Academic Team – Math Practice Test (Sample)

Study Guide

BY EXAMZIFY

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

1. Given a hypotenuse of length 10 in a scalene triangle, what is the length of the largest leg?

    A. 5cbrt(2)

    B. 5cbrt(3)

    C. 5cbrt(4)

    D. cbrt(10)

2. What height in feet does the baseball reach given the equation $y = -14x^2 + 84x + 4$?

    A. 120

    B. 130

    C. 140

    D. 150

3. 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

4. A family of twelve spent $266 on circus tickets, with adult tickets costing $23 and children's tickets $21. How many adults attended?

    A. 5

    B. 6

    C. 7

    D. 8

5. If g(x) = 2x + 3, what is the inverse of g(x)?

    A. x - 3/2

    B. ½ (x - 3)

    C. 3/2 + x

    D. 2x - 3

6. What are the solutions for x in the equation |(2/5)x - 1| = 7?

    A. 20, -15

    B. 15, -20

    C. 10, -14

    D. 2, -16

7. For the function f(x) = 3x^3 - 4x^2 + 1, what interval indicates where the function is concave down?

    A. (-∞, 0)

    B. (0, 4/9)

    C. (-∞, 4/9)

    D. (4/9, ∞)

8. What is the area of the triangle bounded by the lines y = 7 and y = 3 + 2|x - 4|?

    A. 6

    B. 8

    C. 10

    D. 12

9. What is the solution set for the following system of equations: x + 2y + 3z = 16, x + 2y + 2z = 10, 5x + 3y = 4?

    A. (2, -2, 6)

    B. (1, 0, 5)

    C. (3, 2, 4)

    D. (2, 2, 2)

10. Which of the following angles in triangle ABC can be determined if side AB is equal to side BC?

    A. Angle A

    B. Angle B

    C. Angle C

    D. None

Answers

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

Explanations

1. **Given a hypotenuse of length 10 in a scalene triangle, what is the length of the largest leg?**

   A. 5cbrt(2)

   B. 5cbrt(3)

   C. 5cbrt(4)

   D. cbrt(10)

To determine the length of the largest leg in a scalene triangle with a hypotenuse of length 10, we need to consider the properties of right triangles since the challenge involves maximizing one of the legs while adhering to the triangle inequality and the Pythagorean theorem. In a right triangle, where the hypotenuse is the longest side, the lengths of the legs a and b must satisfy the equation $a^2 + b^2 = c^2$, where c is the hypotenuse. In this case, since the hypotenuse is given as 10, we have: $$a^2 + b^2 = 10^2 = 100$$ To find the maximum possible length for the larger leg, we can assign a to be the leg we want to maximize. Thus, we can express b in terms of a: $$b^2 = 100 - a^2$$ Since we are seeking the largest leg, it makes sense that both a and b need to be positive, and we can deduce that for a valid triangle, both legs cannot

2. **What height in feet does the baseball reach given the equation y = -14x² + 84x + 4?**

   A. 120

   B. 130

   C. 140

   D. 150

To determine the maximum height that the baseball reaches given the equation $y = -14x^2 + 84x + 4$, we need to analyze the quadratic function. The equation is in the form $y = ax^2 + bx + c$, where $a = -14$, $b = 84$, and $c = 4$. The vertex of a parabola defined by a quadratic equation $y = ax^2 + bx + c$ can be found using the formula for the x-coordinate of the vertex, which is given by $x = -\frac{b}{2a}$. Substituting in the values from our equation, we have: $$x = -\frac{84}{2 \cdot -14} = \frac{84}{28} = 3$$ Now, we substitute $x = 3$ back into the original equation to find the corresponding height y: $$y = -14(3)^2 + 84(3) + 4$$ Calculating this step-by-step: $$y = -14 \cdot 9 + 252 + 4$$

3. 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: $$f'(6) = 9(6)^2 + 12(6) -$$

4. A family of twelve spent $266 on circus tickets, with adult tickets costing $23 and children's tickets $21. How many adults attended?

    A. 5

    B. 6

    C. 7

    D. 8

To determine the correct number of adults who attended the circus, we can set up a system of equations based on the information provided. Let a represent the number of adults and c represent the number of children. We know from the problem that: 1. The total number of family members (adults and children) is 12. $$a + c = 12$$ 2. The total amount spent on tickets is $266, with adult tickets costing $23 each and children's tickets costing $21 each. $$23a + 21c = 266$$ We can solve this system step by step. First, we can express c in terms of a from the first equation: $$c = 12 - a$$ Next, we substitute this expression for c into the second equation: $$23a + 21(12 - a) = 266$$ Expanding this gives: $$23a + 252 - 21a = 266$$ Combining like terms results in: $$2a + 252 = 266$$ Now

5. If g(x) = 2x + 3, what is the inverse of g(x)?

A. x - 3/2

B. ½ (x - 3)

C. 3/2 + x

D. 2x - 3

To find the inverse of the function g(x) = 2x + 3, we start by replacing g(x) with y: y = 2x + 3. To find the inverse, we need to solve for x in terms of y. We begin by isolating the term with x: y - 3 = 2x. Next, we divide both sides by 2 to solve for x: x = (y - 3) / 2. Now, we replace y with $g^{-1}(x)$ (the notation for the inverse function) to express the inverse function in terms of x: $g^{-1}(x)$ = (x - 3) / 2. Alternatively, this can be rewritten as: $g^{-1}(x)$ = ½(x - 3). This form matches the correct answer. The other options do not correspond to the inverse function as derived. They either result from misapplying algebraic manipulations or incorrectly swapping variables without properly isolating the function. Thus, the inverse function of g(x) = 2x + 3, which is $g^{-1}(x)$ = ½(x - 3), is indeed the correct choice.

6. What are the solutions for x in the equation |(2/5)x - 1| = 7?

A. 20, -15

B. 15, -20

C. 10, -14

D. 2, -16

To solve the equation |(2/5)x - 1| = 7, we need to consider the definition of absolute value. The equation states that the expression within the absolute value can equal either 7 or -7. This gives us two separate equations to solve: 1. (2/5)x - 1 = 7 2. (2/5)x - 1 = -7 Let's solve each equation step-by-step. For the first equation, we can isolate x: 1. (2/5)x - 1 = 7   Adding 1 to both sides gives (2/5)x = 8.   To eliminate the fraction, we multiply both sides by 5:   2x = 40.   Dividing both sides by 2 results in x = 20. Next, we solve the second equation: 2. (2/5)x - 1 = -7   Adding 1 to both sides gives (2/5)x = -6.   Again, we multiply both sides by 5 to eliminate the fraction: 2x = -30.   Dividing by 2 results in x = -15. Thus, the solutions for

7. For the function f(x) = 3x^3 - 4x^2 + 1, what interval indicates where the function is concave down?

A. (-∞, 0)

B. (0, 4/9)

C. (-∞, 4/9)

D. (4/9, ∞)

To determine where the function f(x) = 3x^3 - 4x^2 + 1 is concave down, we need to analyze the second derivative of the function.   First, we find the first derivative, f'(x): f'(x) = 9x^2 - 8. Next, we compute the second derivative, f''(x): f''(x) = 18x. The concavity of a function is indicated by the sign of the second derivative. Specifically, if f''(x) is less than zero, the function is concave down. Setting the second derivative to zero allows us to find the inflection point: 18x = 0 → x = 0. Now, we analyze the sign of f''(x) on either side of x = 0. - For x < 0, f''(x) = 18x < 0, indicating that the function is concave down on the interval (-∞, 0). - For x > 0, f''(x) = 18x > 0, indicating that the function is concave up on the interval (0, ∞). When looking for

8. What is the area of the triangle bounded by the lines y = 7 and y = 3 + 2|x - 4|?

A. 6

B. 8

C. 10

D. 12

To determine the area of the triangle formed by the lines $y = 7$ and $y = 3 + 2|x - 4|$, we first need to find the points of intersection between these two lines. The equation $y = 3 + 2|x - 4|$ can be analyzed based on the expression inside the absolute value. There are two cases to consider: 1. For $x \geq 4$, the equation simplifies to $y = 3 + 2(x - 4) = 2x - 5$. 2. For $x < 4$, it simplifies to $y = 3 + 2(4 - x) = 11 - 2x$. Next, we find where each case intersects with $y = 7$. **For $x \geq 4$:** Set $2x - 5 = 7$: $$ 2x = 12 \implies x = 6 $$ This gives the intersection point $(6, 7)$. **For $x < 4$:** Set $11 - 2x =$

9. What is the solution set for the following system of equations: x + 2y + 3z = 16, x + 2y + 2z = 10, 5x + 3y = 4?

A. (2, -2, 6)

B. (1, 0, 5)

C. (3, 2, 4)

D. (2, 2, 2)

To find the solution set for the system of equations, we need to solve them simultaneously. The first two equations are: 1. $(x + 2y + 3z = 16)$ 2. $(x + 2y + 2z = 10)$ Subtracting the second equation from the first gives us an equation involving z: $$ (x + 2y + 3z) - (x + 2y + 2z) = 16 - 10 $$ $$ z = 6 $$ Now that we have $z = 6$, we can substitute this value back into either of the original equations to solve for x and y. Using the second equation: $$ x + 2y + 2(6) = 10 $$ $$ x + 2y + 12 = 10 $$ $$ x + 2y = -2 \tag{Equation 3} $$ Next, we take the third equation from the system: $$ 5x + 3y = 4 \tag{Equation 4} $$ Now we solve the system formed by

10. Which of the following angles in triangle ABC can be determined if side AB is equal to side BC?

A. Angle A

B. Angle B

C. Angle C

D. None

In triangle ABC, if side AB is equal to side BC, the triangle is classified as isosceles. In an isosceles triangle, the angles opposite the equal sides are also equal. Therefore, since AB is equal to BC, the angles opposite these sides, which are angle A and angle C, will be equal. However, the question asks specifically which angle can be determined. Knowing that angle B is included between the two equal sides (AB and BC), it can be calculated by using the properties of the triangle. We can use the triangle sum theorem, which states that the sum of the angles in any triangle is always 180 degrees. If we know the measures of the two equal angles (A and C), we can easily determine angle B. For example, if the two equal angles (let's say A and C) are known or can be deduced from other information, then angle B can be solved as follows: Angle B = 180° - (Angle A + Angle C) This direct relationship allows us to determine angle B once A and C are established. Thus, the conclusion is that angle B is the angle that can be determined based on the property of isosceles triangles.

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!