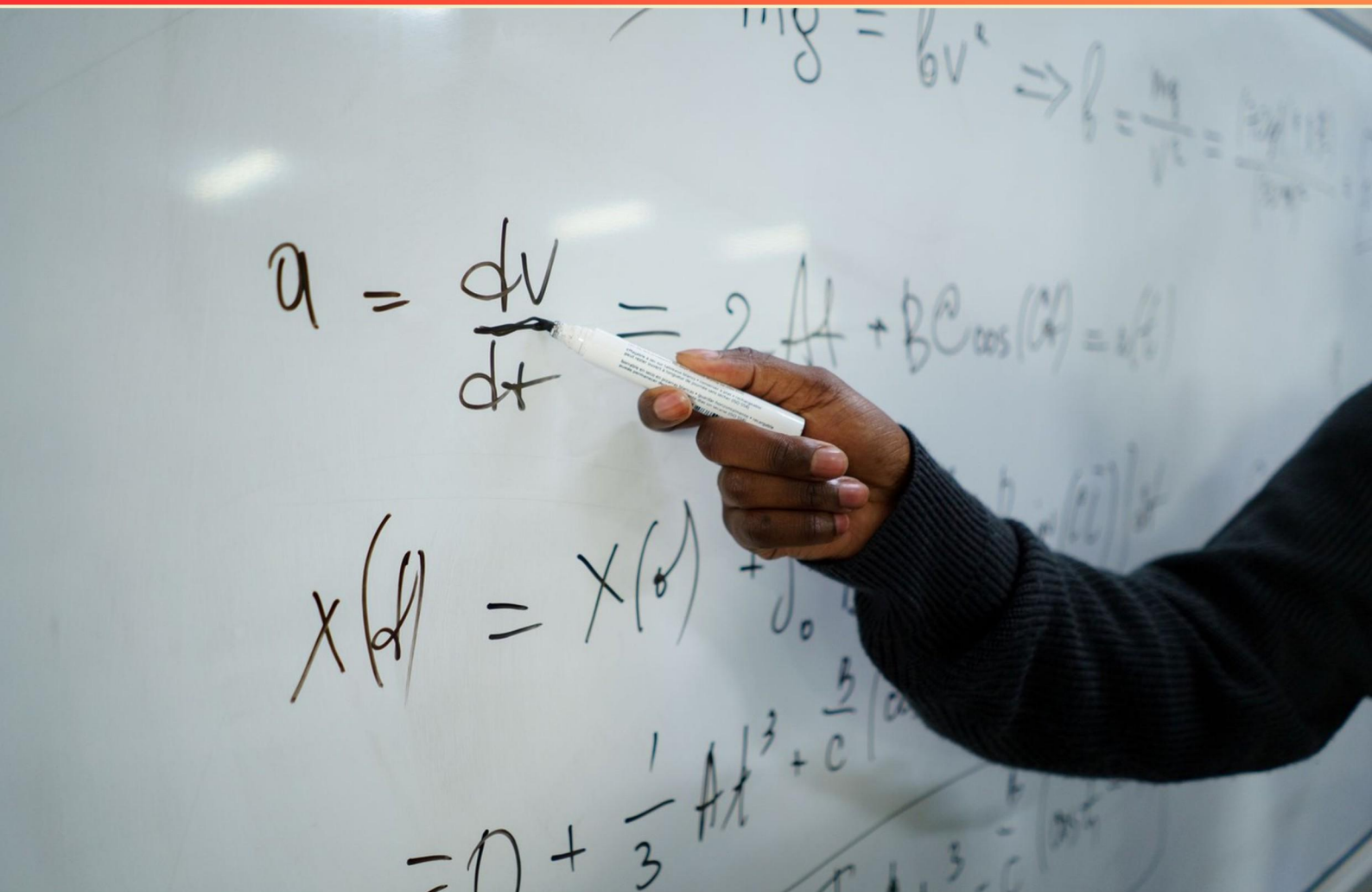


ACT MATHEMATICS PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. How many real solutions does the quadratic $x^2 + 3x - 4 = 0$ have?
- A. 0
 - B. 1
 - C. 2
 - D. 3
2. If $y = 2x + 5$ and $x = -3$, what is y ?
- A. -1
 - B. -5
 - C. -9
 - D. -3
3. Evaluate $f(0)$ for $f(x) = 2x^2 - 3x + 1$.
- A. 0
 - B. 2
 - C. 1
 - D. -1
4. Solve $2x + 3 = 7$. What is x ?
- A. 1
 - B. 2
 - C. 3
 - D. 0
5. Which of the following is the correct ascending order of the numbers $\frac{1}{2}$, $\frac{5}{6}$, and $\frac{5}{8}$?
- A. $\frac{1}{2} < \frac{5}{8} < \frac{5}{6}$
 - B. $\frac{5}{6} < \frac{1}{2} < \frac{5}{8}$
 - C. $\frac{5}{6} < \frac{5}{8} < \frac{1}{2}$
 - D. $\frac{5}{8} < \frac{1}{2} < \frac{5}{6}$

6. The functions $y = \sin x$ and $y = \sin(x + a) + b$ have the same maximum value. Which statement about a and b must be true?
- A. $a < 0$ and $b = 0$
 - B. $a < 0$ and $b > 0$
 - C. $a = 0$ and $b > 0$
 - D. $a > 0$ and $b < 0$
7. In a right triangle with legs 5 and 12, the square of the hypotenuse equals what?
- A. 169
 - B. 196
 - C. 144
 - D. 121
8. In trapezoid ABCD, AB is parallel to DC. If angle D measures x degrees, what is the measure of angle A in terms of x ?
- A. $(180 - x)^\circ$
 - B. $(180 - 0.5x)^\circ$
 - C. $(180 + 0.5x)^\circ$
 - D. $(180 + x)^\circ$
9. Simplify $\sqrt{50}$.
- A. $5\sqrt{2}$
 - B. $\sqrt{50}$
 - C. $5\sqrt{5}$
 - D. $2\sqrt{5}$
10. If a point at $(3, -7)$ is reflected across the y -axis, which are its coordinates after the reflection?
- A. $(-3, -7)$
 - B. $(3, -7)$
 - C. $(-3, 7)$
 - D. $(3, 7)$

Answers

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

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Explanations

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1. How many real solutions does the quadratic $x^2 + 3x - 4 = 0$ have?

- A. 0
- B. 1
- C. 2
- D. 3

The number of real solutions to a quadratic depends on the discriminant, $\Delta = b^2 - 4ac$. If $\Delta > 0$, there are two distinct real roots; if $\Delta = 0$, one real root; if $\Delta < 0$, no real roots. For $x^2 + 3x - 4 = 0$, $a = 1$, $b = 3$, $c = -4$. The discriminant is $\Delta = 3^2 - 4(1)(-4) = 9 + 16 = 25$, which is positive. That means two real solutions exist. Factoring confirms this: $x^2 + 3x - 4 = (x + 4)(x - 1)$, giving $x = -4$ or $x = 1$. So there are two real solutions.

2. If $y = 2x + 5$ and $x = -3$, what is y ?

- A. -1
- B. -5
- C. -9
- D. -3

Substitute the given x into the expression $y = 2x + 5$. With $x = -3$, $y = 2(-3) + 5 = -6 + 5 = -1$. So y equals -1 . The other results would require different x -values (for example, $y = -5$ would need $x = -5$, $y = -9$ would need $x = -7$, and $y = -3$ would need $x = -4$), which isn't the case here.

3. Evaluate $f(0)$ for $f(x) = 2x^2 - 3x + 1$.

- A. 0
- B. 2
- C. 1
- D. -1

Evaluating a function at zero means plugging in $x = 0$ and simplifying. For $f(x) = 2x^2 - 3x + 1$, substitute 0: $2(0)^2 - 3(0) + 1 = 0 - 0 + 1 = 1$. So $f(0)$ equals 1, which is the value where the graph crosses the y -axis. The other numerical options don't come from substituting zero, since the terms containing x vanish and only the constant term remains.

4. Solve $2x + 3 = 7$. What is x ?

- A. 1
- B. 2
- C. 3
- D. 0

Solving a linear equation means undoing the operations on the variable to isolate it, while keeping both sides balanced. First, remove the constant term on the left by subtracting 3 from both sides, which gives $2x = 4$. Then undo the multiplication by 2 by dividing both sides by 2, yielding $x = 2$. You can verify by plugging back in: $2(2) + 3 = 4 + 3 = 7$, which matches the right side.

5. Which of the following is the correct ascending order of the numbers $\frac{1}{2}$, $\frac{5}{6}$, and $\frac{5}{8}$?

A. $\frac{1}{2} < \frac{5}{8} < \frac{5}{6}$

B. $\frac{5}{6} < \frac{1}{2} < \frac{5}{8}$

C. $\frac{5}{6} < \frac{5}{8} < \frac{1}{2}$

D. $\frac{5}{8} < \frac{1}{2} < \frac{5}{6}$

This question tests ordering fractions from smallest to largest. To compare fractions with different denominators, you can use cross-multiplication: for two fractions $\frac{a}{b}$ and $\frac{c}{d}$, $\frac{a}{b} < \frac{c}{d}$ if $a \cdot d < c \cdot b$. First compare $\frac{1}{2}$ and $\frac{5}{8}$. Multiply crosswise: $1 \cdot 8 = 8$ and $2 \cdot 5 = 10$. Since $8 < 10$, $\frac{1}{2}$ is smaller than $\frac{5}{8}$. Next compare $\frac{5}{8}$ and $\frac{5}{6}$. Cross-multiply: $5 \cdot 6 = 30$ and $5 \cdot 8 = 40$. Since $30 < 40$, $\frac{5}{8}$ is smaller than $\frac{5}{6}$. Putting these together from smallest to largest gives $\frac{1}{2} < \frac{5}{8} < \frac{5}{6}$.

6. The functions $y = \sin x$ and $y = \sin(x + a) + b$ have the same maximum value. Which statement about a and b must be true?

A. $a < 0$ and $b = 0$

B. $a < 0$ and $b > 0$

C. $a = 0$ and $b > 0$

D. $a > 0$ and $b < 0$

The main idea is that the maximum value of a sine function is determined by its vertical shift, not by horizontal shifts. The function $\sin(x)$ has a maximum of 1. If we shift the sine horizontally to $\sin(x + a)$, its peak value stays the same, because shifting left or right doesn't change how tall the graph gets—it only moves where the peak occurs. Now add the vertical shift b . The highest value $\sin(x + a)$ can reach is still 1, so the maximum of $\sin(x + a) + b$ will be $1 + b$. For this to match the maximum of $\sin x$, which is 1, we must have $1 + b = 1$. That gives $b = 0$. So the key takeaway is that b must be zero, and a can be any real number—its sign doesn't affect the maximum value. The horizontal shift changes where the peak happens, not how high it goes, so there's no restriction on a from the maximum-value perspective.

7. In a right triangle with legs 5 and 12, the square of the hypotenuse equals what?

A. 169

B. 196

C. 144

D. 121

In a right triangle, the square of the hypotenuse equals the sum of the squares of the legs. So with legs 5 and 12, compute $5^2 + 12^2 = 25 + 144 = 169$. Therefore the square of the hypotenuse is 169, which is also 13^2 , reflecting the classic 5-12-13 triangle.

8. In trapezoid ABCD, AB is parallel to DC. If angle D measures x degrees, what is the measure of angle A in terms of x ?

- A. $(180 - x)^\circ$
- B. $(180 - 0.5x)^\circ$
- C. $(180 + 0.5x)^\circ$
- D. $(180 + x)^\circ$

When a trapezoid has one pair of parallel sides, the interior angles along a leg are supplementary because a transversal crossing two parallel lines makes the pair of interior angles on the same side sum to 180. Here AB is parallel to DC and AD is the transversal, so angle A plus angle D equals 180. Since angle D is x , angle A must be $180 - x$. The other expressions don't fit this supplementary relationship, so $180 - x$ is the correct measure.

9. Simplify $\sqrt{50}$.

- A. $5\sqrt{2}$
- B. $\sqrt{50}$
- C. $5\sqrt{5}$
- D. $2\sqrt{5}$

Simplify by pulling out perfect-square factors from inside the radical. 50 can be written as 25×2 , and 25 is a perfect square. So $\sqrt{50} = \sqrt{25 \times 2} = \sqrt{25} \times \sqrt{2} = 5\sqrt{2}$. This form has no remaining perfect-square factor inside, so it's the simplest radical form. $\sqrt{50}$ is just the unsimplified form of the same value. $5\sqrt{5}$ would come from 25×5 , which equals 125, not 50, so that isn't correct here. $2\sqrt{5}$ corresponds to $\sqrt{20}$, not $\sqrt{50}$, so it expresses a different number.

10. If a point at $(3, -7)$ is reflected across the y -axis, which are its coordinates after the reflection?

- A. $(-3, -7)$
- B. $(3, -7)$
- C. $(-3, 7)$
- D. $(3, 7)$

When you reflect a point across the y -axis, only the x -coordinate changes sign while the y -coordinate stays the same. This is because the y -axis ($x = 0$) is the mirror line for horizontal reflection. So the point $(3, -7)$ becomes $(-3, -7)$. The other possibilities would come from reflections across different lines or no reflection at all: keeping x the same would be no reflection, flipping the y would be a reflection across the x -axis, and flipping both coordinates would correspond to a 180-degree rotation around the origin.

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://actmath.examzify.com>

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

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