

Praxis Middle School Mathematics (5164) Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 - 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

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1. Which expression demonstrates the distributive property of multiplication over addition?
- A. $2 \times (3 + 4) = 2 \times 3 + 4$
 - B. $2 \times (3 + 4) = (2 \times 3) + (2 \times 4)$
 - C. $(2 + 3) \times 4 = 2 \times 3 + 4$
 - D. $2 \times 3 + 4 = (2 \times 3) + (2 \times 4)$
2. Which expression gives the base area of a rectangular prism with length l and width w ?
- A. $l h$
 - B. $B h$
 - C. $l w$
 - D. $w h$
3. Which statement correctly describes the relationship between the set of integers and the set of rational numbers?
- A. The rational numbers are a subset of the integers.
 - B. They are disjoint.
 - C. They are the same set.
 - D. The integers are a subset of the rational numbers.
4. The axis of symmetry for $y = ax^2 + bx + c$ is given by which equation?
- A. $x = -b/a$
 - B. $y = -b/(2a)$
 - C. $x = -b/(2a)$
 - D. $x = -2a/b$
5. A reflection over the x -axis changes which part of the coordinates?
- A. y -sign
 - B. x -sign
 - C. Both coordinates
 - D. None

6. What is 2^3 ?

- A. 8**
- B. 6**
- C. 4**
- D. 9**

7. What is the result of division called?

- A. Remainder**
- B. Sum**
- C. Quotient**
- D. Product**

8. Which value equals 2 to the power of negative three?

- A. $1/8$**
- B. 8**
- C. $-1/8$**
- D. -8**

9. Which formula for circumference uses diameter?

- A. $c = \pi d$**
- B. $c = 2\pi r$**
- C. $c = d^2$**
- D. $c = \pi r$**

10. Which formula gives the area of a triangle with base b and height h ?

- A. $a = 1/2 b h$**
- B. $a = s^2$**
- C. $p = \text{sum of all 3 sides}$**
- D. $a = l \times w$**

Answers

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1. C
2. C
3. C
4. C
5. A
6. A
7. C
8. A
9. A
10. A

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Explanations

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1. Which expression demonstrates the distributive property of multiplication over addition?

- A. $2 \times (3 + 4) = 2 \times 3 + 4$
- B. $2 \times (3 + 4) = (2 \times 3) + (2 \times 4)$
- C. $(2 + 3) \times 4 = 2 \times 3 + 4$**
- D. $2 \times 3 + 4 = (2 \times 3) + (2 \times 4)$

Distributive property means you multiply the factor outside the parentheses by each addend inside, then add those products. So for $2 \times (3 + 4)$, you can distribute 2 to both 3 and 4: $2 \times (3 + 4) = (2 \times 3) + (2 \times 4)$. This gives $6 + 8 = 14$, showing the same value in two equivalent ways. If you drop one of the products, like saying $2 \times (3 + 4) = 2 \times 3 + 4$, you're missing the 2×4 piece, and the two sides don't match ($6 + 4 = 10$, not 14). If you try to apply distribution to a sum on the outside, such as $(2 + 3) \times 4$, you should distribute the 4 to both 2 and 3, giving $2 \times 4 + 3 \times 4 = 8 + 12 = 20$, not 10. And equating expressions that don't follow the distribution pattern will also fail to balance.

2. Which expression gives the base area of a rectangular prism with length l and width w ?

- A. $l h$
- B. $B h$
- C. $l w$**
- D. $w h$

The base area of a rectangular prism comes from the rectangle at the bottom, which has side lengths equal to the length and the width. The area of a rectangle is found by multiplying its two side lengths, so the base area is $l \times w$. That's why the expression $l w$ is the one that describes the base. The other expressions involve height, which is not part of the base; they would describe areas of the side faces rather than the bottom.

3. Which statement correctly describes the relationship between the set of integers and the set of rational numbers?

- A. The rational numbers are a subset of the integers.
- B. They are disjoint.
- C. They are the same set.**
- D. The integers are a subset of the rational numbers.

The main idea is how integers relate to rational numbers. Any integer can be written as a fraction with denominator 1, like $n = n/1$, so every integer is a rational number. That means the set of integers sits inside the set of rational numbers. But not every rational is an integer—for example, $1/2$ or $-3/4$ are rational but not integers. So the two sets are not the same; the integers form a subset of the rationals, with rationals strictly broader.

4. The axis of symmetry for $y = ax^2 + bx + c$ is given by which equation?

A. $x = -b/a$

B. $y = -b/(2a)$

C. $x = -b/(2a)$

D. $x = -2a/b$

The axis of symmetry is the vertical line that passes through the parabola's vertex. For $y = ax^2 + bx + c$, the x-coordinate of the vertex can be found by completing the square: $y = a[(x + b/(2a))^2] - b^2/(4a) + c$, so the vertex occurs at $x = -b/(2a)$. Equivalently, taking the derivative $y' = 2ax + b$ and setting it to zero gives $x = -b/(2a)$. Therefore the axis of symmetry is $x = -b/(2a)$. Remember, it's a vertical line; a horizontal line like $y =$ something would not be the axis.

5. A reflection over the x-axis changes which part of the coordinates?

A. y-sign

B. x-sign

C. Both coordinates

D. None

Reflecting over the x-axis flips points vertically. This keeps the horizontal position the same, but the vertical position is inverted. So a point (x, y) becomes $(x, -y)$. That means the sign that changes is the y-coordinate, while the x-coordinate stays unchanged. For example, $(3, 4)$ becomes $(3, -4)$.

6. What is 2^3 ?

A. 8

B. 6

C. 4

D. 9

Exponentiation is about multiplying the base by itself as many times as the exponent says. Here, 2^3 means 2 multiplied by itself three times: $2 \times 2 \times 2 = 4 \times 2 = 8$. So the value is 8. The other results come from different operations: 2^2 would be 4, 2^4 would be 16, and 9 comes from 3^2 (or 9 in a different context), not from 2 raised to the 3rd power.

7. What is the result of division called?

- A. Remainder
- B. Sum
- C. Quotient**
- D. Product

Division asks how many times one number fits into another and what's left over. The result of division is called the quotient, which tells you how many times the divisor goes into the dividend. For example, 14 divided by 4 gives a quotient of 3 with a remainder of 2. If there's no leftover, the remainder is zero and the quotient is the exact result. The remainder is what's left over after dividing, not the main result. Sum comes from addition, and product comes from multiplication.

8. Which value equals 2 to the power of negative three?

- A. 1/8**
- B. 8
- C. -1/8
- D. -8

A negative exponent means you take the reciprocal of the base raised to the corresponding positive exponent. So 2 to the power of negative three becomes 1 divided by 2 to the power of 3. Since $2^3 = 8$, that gives $1/8$. The sign stays positive because the base is positive, and a negative exponent doesn't flip the sign. The other options would correspond to 2^3 (which is 8) or a negative version, which isn't what a negative exponent produces.

9. Which formula for circumference uses diameter?

- A. $c = \pi d$**
- B. $c = 2\pi r$
- C. $c = d^2$
- D. $c = \pi r$

The key idea is that circumference is tied to diameter through pi. Start from the standard formula $C = 2\pi r$ and remember that the diameter d equals twice the radius, so $r = d/2$. Substituting gives $C = 2\pi(d/2) = \pi d$. That shows why the formula that uses diameter is $C = \pi d$: you're multiplying the diameter by pi to get the circumference. For a quick check, if the diameter is 6, $C = \pi d = 6\pi \approx 18.85$, which matches the usual $C = 2\pi r$ with $r = 3$. The other forms either involve the radius rather than the diameter or mix in a squared term, which isn't correct for circumference.

10. Which formula gives the area of a triangle with base b and height h ?

A. $a = 1/2 b h$

B. $a = s^2$

C. $p = \text{sum of all 3 sides}$

D. $a = l \times w$

The area of a triangle is found by taking half of the product of its base and its height. If you lay out a rectangle with the same base and height, its area would be $\text{base} \times \text{height}$, and the triangle fits exactly half of that rectangle, so the triangle's area is $1/2 \times \text{base} \times \text{height}$. Written with symbols, that's $a = 1/2 b h$. The other formulas correspond to different shapes: s^2 is for a square, $p = \text{sum of all three sides}$ is the perimeter, and $a = l \times w$ is for a rectangle.

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Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

<https://praxis5164.examzify.com>

We wish you the very best on your exam journey. You've got this!

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