DAY 2002A Limits Practice Test (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

1. Evaluate lim_{x→0} arctan x / x.

- **A. 0**
- **B. 1**
- **C. ∞**
- **D. -1**

2. Evaluate lim x→0 (cos x − 1)/x^2.

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

3. Determine the limit as x approaches 0 of |x|/x.

- **A. 0**
- **B. 1**
- **C. DNE**
- **D. -1**

4. If lim_{x->a} f(x) = L and lim_{x->a} g(x) = M, what is lim_{x->a} (f(x) + g(x))?

- **A. L-M**
- **B. LM**
- **C. L+M**
- **D. 0**

5. What is the limit as x -> 0 of (1 - cos x)/x^2?

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

6. Compute the limit lim_{x->0} ln(1+x) / x.

- **A. 0**
- **B. 1**
- **C. ∞**
- **D. -1**

7. Evaluate the limit as x approaches infinity of (3x^2 + 2x + 1)/(2x^2 - 5).

A. 2/3

B. 3/2

C. 1

D. 0

8. What is the maximum engine oil temperature for takeoff or max operation?

A. 100 °C max

B. 105 °C max

C. 110 °C max

D. 115 °C max

9. Minimum fuel on landing shall be no less than ______ in the No. 1 cell

A. 22 lbs

B. 9 lbs

C. 40 lbs

D. 50 lbs

10. Which option lists the maximum torque value for NR power-on takeoff state?

A. 95%

B. 101-103%

C. 110% max

D. 103% max

Answers

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

Explanations

1. Evaluate lim_{x→0} arctan x / x.

A. 0

B. 1

C. ∞

D. -1

The idea is that arctan x behaves like x very close to zero. Its slope at zero is arctan′(0) = 1, so for small x, arctan x ≈ x. This makes the ratio arctan x / x approach 1 as x → 0. You can see this more formally in a couple of standard ways. Using L'Hôpital's rule on the 0/0 form, the derivative of the top is $1/(1+x^2)$ and the derivative of the bottom is 1, giving 1/(1+0) = 1. Alternatively, the Taylor series $\arctan x = x - x^3/3 + \ldots$ shows $\arctan x / x = 1 - x^2/3 + \ldots$, which tends to 1 as x → 0. Thus the limit is 1.

2. Evaluate lim x→0 (cos x − 1)/x^2.

A. -1/2

B. 0

C. 1/2

D. -1

Near zero, cosine behaves like its quadratic approximation: $\cos x = 1 - x^2/2 +$ higher-order terms. Substituting into the expression gives $(\cos x - 1)/x^2 \approx (-x^2/2)/x^2 = -1/2$, and the higher-order terms vanish as x → 0. So the limit is −1/2. Another quick route is L'Hôpital's rule: differentiate top and bottom to get (−sin x)/(2x), and as x → 0 this tends to −(1/2)·(sin x/x) = −1/2 since sin x/x → 1.

3. Determine the limit as x approaches 0 of |x|/x.

A. 0

B. 1

C. DNE

D. -1

The behavior of the expression changes with the sign of x. For positive x, |x|/x = 1, while for negative x, |x|/x = -1. Therefore the limit as x approaches zero from the right is 1, but from the left it is -1. Since these two one-sided limits don't match, the two-sided limit as x approaches zero does not exist. (The expression isn't defined at zero, but the limit looks at behavior as you approach from either side.)

4. If lim_{x->a} f(x) = L and lim_{x->a} g(x) = M, what is lim_{x->a} (f(x) + g(x))?

A. L-M

B. LM

C. L+M

D. 0

The key idea is that limits distribute over addition. If f(x) approaches L and g(x) approaches M as x approaches a, and both limits are finite, then the sum f(x) + g(x) approaches L + M. This follows from the idea that you can make f(x) close to L and g(x) close to M simultaneously: for any small ε, you can ensure $|f(x) - L| < \varepsilon/2$ and $|g(x) - M| < \varepsilon/2$ when x is sufficiently near a, which gives $|(f(x) + g(x)) - (L + M)| \le |f(x) - L| + |g(x) - M| < \varepsilon$. So the limit of the sum is L + M. The other expressions would only hold in special cases (for example, a difference instead of a sum, or a product, or zero under particular conditions) but the general rule for finite limits is to add them.

5. What is the limit as x -> 0 of (1 - cos x)/x^2?

A. 0

B. 1

C. -1

D. 1/2

This limit hinges on a standard small-angle connection between sine and its ratio to its argument. Use the identity 1 − cos x = 2 sin^2(x/2). Then (1 − cos x) / x^2 = [2 sin^2(x/2)] / x^2. Let y = x/2, so this becomes (1/2) [sin(y)/y]^2. As x → 0, y → 0, and sin(y)/y → 1. Therefore the limit is (1/2) · 1^2 = 1/2.

6. Compute the limit lim_{x->0} ln(1+x) / x.

A. 0

B. 1

C. ∞

D. -1

Think about how ln(1+x) behaves when x is very small. It behaves almost like a straight line with slope 1 at the point x = 0, so the ratio ln(1+x)/x approaches that slope. A direct way to see this is by L'Hôpital's rule: as x → 0, both numerator and denominator go to 0, so differentiate top and bottom to get lim x→0 (1/(1+x)) / 1 = 1/(1+0) = 1. Another view is the Taylor expansion: ln(1+x) = x − x^2/2 + ..., so ln(1+x)/x = 1 − x/2 + ... → 1 as x → 0. This limit exists from both sides (within the domain x > −1) and equals 1.

7. Evaluate the limit as x approaches infinity of (3x^2 + 2x + 1)/(2x^2 - 5).

A. 2/3

B. 3/2

C. 1

D. 0

As x grows without bound, the terms with the highest power of x dominate both the numerator and the denominator. Since both have x^2 as the leading term, the limit equals the ratio of their leading coefficients: 3 in the numerator and 2 in the denominator. Dividing every term by x^2 gives (3 + 2/x + 1/x^2) / (2 - 5/x^2). As x → ∞, the terms with 1/x and 1/x^2 vanish, leaving 3/2. So the limit is 3/2.

8. What is the maximum engine oil temperature for takeoff or max operation?

A. 100 °C max

B. 105 °C max

C. 110 °C max

D. 115 °C max

During takeoff or max operation the engine oil temperature is allowed to rise to a specific upper limit to protect the lubrication system under high load. The value of 115 °C is set because it provides a safe boundary where oil remains viscous enough to lubricate precisely when the engine is under peak demand, while still allowing brief high-temperature operation without risking accelerated wear or damage. Exceeding this limit could indicate cooling issues or excessive power demand, increasing the risk to the engine. The lower numbers would unnecessarily restrict performance, so they aren't the official maximum.

9. Minimum fuel on landing shall be no less than ______ in the No. 1 cell

A. 22 lbs

B. 9 lbs

C. 40 lbs

D. 50 lbs

Having a fuel reserve in the No. 1 cell at landing is about guaranteeing a safe margin for the approach and possible go-around, while ensuring the engine continues to receive fuel reliably. The No. 1 cell must contain at least 50 pounds at touchdown to cover scenarios where you need to hold or divert, and to ensure the fuel pump can draw from that cell if other tanks are low or crossfeed isn't available. This amount also helps keep the aircraft's center of gravity within limits as fuel is consumed unevenly during the approach and landing. Smaller values wouldn't provide enough reserve or fuel-feed reliability for a safe landing or a potential missed approach, whereas 50 pounds meets the specified requirement for this system.

10. Which option lists the maximum torque value for NR power-on takeoff state?

A. 95%

B. 101-103%

C. 110% max

D. 103% max

During NR power-on takeoff, torque is kept within a defined maximum to balance the need for lift with the limits of the drivetrain. The allowed torque is 103% max, a small margin above 100% that provides enough power for a safe takeoff while staying within design tolerances for the engine and rotor system. The other options don't fit because 95% is too low to achieve a proper takeoff, a range like 101-103% isn't a single fixed limit, and 110% max would exceed what the system is permitted to deliver, risking overstress or overheating.

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://day2002alimits.examzify.com

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