

# 12 Iowa ISASP Grade 8 Math Practice Tests

*The Complete Coached Test Prep with Tips & Detailed Answer Keys*

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# 12 Practice Tests

*Welcome!*

*This book contains **12 full-length practice tests** — the ultimate preparation program for your Grade 8 math assessment. Each test covers all six major topics:*

 *Irrational Numbers*    *Powers & Scientific Notation*

 *Linear Equations*    *Functions*

 *Geometry*    *Data & Relationships*

*Twelve tests give you unmatched depth and repetition. By the time you finish, there won't be any surprises on test day.*

*Champions aren't born — they're prepared.*



# *How to Use This Book*

*Your complete 12-test championship program*

## **What's Inside**

- **12 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 12 tests and monitor your progress from start to finish.

## **Your 12-Test Championship Plan**

### ★ **PHASE 1: Foundation (Tests 1–3)**

Untimed. Learn the format, discover your strengths and weak spots. Focus on understanding, not speed.

### ★★ **PHASE 2: Building (Tests 4–6)**

Soft-timed. Practice showing full solutions, and study the topics you missed between each test.

### ★★★ **PHASE 3: Sharpening (Tests 7–9)**

Timed (70 minutes). Build pacing and accuracy under real-time constraints. Review every mistake.

### **PHASE 4: Championship (Tests 10–12)**

Full test conditions: strict timing, quiet space, no notes. These are your final dress rehearsals.

**Schedule:** Take one test every 3–4 days. Use study days between tests to review and improve.

 **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: Twelve tests is a true championship program. Don't rush — the power is in what you do between tests. Study, review, and master your weak areas before moving on.*



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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!*



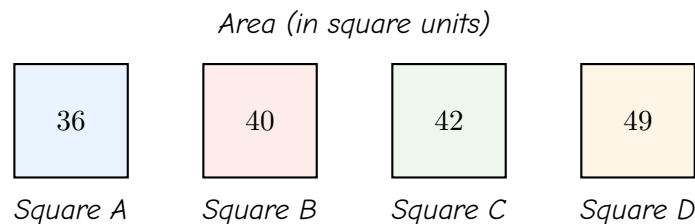
1. Which best explains why  $\sqrt{\frac{1}{9}}$  is a rational number?

- (A) Because the fraction  $\frac{1}{9}$  is less than 1
- (B) Because  $\sqrt{\frac{1}{9}} = \frac{1}{3}$ , which is a ratio of two integers
- (C) Because the square root of any fraction is always rational
- (D) Because 9 is a single-digit number

2. What is  $0.\overline{3}$  written as a fraction?

- (A)  $\frac{3}{10}$
- (B)  $\frac{3}{99}$
- (C)  $\frac{1}{3}$
- (D)  $\frac{3}{100}$

3. The diagram shows four squares with their areas labeled. Which square has a side length closest to 6.5?



- (A) Square A (area 36)
- (B) Square B (area 40)
- (C) Square C (area 42)
- (D) Square D (area 49)

4. What is the exact value of  $(\sqrt{3})^2$ ?

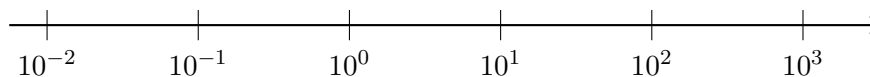
- (A) 1.73
- (B) 3
- (C) 9
- (D)  $\sqrt{9}$



5. Evaluate  $\sqrt[3]{-64}$ .

- (A)  $-4$  (B)  $4$   
(C)  $-8$  (D) *Not a real number*

6. The number line below shows powers of 10. Where does  $5 \times 10^1$  fall on this number line?



- (A) *Between  $10^{-1}$  and  $10^0$*  (B) *Between  $10^0$  and  $10^1$*   
(C) *Between  $10^1$  and  $10^2$*  (D) *Between  $10^2$  and  $10^3$*

7. A farm produces  $4.5 \times 10^6$  kilograms of wheat. Each bag holds  $5 \times 10^1$  kilograms. How many bags can be filled?

- (A)  $9 \times 10^5$  (B)  $9 \times 10^4$   
(C)  $9 \times 10^7$  (D)  $0.9 \times 10^5$

8. A table for a proportional relationship is shown below. What is the constant of proportionality?

|     |      |    |      |
|-----|------|----|------|
| $x$ | 5    | 10 | 15   |
| $y$ | 17.5 | 35 | 52.5 |

Your Answer:



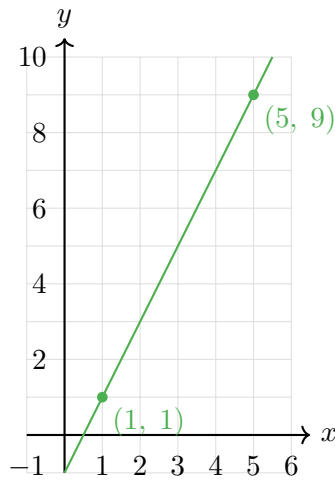
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9. The graph below shows a line passing through two labeled points. Find the slope.



Your Answer:

10. Solve  $\frac{x}{2} - 3 = \frac{x}{5} + 3$ .

- (A)  $x = 6$                       (B)  $x = 10$   
(C)  $x = 15$                       (D)  $x = 20$



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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 B

2 C

3 C

4 B

5 A

6 C

7 B

8 3.5

9 2

10 D

### 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  $\sqrt{\frac{1}{9}} = \frac{\sqrt{1}}{\sqrt{9}} = \frac{1}{3}$ , which can be written as a fraction of integers. Choice C is false:  $\sqrt{\frac{1}{2}}$  is irrational.

2 Let  $x = 0.333\dots$ . Then  $10x = 3.333\dots$ . Subtracting:  $9x = 3$ , so  $x = \frac{3}{9} = \frac{1}{3}$ .



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3 Side lengths:  $\sqrt{36} = 6$ ,  $\sqrt{40} \approx 6.32$ ,  $\sqrt{42} \approx 6.48$ ,  $\sqrt{49} = 7$ . Since 6.48 is closest to 6.5, Square C is the answer.

4 By definition,  $(\sqrt{3})^2 = 3$  exactly. Squaring a square root undoes the operation.

5  $(-4)^3 = (-4)(-4)(-4) = -64$ , so  $\sqrt[3]{-64} = -4$ . Cube roots of negative numbers are real and negative.

6  $5 \times 10^1 = 50$ . Since  $10^1 = 10$  and  $10^2 = 100$ , the value 50 falls between  $10^1$  and  $10^2$ .

7 To divide in scientific notation, divide the coefficients and subtract the exponents.  $\frac{4.5}{5} = 0.9$  and  $10^{6-1} = 10^5$ . Then adjust:  $0.9 \times 10^5 = 9 \times 10^4 = 90,000$  bags.

8 The constant of proportionality is  $k = \frac{y}{x}$ . Using the first pair:  $k = \frac{17.5}{5} = 3.5$ . The other ratios  $\frac{35}{10} = 3.5$  and  $\frac{52.5}{15} = 3.5$  confirm this.

9 Use the slope formula  $m = \frac{y_2 - y_1}{x_2 - x_1}$ . From the labeled points:  $m = \frac{9-1}{5-1} = \frac{8}{4} = 2$ .

10 To clear fractions, multiply every term by the LCD (10):  $5x - 30 = 2x + 30$ . Collect variable terms:  $3x = 60$ , so  $x = 20$ .



**Well done checking your answers!**

Keep practicing to strengthen your skills.



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THANK YOU

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