 6.76 \approx 7$ and $2.65^2 \approx 7.02$, we estimate $\sqrt{7} \approx 2.65$.
13) **Choice D is correct.** 8.EE.A.3 $9.9 \times 10^2 = 990$ and $1.0 \times 10^3 = 1{,}000$. The exponent dominates when coefficients are close.
14) **Choice D is correct.** 8.NS.A.1 $\sqrt{2}$, $\sqrt{7}$, and $\sqrt{20}$ are all irrational because 2, 7, and 20 are not perfect squares. None of these can be simplified to a rational number.
15) **Choice D is correct.** 8.NS.A.1 Let $x = 0.\overline{36}$. Then $100x = 36.\overline{36}$. Subtracting: $99x = 36$, so $x = \frac{36}{99} = \frac{4}{11}$.
16) **Choice D is correct.** 8.EE.B.6 Slope $= \dfrac{-2-4}{2-(-1)} = \dfrac{-6}{3} = -2$.
17) **Choice D is correct.** 8.EE.C.7 After distributing $2(3x + 1) = 6x + 2$, you have $6x + 2 = 20$. The next step is to isolate the variable term by subtracting 2: $6x = 18$, then divide by 6 to get $x = 3$.
18) **Choice D is correct.** 8.EE.B.5 Slope $= \frac{9-0}{3-0} = \frac{9}{3} = 3$. The rise is 9 and the run is 3, so the slope is 3.
19) **Choice A is correct.** 8.EE.C.8a Substitute $y = \frac{2}{3}x - 1$ into $3y + 2x = 9$: $3(\frac{2}{3}x - 1) + 2x = 9$, so $2x - 3 + 2x = 9$, giving $4x = 12$ and $x = 3$. Then $y = \frac{2}{3}(3) - 1 = 2 - 1 = 1$. So $(3, 1)$ is the answer.
20) **Choice D is correct.** 8.G.B.7 Account A: $I = 1000 \times 0.04 \times 5 = \$200$. Account B: $A = 1000(1.03)^5 \approx 1159.27$, so interest $\approx \$159.27$. Account A earns more interest.
21) **Choice C is correct.** 8.EE.A.1 New side is s^2, so new area is $(s^2)^2 = s^{2 \cdot 2} = s^4$.
22) **The correct answer is B,C.** 8.EE.C.7 $(x + 6)^2 = (x + 6)(x + 6) = x^2 + 12x + 36$. Choice B is the expanded form, and choice C is the factored form. Choice A ignores the middle term. Choice D has an error. Choice E is a different factorization that does not equal $(x + 6)^2$.
23) **Choice D is correct.** 8.EE.A.4 Rewrite: $4.0 \times 10^5 + 0.6 \times 10^5 = (4.0 + 0.6) \times 10^5 = 4.6 \times 10^5$.
24) **Choice B is correct.** 8.F.A.1 Base fare is \$5. Charge per mile is \$3. Total charge $= 3m + 5$.
25) **The correct answer is** $(28, 62)$ **.** 8.G.B.7 Complementary angles sum to 90°: $x + (2x + 6) = 90 \Rightarrow 3x + 6 = 90 \Rightarrow 3x = 84 \Rightarrow x = 28°$. The angles are 28° and 62°.
26) **Choice B is correct.** 8.F.A.2 X fee: \$30/mo. Y fee: $(115 - 50)/(3 - 1) = 65/2 = 32.5$/mo. Since $32.5 > 30$, Y is higher.
27) **Choice A is correct.** 8.F.B.5 From 0 to 2 minutes, the graph shows the temperature decreasing from 6°C to 4°C. Option A claims an increase, so it is false.
28) **Choice B is correct.** 8.G.A.2 Congruent figures have equal perimeters. Since ABCDEF is congruent to GHIJKL, and the perimeter of ABCDEF is 48 cm, the perimeter of GHIJKL is also 48 cm.

Hi, Detail Champion!

◇ In Grade 8, small details can change an entire answer: a negative sign, a decimal place, a unit, an exponent, or an inequality symbol. ◇

⋆ **Remember this:** You practiced noticing those details. That is a serious test skill, and it gets better with every careful review. This version gave you 8 opportunities to rehearse test-day habits. ⋆

Detail Checks

- **Signs:** Circle negatives before simplifying.
- **Symbols:** Read inequality signs carefully.
- **Decimals:** Line up place values.
- **Units:** Match the unit the question asks for.

Grade 8 test-day tip: Use the final minute on each section for a detail scan, not a full redo.

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

Jay Daie

Your Detail-Check Coach

PRACTICE TODAY, SUCCEED TOMORROW!

GRADE 8

Give your child the confidence and skills they need with **8 full-length Grade 8** Math practice tests that mirror 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.

BUILD SKILLS & BOOST CONFIDENCE
Strengthen understanding and feel prepared for test day.

COVERS ALL ESSENTIAL TOPICS

- The Number System
- Expressions & Equations
- Ratios & Proportional Relationships
- Linear Equations
- Functions
- Geometry
- Measurement & Data
- Statistics & Probability
- Pythagorean Theorem
- Volume & Surface Area
- Transformations
- Inequalities
- Data Analysis & Graphing
- And More!

2 EXTRA ONLINE PRACTICE TESTS INCLUDED!

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

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PRACTICE. PREPARE. SUCCEED.

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