

# FAA AIRFRAME WEIGHT AND BALANCE PRACTICE TEST (SAMPLE)

## STUDY GUIDE



## SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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THE FULL VERSION STUDY GUIDE

<https://faairframewtbalance.examzify.com>



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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 must be completed before weighing an aircraft to determine its empty weight?**
  - A. Remove all removable seats
  - B. Drain fuel and fill hydraulic reservoir; remove all items except those on the aircraft equipment list
  - C. Weigh the aircraft while loaded
  - D. Perform a thorough inspection
  
- 2. Given the provided data, what is the empty weight CG of the aircraft?**
  - A. 50.25 inches
  - B. 60.31 inches
  - C. 70.50 inches
  - D. 75.00 inches
  
- 3. For what purpose is it essential to determine an aircraft's center of gravity (CG)?**
  - A. To ensure it will fly faster
  - B. To maintain safe and effective flight operations
  - C. To calculate fuel consumption accurately
  - D. To increase the aircraft's payload capacity
  
- 4. What is a "moment arm" in aviation?**
  - A. The angle of an aircraft in flight
  - B. The distance from a reference point to the center of gravity
  - C. The distance from a reference point to the location of a weight
  - D. The maximum distance an aircraft can fly
  
- 5. What factor does not contribute to the useful load of an aircraft?**
  - A. Usable fuel
  - B. Basic empty weight
  - C. Cargo
  - D. Passengers

**6. Which calculation is crucial for maintaining performance in small aircraft?**

- A. Total fuel weight
- B. Center of gravity
- C. Both A and B
- D. None of the above

**7. How is the maximum weight of an aircraft determined?**

- A. Empty weight minus useful load
- B. Empty weight plus useful load
- C. Maximum fuel capacity plus useful load
- D. Maximum payload plus empty weight

**8. After alterations to an aircraft, how much did the new empty weight CG move aft?**

- A. 1.02 inches
- B. 1.62 inches
- C. 2.00 inches
- D. 2.75 inches

**9. How are LEMAC and TEMAC defined in relation to an aircraft?**

- A. Distance from the tail
- B. Distance from the engines
- C. Distance from the datum
- D. Distance from the wings

**10. Why is center of gravity (CG) important for aircraft control?**

- A. It has no impact on aircraft performance
- B. It affects maneuverability and stability
- C. CG only determines speed
- D. CG is only important during takeoff

## **Answers**

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

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## **Explanations**

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**1. What must be completed before weighing an aircraft to determine its empty weight?**

- A. Remove all removable seats
- B. Drain fuel and fill hydraulic reservoir; remove all items except those on the aircraft equipment list**
- C. Weigh the aircraft while loaded
- D. Perform a thorough inspection

*Before weighing an aircraft to determine its empty weight, it is essential to drain fuel and fill the hydraulic reservoir, as well as remove all items except those on the aircraft equipment list. This procedure ensures that only the necessary components that contribute to the aircraft's structural weight are included in the empty weight calculation. The definition of empty weight includes the airframe, powerplant, all permanently installed equipment, and unusable fuel and oil, but excludes any removable equipment that is not specified in the equipment list. By draining the fuel, you ensure that only the unusable fuel is accounted for, which is crucial for an accurate empty weight measurement. Filling the hydraulic reservoir ensures that the aircraft's hydraulic systems are in a consistent state, which is important for proper weight calculations. This thorough preparatory step helps prevent any discrepancies that may arise from including unnecessary weights or variances in the operational fluids, enabling a precise determination of the aircraft's empty weight.*

**2. Given the provided data, what is the empty weight CG of the aircraft?**

- A. 50.25 inches
- B. 60.31 inches**
- C. 70.50 inches
- D. 75.00 inches

*To determine the empty weight center of gravity (CG) of the aircraft, one must analyze the aircraft's weight distribution and the distances from a reference point, which is typically the leading edge of the wing or a point on the fuselage. The empty weight CG is calculated by dividing the total moment (calculated by multiplying each weight by its distance from the reference point) by the total weight of the aircraft in its empty state. In this scenario, the choice of 60.31 inches suggests that this value corresponds to the calculated position of the CG given the weights and their respective arm (the distance from the reference point). An accurate CG location is critical for flight safety, affecting stability, control, and the overall performance of the aircraft. The other options present different CG positions, which may not align with the calculated data provided in the question. Each option should reflect distinct data points based on specific weight and moment calculations employing established formulas to derive the CG. Therefore, the selected value of 60.31 inches is justified based on these weight distribution calculations that follow proper methodology to identify the aircraft's empty weight center of gravity.*

### 3. For what purpose is it essential to determine an aircraft's center of gravity (CG)?

- A. To ensure it will fly faster
- B. To maintain safe and effective flight operations**
- C. To calculate fuel consumption accurately
- D. To increase the aircraft's payload capacity

*Determining an aircraft's center of gravity (CG) is essential for maintaining safe and effective flight operations. The CG affects the aircraft's stability, control, and performance. An improperly located CG can lead to difficulties in handling the aircraft, such as causing it to be tail-heavy or nose-heavy, which can lead to a loss of control or inefficient flight characteristics. Ensuring that the CG is within the specified limits allows the aircraft to operate as designed, providing the pilot with the necessary control authority and stability throughout the flight envelope. In contrast to other options, such as improving speed, accurately calculating fuel, or increasing payload capacity, the primary focus of calculating the CG is on safety and operational effectiveness. Proper CG management helps prevent potential hazards and enhances the overall flying experience, ensuring the aircraft performs reliably under various flight conditions.*

### 4. What is a "moment arm" in aviation?

- A. The angle of an aircraft in flight
- B. The distance from a reference point to the center of gravity
- C. The distance from a reference point to the location of a weight**
- D. The maximum distance an aircraft can fly

*A moment arm in aviation refers to the distance from a specified reference point (often the center of gravity) to the location of a weight on the aircraft. It is a crucial concept in understanding how weight distribution affects the aircraft's balance and stability. The moment arm affects the lever arm principle in which the farther the weight is from the center of gravity, the greater the moment that weight will create, impacting the aircraft's control and handling characteristics. This understanding is vital for pilots and aircraft maintenance personnel emphasizing proper weight and balance calculations to ensure safe and efficient operation of the aircraft. By knowing where a weight is located and its distance from the center of gravity, one can predict how it will affect the aircraft's performance and stability during flight.*

### 5. What factor does not contribute to the useful load of an aircraft?

- A. Usable fuel
- B. Basic empty weight**
- C. Cargo
- D. Passengers

*The basic empty weight of an aircraft does not contribute to its useful load because it represents the weight of the aircraft itself without any payload. This includes the airframe, engine, and all installed systems, fluids (except usable fuel), and any optional equipment that is included as part of the aircraft. In contrast, the useful load is defined as the total weight of the payload that an aircraft can carry, which includes cargo, passengers, and usable fuel. By understanding that the basic empty weight is the foundational weight of the aircraft minus the operational elements, one can appreciate that it serves as a baseline for calculating how much additional weight (useful load) can be carried without exceeding the aircraft's maximum weight limits.*

## 6. Which calculation is crucial for maintaining performance in small aircraft?

- A. Total fuel weight
- B. Center of gravity
- C. Both A and B**
- D. None of the above

Maintaining performance in small aircraft heavily relies on both total fuel weight and center of gravity. The total fuel weight is crucial because it directly impacts the aircraft's overall weight, which affects performance characteristics such as takeoff distance, climb rate, and fuel efficiency. An accurate calculation of fuel weight ensures that the aircraft is operated within its weight limits, promoting safe and efficient flight. Equally important is the center of gravity (CG). The CG determines the balance point of the aircraft and influences its stability and control. If the CG is outside of the allowable range, it can lead to undesirable flight characteristics, such as difficulty in controlling the aircraft, which can be especially critical during maneuvers and when landing. Together, total fuel weight and center of gravity calculations are fundamental in ensuring that the aircraft operates safely and efficiently, making them both vital components of performance calculations in small aircraft operation.

## 7. How is the maximum weight of an aircraft determined?

- A. Empty weight minus useful load
- B. Empty weight plus useful load**
- C. Maximum fuel capacity plus useful load
- D. Maximum payload plus empty weight

The maximum weight of an aircraft is determined by adding the empty weight and the useful load together. The empty weight includes the airframe, engines, and all fixed equipment, whereas the useful load comprises the weight of the fuel, passengers, baggage, and any cargo. To ensure safe operations, understanding this relationship is vital as exceeding this maximum weight can lead to performance issues, including reduced climb rates, longer landing distances, and overall aerodynamic inefficiencies. The configuration of empty weight plus useful load provides a clear and concrete figure that pilots and operators refer to when calculating the maximum Gross Takeoff Weight (GTOW) or Maximum Ramp Weight (MRW) of the aircraft. By ensuring the total weight does not exceed the limits set by the manufacturer, pilots can maintain safety standards and enhance performance capabilities during flight operations.

**8. After alterations to an aircraft, how much did the new empty weight CG move aft?**

- A. 1.02 inches
- B. 1.62 inches**
- C. 2.00 inches
- D. 2.75 inches

*The movement of the center of gravity (CG) is a crucial factor in aircraft weight and balance calculations, particularly after modifications or alterations are made. In this context, the correct choice indicates that the new empty weight CG moved 1.62 inches aft, which is a specific measurement that reflects a moderate shift in the aircraft's balance. When alterations are made to an aircraft, such as adding or removing equipment, this can significantly impact the distribution of weight. The forward or aft movement of the CG affects stability and control. A movement of 1.62 inches aft may suggest that the modifications involved a substantial addition of weight towards the rear of the aircraft, or a removal of weight from the front, providing a noticeable shift that still keeps the aircraft within safe operating limits. Understanding the implications of this shift is essential for ensuring that the aircraft remains controllable and stable during flight. Accurately determining the extent of CG movement after alterations helps flight planners and engineers assess the airworthiness of the aircraft and maintain compliance with safety regulations.*

**9. How are LEMAC and TEMAC defined in relation to an aircraft?**

- A. Distance from the tail
- B. Distance from the engines
- C. Distance from the datum**
- D. Distance from the wings

*LEMAC (Leading Edge Mean Aerodynamic Chord) and TEMAC (Trailing Edge Mean Aerodynamic Chord) are both key reference points used in the weight and balance calculations of an aircraft. They are defined in relation to the aircraft's datum, which serves as a baseline measurement point from which all other measurements are taken. In weight and balance, understanding the location of LEMAC and TEMAC is crucial because it allows for the determination of the center of gravity (CG) of the aircraft. The CG position is critical for ensuring the safe operation of the aircraft, affecting stability and control during flight. By measuring the distances of LEMAC and TEMAC from the datum, pilots and engineers can assess how weight is distributed across the aircraft and make necessary adjustments for safe flight operations. The other options do not correctly describe LEMAC and TEMAC as they are specifically oriented around the datum and not related to distances from the tail, engines, or wings directly. This distinction is fundamental in aviation dynamics where accurate weight and balance are essential for performance and safety.*

## 10. Why is center of gravity (CG) important for aircraft control?

- A. It has no impact on aircraft performance
- B. It affects maneuverability and stability**
- C. CG only determines speed
- D. CG is only important during takeoff

*The center of gravity (CG) is a crucial factor in aircraft control because it significantly affects how the aircraft handles during flight. When the CG is located at the correct position, it ensures that the aircraft is balanced, providing optimal stability and control responsiveness. The positioning of the CG directly influences the aircraft's maneuverability; a CG that is too far forward can make the aircraft difficult to pitch up or down, while a CG that is too far aft can lead to over-sensitive control and a risk of stalling. Additionally, the integrity of the aircraft's stability—both longitudinal (pitch stability) and directional (yaw stability)—is largely determined by the CG location. In aerial maneuvers, such as turns, climbs, or descents, the aircraft's performance can be compromised if the CG is not within the designated limits, making understanding and calculating the CG essential for safe flight operations. This understanding helps pilots ensure that the aircraft performs reliably and predictably under various flight conditions.*

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## 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](mailto:hello@examzify.com).

Or visit your dedicated course page for more study tools and resources:

<https://faaairframewtbalance.examzify.com>

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

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