

10 Alaska AK STAR Grade 8 Math Practice Tests

The Ultimate Test Prep Collection with Answer Explanations

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10 Practice Tests

🏆 Grade 8 Mathematics 🏆

10 tests × full coverage

Welcome!

*This book contains **10 full-length practice tests** — the most comprehensive preparation you can get for your Grade 8 math assessment. Each test covers all six topics:*

📖 Irrational Numbers 📖 Powers & Scientific Notation

📖 Linear Equations 📖 Functions

📖 Geometry 📖 Data & Relationships

Ten tests give you the practice needed to walk into the real test feeling fully prepared.

Thorough preparation leads to outstanding results.

4

“ Ten full tests! By the time you finish, there won't be any surprises on test day. ”



1

How to Use This Book

A complete 10-test preparation program

What's Inside

- **10 Full-Length Practice Tests** — each covers all 6 chapters of Grade 8 math: irrational numbers, exponents & scientific notation, linear equations, functions, geometry, and data analysis.
- **Detailed Answer Explanations** — every question includes a step-by-step solution so you learn from every mistake.
- **Formula Reference Sheet** — all the key Grade 8 formulas you need, organized and ready for quick review.
- **Test Tracker** — log your scores across all 10 tests and monitor your progress from start to finish.

Your 10-Test Training Plan

★ PHASE 1: Foundation (Tests 1–3)

Untimed or soft-timed. Focus on understanding the format, identifying strengths and weaknesses, and building good study habits.

★★ PHASE 2: Building Skills (Tests 4–7)

Timed (70 minutes each). Work on pacing, accuracy, and showing complete solutions. Review weak topics between tests.

★★★ PHASE 3: Test-Day Ready (Tests 8–10)

Full test conditions: strict timing, quiet space, no notes. Compare scores with your early tests to see your growth.

Schedule: Take one test every 3–4 days, or one per week. Use study days between tests to review.

 Types of Questions

 **Multiple Choice:** Four options — work the problem first, then match. Eliminate obviously wrong answers to narrow your choices.

 **Short Answer & Constructed Response:** Show every step: equations, substitutions, simplifications. Partial credit rewards correct reasoning even if the final answer is off.

 **Graphing & Data Analysis:** Plot points, draw lines, interpret graphs. Label axes clearly.



Tip: Ten tests is a full preparation program. Don't rush. The key is what you do between tests — study, review, and understand your mistakes before moving forward.



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💡 *Test-Taking Tips* 💡

Your complete test-day toolkit

🕒 *Before the Test*

- *Review your notes from the previous test — focus on your weak topics*
- *Set up a quiet, clean workspace with all your materials ready*
- *Start with a positive mindset: you've prepared for this*

✎ *During the Test*

- *Read each problem fully before calculating anything*
- *Write the formula or set up the equation first, then substitute values*
- *Show all your work — every step, every operation*
- *If stuck for more than 2 minutes, mark it and move on*
- *Use estimation to check if your answers are reasonable*

📖 *After the Test*

- *Read the full explanation for every question you got wrong*
- *Write down which topics gave you trouble (not just question numbers)*
- *Study those topics before taking the next test*
- *Record your score in the Test Tracker*

 Common Mistakes in Grade 8 Math

 **Exponents:** $(ab)^n = a^n b^n$, but $a^m + a^n \neq a^{m+n}$. Only multiply/divide to combine.

 **Slope formula:** $m = \frac{y_2 - y_1}{x_2 - x_1}$ — keep the order consistent.

 **Systems of equations:** The solution must satisfy both equations.

 **Transformations:** Rotations and reflections change position; dilations change size.

 **Volume:** Use $\pi \approx 3.14$ or leave as π — match what the question asks.



“ The students who improve the most aren't the ones who take the most tests — they're the ones who carefully review every mistake. Make that your priority. ”



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Grade 8 Formula Reference

Keep this page handy — you may use it during your practice tests!

Exponent Rules

$$a^m \cdot a^n = a^{m+n} \quad (a^m)^n = a^{mn} \quad (ab)^n = a^n \cdot b^n$$
$$\frac{a^m}{a^n} = a^{m-n} \quad a^0 = 1 \quad (a \neq 0) \quad a^{-n} = \frac{1}{a^n}$$

Lines & Linear Equations

Slope: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}}$

m = slope b = y -intercept

Slope-intercept: $y = mx + b$

Parallel lines: same slope

Proportional: $y = mx$

Proportional: passes through origin

Scientific Notation

$a \times 10^n$ where $1 \leq |a| < 10$

Multiply: add exponents

Divide: subtract exponents

Roots & Number Sense

Perfect squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144

Perfect cubes: 1, 8, 27, 64, 125 $\sqrt{2} \approx 1.414$ $\sqrt{3} \approx 1.732$ $\pi \approx 3.14159$

Pythagorean Theorem & Distance

$a^2 + b^2 = c^2$ c = hypotenuse (longest side of a right triangle) **Distance:** $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Volume Formulas

Cylinder $V = \pi r^2 h$ **Cone** $V = \frac{1}{3} \pi r^2 h$ **Sphere** $V = \frac{4}{3} \pi r^3$

Angle Relationships

Triangle angle sum: 180°

Exterior angle = sum of two remote interior angles

Parallel lines + transversal: Alternate interior angles are equal • Co-interior angles sum to 180°

Functions

Each input $\rightarrow$ exactly one output **Vertical line test:** if any vertical line hits graph more than once $\Rightarrow$ not a function

Linear: constant rate of change ($y = mx + b$)

Nonlinear: rate of change varies

Transformations

Translation: slide

Reflection: flip

Rotation: turn

Dilation: resize

Congruent = same shape & size

Similar = same shape, proportional size



Tip: Bookmark this page! Review it before each test so these formulas become second nature.



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PRACTICE TEST

1

Practice Test 1

 10 Questions

Before You Start

- ✓ *Read each question carefully before choosing your answer.*
- ✓ *Show your work on scratch paper when you need to.*
- ✓ *Skip hard questions and come back to them later.*
- ✓ *Check your answers when you're done.*
- ✓ *Take your time — there's no rush!*

★ *You've Got This!* ★

Do your best and show what you know!



1. True or false: The number $\frac{22}{7}$ is equal to π .

Your Answer:

2. The table below shows four repeating decimals and the power of 10 a student used to convert each. Which one uses the **WRONG** power of 10?

Decimal	Multiply by
$0.\overline{7}$	10
$0.\overline{45}$	100
$0.\overline{123}$	100
$0.\overline{8}$	10

- (A) $0.\overline{7}$ (B) $0.\overline{45}$
 (C) $0.\overline{123}$ (D) $0.\overline{8}$

3. The table below shows a student's work to approximate $\sqrt{14}$. What should go in the blank?

Guess	Square	Compare to 14
3	9	too small
4	16	too big
3.7	13.69	too small
3.8	14.44	too big
?	?	closest

- (A) 3.74, because $3.74^2 = 13.9876$ (B) 3.72, because $3.72^2 = 13.8384$
 (C) 3.80, because $3.8^2 = 14.44$ (D) 3.75, because $3.75^2 = 14.0625$



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4. What is the best estimate for $5 - \sqrt{7}$?

(A) 1.4

(B) 2.4

(C) 3.0

(D) 0.4

5. The diagram shows a square and a cube. The square has an area of A square units and the cube has a volume of V cubic units. If $A = V$, which pair of side lengths is correct?



(A) $s = 6, e = 6$

(B) $s = 8, e = 4$

(C) $s = 9, e = 3$

(D) $s = 5, e = 5$

6. Estimate the product $498,000,000 \times 6,200$ by first writing each factor in scientific notation and then computing.

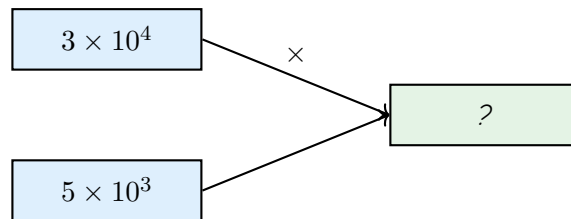
Your Answer:



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7. Study the diagram below. Each box produces its output by multiplying the two inputs. What belongs in the output box marked “?”?



(A) 8×10^7

(B) 1.5×10^7

(C) 1.5×10^8

(D) 15×10^7

8. A bike rental company charges \$8 per hour. Which equation models the total cost y for x hours?

(A) $y = x + 8$

(B) $y = 8x$

(C) $y = \frac{x}{8}$

(D) $y = 8x + 10$

9. Find the slope through $(3, -1)$ and $(7, 11)$.

Your Answer:

10. Solve $\frac{x+5}{2} = 9$.

Your Answer:



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★ End of Practice Test 1 ★

Great job finishing the test!

My Score

I got _____ out of 10 questions right.

*Check your answers in the **Answer Key** at the back of the book.*

 *Review any questions you missed. That's how we learn!*

Answer Key & Explanations



Answer Key

First try each test on your own, then check your work here.

Practice Test 1 — Answer Key

1 False

2 C

3 D

4 B

5 B

6 $\approx 3.1 \times 10^{12}$

7 C

8 B

9 3

10 $x = 13$

Time to Learn!

Review the explanations below, *especially for the questions you missed*.

Understanding why each answer is correct builds stronger problem-solving skills.

Tip: Circle any questions you got wrong, then read their explanation carefully.

Practice Test 1 — Detailed Explanations

1 $\frac{22}{7} \approx 3.142857 \dots$ is a rational approximation of π , but $\pi = 3.14159265 \dots$ is irrational. They are close but not equal.

2 $0.\overline{123}$ has a 3-digit repeating block, so you should multiply by $10^3 = 1000$, not 100.



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3 $3.74^2 = 13.9876$ (under) and $3.75^2 = 14.0625$ (just over). 14.0625 is very close to 14, so 3.75 is the best next estimate.

4 $\sqrt{7} \approx 2.646$, so $5 - \sqrt{7} \approx 5 - 2.646 = 2.354 \approx 2.4$.

5 If $s = 8$, then $A = 8^2 = 64$. If $e = 4$, then $V = 4^3 = 64$. Since $A = V = 64$, the pair $s = 8, e = 4$ works.

6 $498,000,000 \approx 5 \times 10^8$ and $6,200 \approx 6.2 \times 10^3$. Product $\approx 5 \times 6.2 \times 10^{11} = 31 \times 10^{11} = 3.1 \times 10^{12}$.

7 $(3 \times 10^4)(5 \times 10^3) = 15 \times 10^7 = 1.5 \times 10^8$.

8 At \$8 per hour with no extra fee, the relationship is proportional: $y = 8x$.

9 $m = \frac{11 - (-1)}{7 - 3} = \frac{12}{4} = 3$.

10 Multiply by 2: $x + 5 = 18$. Subtract 5: $x = 13$.



Well done checking your answers!

Keep practicing to strengthen your skills.



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THANK YOU

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Get the Full Book!

This preview shows just a small sample of what's inside.

The complete book includes:

- ✓ *All chapters and topics*
- ✓ *Hundreds of practice problems*
- ✓ *Complete answer key with explanations*
- ✓ *Colorful visuals and step-by-step examples*
- ✓ *Reference sheets and progress trackers*

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