

# 10 Kentucky KSA Grade 8 Math Practice Tests

*The Ultimate Test Prep Collection with Answer Explanations*

**Dr. A. Nazari**

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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. ”



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# 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  $\pi$  — 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:**  $180^\circ$

**Exterior angle** = sum of two remote interior angles

**Parallel lines + transversal:** Alternate interior angles are equal • Co-interior angles sum to  $180^\circ$

### 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  $\pi$ .

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.

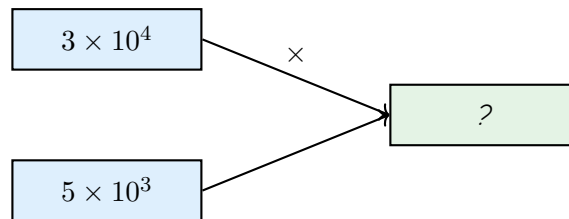
Your Answer:



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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)  $8 \times 10^7$  (B)  $1.5 \times 10^7$   
(C)  $1.5 \times 10^8$  (D)  $15 \times 10^7$

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  $\pi$ , 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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- ✓ *Complete answer key with explanations*
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