DAY 2002A LIMITS 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

1. Evaluate lim x ∞ (ln x)^2 / x.

A. ∞

B. -∞

C. 1

D. 0

2. N2 minimum percentage is

A. 95-101%

B. 60%

C. 95%

D. 101-103%

3. Engine oil pressure minimum

A. 80 psi

B. 0 psi

C. 40 psi

D. 110 psi

4. As x grows without bound, arctan x approaches which value?

A. 0

B. π/4

C. π

D. π/2

5. N1 transient value and duration

A. 60% for 60 seconds

B. 101-103% for 2 minutes

C. 103.2% max for 5 minutes

D. 103.8% for 30 seconds

6. Evaluate lim x 0 (tan x − x)/x^3.

A. 1

B. 0

C. -1/3

D. 1/3

7. Evaluate the limit as x approaches 0 of arctan x divided by x.

A. 0

B. -1

C. 1

D. 2

8. What is the value of lim x->0+ |x|/x?

A. -1

B. 0

C. 1

D. Infinity

9. Engine oil temperature transient is specified as 127 °C (5 min) with N1 at which approximate value?

A. 125 °C (5 min with N1 at 60±1%)

B. 126 °C (5 min with N1 at 62±1%)

C. 127 °C (5 min with N1 at 61±1%)

D. 128 °C (5 min with N1 at 63±1%)

10. Which expression denotes a limit taken with x approaching 0 from the positive side?

A. lim x->0 (tan x)/x

B. lim x->0 (1 - cos x)/x^2

C. lim x->0 (arctan x)/x

D. lim x->0+ sqrt(x)/x

Answers

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

Explanations

1. Evaluate lim x ∞ (ln x)^2 / x.

A. ∞

B. -∞

C. 1

D. 0

As x grows large, the logarithm grows without bound but far more slowly than x itself. Even squaring ln x doesn't change the fact that it is still overwhelmed by the linear growth of x, so the ratio (ln x)^2 / x tends to zero. A clean way to see this is to use L'Hôpital's rule. The form is ∞/∞, so differentiate top and bottom: derivative of (ln x)^2 is 2(ln x)(1/x) = 2 ln x / x, and derivative of x is 1. Now you have lim x ∞ (2 ln x)/x, still ∞/∞, so apply L'Hôpital again: derivative of 2 ln x is 2/x, and derivative of x is 1, giving lim x ∞ 2/x = 0. Therefore, the limit is 0.

2. N2 minimum percentage is

A. 95-101%

B. 60%

C. 95%

D. 101-103%

Think of N2 as nitrogen gas purity. When a minimum percentage is specified, it means the gas must be at least that pure to be considered nitrogen for the intended use, such as creating an inert or blanketing atmosphere. If you only had 60% N2, the remaining 40% would bring in enough other gases (often including oxygen) to compromise the inert conditions. The options that imply more than 100% nitrogen aren't physically possible, and ranges that are too low wouldn't meet the standard for an effective inert environment. Therefore, the minimum acceptable nitrogen content is 95%.

3. Engine oil pressure minimum

A. 80 psi

B. 0 psi

C. 40 psi

D. 110 psi

Oil pressure must stay above a minimum level to ensure oil keeps flowing to all moving parts for proper lubrication. When the engine is hot and running at normal speeds, you expect the pressure to be above this floor; it can be higher when the engine is cold or at higher RPM. The specified minimum around 40 psi serves as that floor to prevent excessive wear. If the pressure drops to zero or very low (like 0 psi), that signals a serious problem with the oil pump, pickup, leaks, or viscosity, and the engine could be damaged. Pressures like 80 psi or 110 psi are typical during higher RPM or cold conditions, not the minimum acceptable value. Therefore, 40 psi is the correct minimum.

4. As x grows without bound, arctan x approaches which value?

A. 0

B. π/4

C. π

D. π/2

As x grows without bound, arctan x approaches π/2. The arctan function gives the angle whose tangent is x, and its outputs lie in the interval (-π/2, π/2). As the tangent value x becomes arbitrarily large, the corresponding angle must get arbitrarily close to the vertical ray, i.e., π/2, from below. Tangent blows up near π/2, so you can make the angle as close to π/2 as you like, but never actually reach it for any finite x. Hence the limit is π/2.

5. N1 transient value and duration

A. 60% for 60 seconds

B. 101-103% for 2 minutes

C. 103.2% max for 5 minutes

D. 103.8% for 30 seconds

N1 transient limits define how much the engine speed can briefly overshoot the normal maximum during fast throttle changes, and for how long that overspeed can be held. This reflects a balance: a short, controlled spike is tolerable because engines experience brief surges, but staying above the limit too long or by too much risks stressing components. The specified transient limit of 103.8% for 30 seconds means N1 may peak at 103.8% for up to half a minute during transient conditions, then must settle back down. This combination protects turbine blades and other hardware while still allowing responsive throttle movement. The other options don't fit typical transient limits: 60% for 60 seconds would be far too low to allow normal transient behavior; 101–103% for 2 minutes would exceed safe duration for a near-limit overspeed; 103.2% for 5 minutes would also be unsafe due to both the higher-than-desired overshoot and the much longer duration.

6. Evaluate lim x 0 (tan x − x)/x^3.

A. 1

B. 0

C. -1/3

D. 1/3

When a limit involves a trigonometric function near zero, using its small-angle (Maclaurin) expansion is the most straightforward path. For tan x near 0, the expansion is tan x = x + x^3/3 + higher-order terms. Subtracting the linear term x leaves tan x − x = x^3/3 + higher-order terms. Dividing by x^3 gives (tan x − x)/x^3 = 1/3 + terms that vanish as x 0. So the limit is 1/3. If you only kept the linear term you'd get 0, which shows why the cubic term matters here. The result is 1/3.

7. Evaluate the limit as x approaches 0 of arctan x divided by x.

A. 0

B. -1

C. 1

D. 2

The limit is governed by the derivative at zero. Arctan is differentiable at 0, and its derivative there is arctan'(0) = 1/(1+0^2) = 1. By the definition of the derivative, the limit of [arctan x − arctan 0]/(x − 0) as x 0 equals 1. Since arctan 0 = 0, this is exactly the limit of arctan x / x. Therefore, the limit is 1.

8. What is the value of lim x->0+ |x|/x?

A. -1

B. 0

C. 1

D. Infinity

As x approaches 0 from the right, x is positive, so |x| equals x. The expression |x|/x becomes x/x, which is 1 for all positive x. Therefore the limit from the right is 1. (Note: approaching from the left would give -1, so the two-sided limit does not exist, but the right-hand limit is 1.)

9. Engine oil temperature transient is specified as 127 °C (5 min) with N1 at which approximate value?

A. 125 °C (5 min with N1 at 60±1%)

B. 126 °C (5 min with N1 at 62±1%)

C. 127 °C (5 min with N1 at 61±1%)

D. 128 °C (5 min with N1 at 63±1%)

Engine oil temperature in this transient test is driven by engine speed, N1. The target of 127 °C after 5 minutes corresponds to a specific N1 value. The calibration data show that to reach 127 °C in 5 minutes you set N1 to about 61%, with a tolerance of ±1%. If you use 60%, you get around 125 °C, and at 63% you're around 128 °C. So the value that matches the 127 °C target is N1 roughly 61% (61 ± 1%).

10. Which expression denotes a limit taken with x approaching 0 from the positive side?

A. lim x->0 (tan x)/x

B. lim x->0 (1 - cos x)/x^2

C. lim x->0 (arctan x)/x

D. lim x->0+ sqrt(x)/x

Approaching zero from the positive side means x stays positive and gets arbitrarily close to zero. The expression that explicitly uses x 0+ is the one that denotes this one-sided limit. Here, sqrt(x)/x simplifies to 1/√x, which grows without bound as x 0+, so the limit is +∞. This shows how the plus in the limit notation signals a direction of approach, which is exactly what the question is testing. The other expressions describe two-sided limits and, in fact, approach finite values as x 0 from either side (tan x / x 1, (1 − cos x)/x^2 1/2, arctan x / x 1).

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!