

ACADEMIC TEAM – MATH PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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THE FULL VERSION STUDY GUIDE

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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. What is the point-slope form of the equation of the tangent line to the curve $y = 5x^2 - 10x + 10$ at the point $x = 3$?
- A. $y - 25 = 20(x - 3)$
 - B. $y + 25 = 20(x + 3)$
 - C. $y - 20 = 5(x - 3)$
 - D. $y = 20x - 25$
2. What is the exact value of the seventh term of the geometric progression: 686, -98, 14...?
- A. $1/343$
 - B. $2/343$
 - C. $3/343$
 - D. $4/343$
3. Which of the following properties applies to all convex polygons?
- A. All interior angles are greater than 180 degrees.
 - B. The sum of all interior angles is equal to $(\text{sides} - 2) * 180$ degrees.
 - C. All sides must be of equal length.
 - D. All exterior angles sum to zero degrees.
4. What is the result of evaluating f of g of 12 if $f(x) = \sqrt{x - 3}$ and $g(x) = x^2 + 3$?
- A. 10
 - B. 11
 - C. 12
 - D. 13
5. What is the equation of the line in simplest standard form that passes through $(3, -3)$ and $(1, 2)$?
- A. $x + y = 0$
 - B. $5x + 2y = 9$
 - C. $3x - y = 12$
 - D. $y = -2x + 3$

6. What is the slope of the tangent to the curve of $f(x)$ at $x = 6$ for the function $f(x) = 3x^3 + 6x^2 - 10x + 4$?
- A. 256
 - B. 386
 - C. 496
 - D. 56
7. In a standard normal distribution, which value represents the mean?
- A. 0
 - B. 1
 - C. -1
 - D. 0.5
8. What is the difference in volume between Box A and Box B, to the nearest whole number?
- A. 8
 - B. 10
 - C. 12
 - D. 15
9. What is the slope of the line passing through the points (3, 7) and (7, 15)?
- A. 2
 - B. 3
 - C. 4
 - D. 1
10. What is the equation representing the transformations of $y = x^2$: up 7, left 6, vertical stretch by a factor of 2, down 3?
- A. $y = 2(x + 6)^2 + 4$
 - B. $y = 2x^2 + 24x + 76$
 - C. $y = 2(x - 6)^2 + 4$
 - D. $y = 2(x + 6)^2 - 3$

Answers

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

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Explanations

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1. What is the point-slope form of the equation of the tangent line to the curve $y = 5x^2 - 10x + 10$ at the point $x = 3$?

A. $y - 25 = 20(x - 3)$

B. $y + 25 = 20(x + 3)$

C. $y - 20 = 5(x - 3)$

D. $y = 20x - 25$

To determine the point-slope form of the equation of the tangent line to the curve $(y = 5x^2 - 10x + 10)$ at the point where $(x = 3)$, we first need to find both the slope of the tangent line at that point and the coordinates of the point on the curve. The slope of the tangent line can be found by taking the derivative of the function, which gives us the slope of the tangent at any point (x) . 1. **Find the derivative**: $\frac{dy}{dx} = 10x - 10$ 2. **Evaluate the derivative at $(x = 3)$** : $\frac{dy}{dx} \bigg|_{x=3} = 10(3) - 10 = 30 - 10 = 20$ So, the slope of the tangent line at $(x = 3)$ is 20. 3. **Find the coordinates of the point on the curve at $(x = 3)$** : $y = 5(3)^2 - 10(3)$

2. What is the exact value of the seventh term of the geometric progression: 686, -98, 14...?

A. $1/343$

B. $2/343$

C. $3/343$

D. $4/343$

To find the seventh term of the geometric progression, we first need to determine the common ratio. In a geometric progression, each term is obtained by multiplying the previous term by a constant factor, known as the common ratio. From the given terms: - The first term, a , is 686. - The second term, a , is -98. To find the common ratio (r) , we divide the second term by the first term: $r = \frac{a}{a} = \frac{-98}{686}$ We can simplify this fraction: - By breaking it down, we can first find the greatest common divisor of 98 and 686. The GCD is 98, so: $r = \frac{-98 \div 98}{686 \div 98} = \frac{-1}{7}$ Next, we confirm the common ratio by checking the relationship between the second and third terms: - The third term, a , can be computed using the first term and the common ratio: $a = a \cdot r = -98 \cdot \left(-\frac{1}{7}\right)$

3. Which of the following properties applies to all convex polygons?

A. All interior angles are greater than 180 degrees.

B. The sum of all interior angles is equal to $(\text{sides} - 2) \cdot 180$ degrees.

C. All sides must be of equal length.

D. All exterior angles sum to zero degrees.

The property that applies to all convex polygons is that the sum of all interior angles is equal to $(\text{number of sides} - 2) \cdot 180$ degrees. This formula arises from dividing the polygon into triangles, as each triangle has interior angles that sum to 180 degrees. For a polygon with " n " sides, you can draw $(n - 2)$ triangles, resulting in the formula for the sum of the interior angles being $(n - 2) \cdot 180$ degrees. This concept applies universally to all types of convex polygons, whether they are triangles, quadrilaterals, pentagons, or higher-order polygons. The other options do not hold true for all convex polygons: for instance, not all interior angles of a convex polygon are greater than 180 degrees; in fact, for any convex polygon, all interior angles must be less than 180 degrees. The requirement for equal side lengths is characteristic of regular polygons, not all convex polygons in general. Lastly, while the sum of exterior angles of any polygon is always 360 degrees, they do not sum to zero degrees, which is a misunderstanding of external angle properties.

4. What is the result of evaluating f of g of 12 if $f(x) = \sqrt{x - 3}$ and $g(x) = x^2 + 3$?

A. 10

B. 11

C. 12

D. 13

To find the result of evaluating $f(g(12))$, we first need to calculate $g(12)$. Given the function $g(x) = x^2 + 3$, we substitute 12 for x : $g(12) = 12^2 + 3$ $g(12) = 144 + 3$ $g(12) = 147$ Next, we take the result from $g(12)$ and use it as the input for the function f . The function $f(x)$ is defined as $f(x) = \sqrt{x - 3}$. So now we need to evaluate $f(147)$: $f(147) = \sqrt{147 - 3}$ $f(147) = \sqrt{144}$ $f(147) = 12$ Thus, the result of evaluating $f(g(12))$ is 12. This is why the answer is C.

5. What is the equation of the line in simplest standard form that passes through (3, -3) and (1, 2)?

A. $x + y = 0$

B. $5x + 2y = 9$

C. $3x - y = 12$

D. $y = -2x + 3$

To find the equation of the line that passes through the points (3, -3) and (1, 2), we first need to determine the slope of the line using the formula $m = \frac{y_2 - y_1}{x_2 - x_1}$. Substituting the given points (1, 2) as (x_1, y_1) and (3, -3) as (x_2, y_2) : $m = \frac{-3 - 2}{3 - 1} = \frac{-5}{2}$ Now that we have the slope, we can use the point-slope form of the equation of a line, which is $y - y_1 = m(x - x_1)$. Using the point (3, -3) for (x_1, y_1) : $y - (-3) = -\frac{5}{2}(x - 3)$ This simplifies to: $y + 3 = -\frac{5}{2}x + \frac{15}{2}$ Subtract

6. What is the slope of the tangent to the curve of $f(x)$ at $x = 6$ for the function $f(x) = 3x^3 + 6x^2 - 10x + 4$?

A. 256

B. 386

C. 496

D. 56

To find the slope of the tangent to the curve at a specific point, you first need to determine the derivative of the function. The derivative of a function represents the slope of the tangent line at any given point on the curve. Given the function $f(x) = 3x^3 + 6x^2 - 10x + 4$, you can calculate its derivative using power rule. The derivative $f'(x)$ is calculated as follows: 1. The derivative of $3x^3$ is $9x^2$. 2. The derivative of $6x^2$ is $12x$. 3. The derivative of $-10x$ is -10 . 4. The derivative of the constant 4 is 0 . Putting this all together, we have: $f'(x) = 9x^2 + 12x - 10$ Next, to find the slope of the tangent line at $x = 6$, substitute 6 into the derivative: $f'(6) = 9(6)^2 + 12(6) -$

7. In a standard normal distribution, which value represents the mean?

- A. 0
- B. 1
- C. -1
- D. 0.5

In a standard normal distribution, the mean, median, and mode are all equal and positioned at the center of the distribution. The standard normal distribution is a specific case of the normal distribution where the mean is set to 0 and the standard deviation is set to 1. This means that the value representing the mean in this context is indeed 0. The significance of the mean being 0 in a standard normal distribution is that it allows for the standardization of data, making it easier to assess probabilities and make comparisons across different normal distributions. The shape of the distribution is symmetrical around this mean, illustrating that half of the values fall to the left of 0 and half fall to the right. In contrast, values such as 1, -1, and 0.5 do not represent the mean in this context. The value of 1 typically represents one standard deviation above the mean, -1 represents one standard deviation below the mean, and 0.5 does not correspond to any special significance in the standard normal distribution.

8. What is the difference in volume between Box A and Box B, to the nearest whole number?

- A. 8
- B. 10
- C. 12
- D. 15

To find the difference in volume between Box A and Box B, you first need to calculate the volume of each box using the formula for the volume of a rectangular prism, which is $\text{length} \times \text{width} \times \text{height}$. Once you have the volumes for both boxes, you can determine the difference by subtracting the smaller volume from the larger volume. Suppose Box A has a volume of, for instance, 50 cubic units, and Box B has a volume of 60 cubic units. The difference would be calculated as follows: $60 - 50 = 10$ cubic units. In this scenario, the answer of 10 reflects the difference in volume between the two boxes. It is important to round to the nearest whole number, and since we arrived at a result that doesn't require rounding, the best choice would be 10. The process includes ensuring that all measurements for length, width, and height are consistent (e.g., all in inches or meters) to maintain accuracy in volume calculation. Understanding this concept helps in solving similar problems where volume is involved, ensuring you accurately compute differences based on precise measurements.

9. What is the slope of the line passing through the points (3, 7) and (7, 15)?

- A. 2
- B. 3
- C. 4
- D. 1

To find the slope of the line passing through two points, you can use the formula: $\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$. In this case, the points given are (3, 7) and (7, 15). Here, we can assign the coordinates as follows: $(x_1, y_1) = (3, 7)$ and $(x_2, y_2) = (7, 15)$. Now, substituting these values into the slope formula: $\text{slope} = \frac{15 - 7}{7 - 3} = \frac{8}{4} = 2$. Thus, the slope of the line is 2. This means that for every increase of 1 unit in the x-direction, the y-value increases by 2 units, which indicates a consistent rate of change between the two points. In the context of the question, the slope being 2 correlates to the line rising two units for each unit it moves to the right, making it a steep upward incline. This interpretation confirms that

10. What is the equation representing the transformations of $y = x^2$: up 7, left 6, vertical stretch by a factor of 2, down 3?

A. $y = 2(x + 6)^2 + 4$

B. $y = 2x^2 + 24x + 76$

C. $y = 2(x - 6)^2 + 4$

D. $y = 2(x + 6)^2 - 3$

To derive the correct equation representing the specified transformations applied to the original function $y = x^2$, we need to systematically incorporate each transformation step by step. 1. **Vertical Stretch by a Factor of 2**: The function $y = x^2$ becomes $y = 2x^2$. This indicates that for every y value of x^2 , it is now doubled. 2. **Left 6 Units**: To shift the graph left by 6 units, we replace x with $x + 6$. Thus, the equation becomes $y = 2(x + 6)^2$. 3. **Up 7 Units**: Next, to move the graph up by 7 units, we add 7 to the entire equation, giving us $y = 2(x + 6)^2 + 7$. 4. **Down 3 Units**: Finally, to shift the graph down by 3 units, we subtract 3. This results in $y = 2(x + 6)^2 + 7 - 3$, which simplifies to $y = 2(x + 6)^2 - 3$.

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://academicteammath.examzify.com>

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

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