Weight and Balance

1. Center of gravity can be found by

- Multiplying weight times arm.
- Dividing total weight by total moment.
- **Dividing total moment by total weight.**

Note:
The center of gravity (CG) is a point at which the entire weight of an object can be considered to be concentrated. It can be calculated using the formula:

CG = Total Moment/Total Weight

2. In weight and balance calculations, arm is

- The distance between items.
- **The distance from the datum line to the item.**
- Weight times moment.

Note:
In weight and balance calculations, the arm is a crucial concept. It refers to the horizontal distance from a reference point, known as the datum, to the center of gravity of an item. The arm is used to calculate moments, which help determine the overall balance and center of gravity of the aircraft.

3. Which items are included in the empty weight of an aircraft?

- **Unusable fuel and undrainable oil.**
- Only the airframe, powerplant, and optional equipment.
- Full fuel tanks and engine oil to capacity.

Note:
Title 14 § 110.2 Definitions.

Empty weight means the weight of the airframe, engines, propellers, rotors, and fixed equipment. Empty weight excludes the weight of the crew and payload, but includes the weight of all fixed ballast, unusable fuel supply, undrainable oil, total quantity of engine coolant, and total quantity of hydraulic fluid.

4. An aircraft is loaded 110 pounds over maximum certificated gross weight. If fuel (gasoline) is drained to bring the aircraft weight within limits, how much fuel should be drained?

- 15.7 gallons.
- 16.2 gallons.
- **18.4 gallons.**

Note:
Aviation gasoline weighs approximately 6 pounds per gallon. To reduce the aircraft weight by 110 pounds, you need to drain 110 pounds ÷ 6 pounds per gallon = 18.33 gallons. Therefore, the correct answer, considering rounding, is 18.4 gallons.

5. If an aircraft is loaded 90 pounds over maximum certificated gross weight and fuel (gasoline) is drained to bring the aircraft weight within limits, how much fuel should be drained?

- 10 gallons.
- 12 gallons.
- **15 gallons.**

Note:
Aviation gasoline weighs approximately 6 pounds per gallon. To reduce the aircraft weight by 90 pounds, you need to drain 90 pounds ÷ 6 pounds per gallon = 15 gallons.
