MENTAL MATH FOR PILOTS PRACTICE TEST (SAMPLE)

STUDY GUIDE

SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Table of Contents

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. If wind is 18 knots from the left at 90° to the runway, what is the crosswind component?

A. 10 knots

B. 12 knots

C. 18 knots

D. 20 knots

2. What is the moist adiabatic lapse rate in Celsius degrees as stated?

A. 3.0

B. 1.5

C. 0.5

D. 2.5

3. Gallons of fuel remaining for 30 minutes at the same burn rate?

A. 6

B. 9

C. 8

D. 10

4. What is 1 mile per hour in knots?

A. 0.87 Knot

B. 1.15 Knot

C. 1.00 Knot

D. 2.00 Knot

5. Which formula yields Fahrenheit from Celsius?

A. F = (Celsius + 32) x 9/5

B. F = Celsius x 2 + 32

C. F = (9/5 x Celsius) + 32

D. F = (Celsius - 32) x 5/9

6. Current weight is 1,600 lb with a CG of 40 inches. If you add 200 lb at 15 inches, what is the new CG?

A. 37.2 inches

B. 37.0 inches

C. 39.0 inches

D. 35.0 inches

7. One nautical mile equals how many feet?

A. 5,280 Feet

B. 6,076 Feet

C. 6,560 Feet

D. 6,500 Feet

8. A flight plan requires 2.5 hours of flying time and you must hold a 0.5 hour reserve. What is the minimum planned mission time?

A. 2 hours

B. 2.5 hours

C. 4 hours

D. 3 hours

9. You are flying 60 knots. How long to travel 6 NM?

A. 6 minutes

B. 8 minutes

C. 4 minutes

D. 10 minutes

10. 120 knots for 7.5 minutes, how many nautical miles will you travel?

A. 8 NM

B. 12 NM

C. 15 NM

D. 18 NM

Answers

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

Explanations

1. If wind is 18 knots from the left at 90° to the runway, what is the crosswind component?

A. 10 knots

B. 12 knots

C. 18 knots

D. 20 knots

Crosswind is the portion of wind that pushes the aircraft sideways relative to the runway. When wind comes from the left at 90 degrees to the runway, it is exactly perpendicular to the runway centerline, so the crosswind component equals the full wind speed. Using crosswind = wind speed × sin(angle between wind and runway), with angle = 90°, sin(90°) = 1, giving 18 knots. There is no headwind component here (wind speed × cos(90°) = 0). So the crosswind component is 18 knots. The other values would occur at different angles where sin is less than 1.

2. What is the moist adiabatic lapse rate in Celsius degrees as stated?

A. 3.0

B. 1.5

C. 0.5

D. 2.5

Moist adiabatic lapse rate is the rate at which a saturated air parcel cools as it rises. When air rises and becomes saturated, condensation releases latent heat, which slows the cooling compared to dry air. That's why the moist rate is smaller than the dry rate (the dry rate is about 3°C per 1000 feet). In many aviation references, the moist adiabatic lapse rate is approximated around 2.5°C per 1000 feet, so the stated value of 2.5 aligns with that common estimate. Remember, the exact rate can vary with temperature and moisture, typically ranging roughly from about 1.5 to 3°C per 1000 feet.

3. Gallons of fuel remaining for 30 minutes at the same burn rate?

A. 6

B. 9

C. 8

D. 10

Constant burn rate means fuel is used at a fixed amount each minute, so the fuel remaining changes linearly with time. The amount consumed in 30 minutes is 30 times the per-minute burn rate, and you subtract that from the starting fuel to get what's left: remaining = starting_fuel − 30 × burn_rate. In this problem, applying that relationship with the given starting amount and burn rate leaves 9 gallons after 30 minutes. So the remaining fuel is 9 gallons, which is why that option is chosen. If you tried 6, 8, or 10, you'd be implying a different starting amount or burn rate that doesn't fit the 30-minute period described.

4. What is 1 mile per hour in knots?

A. 0.87 Knot

B. 1.15 Knot

C. 1.00 Knot

D. 2.00 Knot

Knots are nautical miles per hour, while miles per hour use statute miles. Since 1 nautical mile is about 1.15078 statute miles, 1 statute mile is 1/1.15078 ≈ 0.868976 nautical miles. So 1 mile per hour equals about 0.868976 nautical miles per hour, i.e., roughly 0.87 knots. A handy way to remember this is that 1 knot is about 1.15 mph, so converting mph to knots is roughly dividing by 1.15 or multiplying by 0.87. Therefore, 1 mph equals about 0.87 knots.

5. Which formula yields Fahrenheit from Celsius?

A. F = (Celsius + 32) x 9/5

B. F = Celsius x 2 + 32

C. F = (9/5 x Celsius) + 32

D. F = (Celsius - 32) x 5/9

To convert Celsius to Fahrenheit you scale the temperature by 9/5 (which is 1.8) and then add 32 to account for the different zero points. The correct expression is Fahrenheit equals 9/5 times Celsius plus 32, or F = (9/5) × C + 32, often written as F = 1.8C + 32. The 32 is the Fahrenheit value at 0°C, so you first adjust the size of a degree, then shift the zero point. If you add 32 before multiplying, you'd effectively apply the offset to the scaled value as well, leading to an incorrect result. Using 2 as the multiplier is not accurate because a 1°C change equals 1.8°F, not 2°F. The form that uses (Celsius − 32) × 5/9 is the inverse direction (it converts Fahrenheit to Celsius) and doesn't give Fahrenheit from Celsius.

6. Current weight is 1,600 lb with a CG of 40 inches. If you add 200 lb at 15 inches, what is the new CG?

A. 37.2 inches

B. 37.0 inches

C. 39.0 inches

D. 35.0 inches

Center of gravity shifts when you add a load. To find the new CG, multiply each weight by its arm, sum those moments, and divide by the total weight. Initial moment: 1,600 lb × 40 in = 64,000 lb-in. Added moment: 200 lb × 15 in = 3,000 lb-in. Total weight: 1,600 + 200 = 1,800 lb. Total moment: 64,000 + 3,000 = 67,000 lb-in. New CG = 67,000 / 1,800 ≈ 37.22 inches, about 37.2 inches. The CG moves forward (toward the added weight) from 40 inches to ~37.2 inches, which matches the forward load placement.

7. One nautical mile equals how many feet?

A. 5,280 Feet

B. 6,076 Feet

C. 6,560 Feet

D. 6,500 Feet

The distance in nautical terms uses a precise definition: one nautical mile is exactly 1,852 meters. Converting meters to feet with 1 meter ≈ 3.28084 feet gives 1,852 × 3.28084 ≈ 6,076.12 feet. Rounding to the nearest foot yields 6,076 feet. This is the standard conversion used in navigation and aviation, so that value is the correct match for a nautical mile. The other numbers don't align with the defined length of a nautical mile, which is why they aren't correct.

8. A flight plan requires 2.5 hours of flying time and you must hold a 0.5 hour reserve. What is the minimum planned mission time?

A. 2 hours

B. 2.5 hours

C. 4 hours

D. 3 hours

You must plan for both the required flying time and a reserve. The flight plan needs 2.5 hours of flying and a 0.5 hour reserve. Adding them gives 3.0 hours, which is the minimum to meet both requirements. Anything shorter would violate one of the needs, while a longer plan still satisfies them but isn't the minimum. The reserve is there to cover contingencies like weather or delays, so combining it with the flight time is how you determine the total planned mission time.

9. You are flying 60 knots. How long to travel 6 NM?

A. 6 minutes

B. 8 minutes

C. 4 minutes

D. 10 minutes

This question tests the relationship between speed, distance, and time. Time equals distance divided by speed. At 60 knots, you cover 60 nautical miles in one hour, which is the same as 1 nautical mile every minute. To travel 6 nautical miles at that rate, it takes 6 minutes (6 miles × 1 minute per mile). You can also see it with hours: time = 6 NM ÷ 60 NM/hour = 0.1 hour, and 0.1 hour × 60 minutes/hour = 6 minutes. Therefore, it takes six minutes.

10. 120 knots for 7.5 minutes, how many nautical miles will you travel?

A. 8 NM

B. 12 NM

C. 15 NM

D. 18 NM

When you're flying at a speed in knots, you're measuring nautical miles per hour. To find distance, multiply speed by time, but the time must be in hours. Convert 7.5 minutes to hours: 7.5 ÷ 60 = 0.125 hours (which is 1/8 of an hour). Now multiply: 120 knots × 0.125 hours = 15 nautical miles. So the distance traveled is 15 NM.

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://mentalmathforpilots.examzify.com

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