Please note: When you perform this homework, you should label everything with letters. Next make a table of known values. Then solve the equations algebraically. Finally, plug in your values into the last equation. This method was not used in this first draft of the homework solutions to save time and get the solutions out to you.

Also, if you print on a black and white printer, set the print dialogue to black and white rather than grayscale as the colored text and pictures will show up better.

1) There are two 500-lb bombs placed on one wing of an aircraft. One is 5-ft from the center of the fuselage and the other is 10-ft away. Where should an 800-lb bomb be placed on the other wing to achieve balance?

2) In large aircraft, it is important to load the wing tanks carefully, and to use the fuel such that the plane stays in balance. The centers of tanks 1 and 4 are 18 feet from the center of the fuselage and tanks 2 and 3 are 10 feet away. If there is 25,000-lbs of fuel in tank 1; 60,000-lbs in tank 2; 50,000-lbs in tank 3; how much should be in tank 4 to maintain balance?
3) Find the center of gravity as measured from the datum of the following “plane”.

4) A 10m long wing is held up with a strut attached 2.5 m from the fuselage as shown. If the wing is considered uniform with a mass of 200-kg, find the compression force on the strut in Newtons.
5) An empty plane weighs 3000-lbs and has its center of gravity located 2 ft. aft of the center of lift (COL). Four hundred pounds of fuel are added 3 ft. fore of the COL and 500-lb of passengers are added 10 fore of the COL. Where should 600-lb of cargo be placed to maintain level flight without any trim?

6) A experimental plane has its total weight supported by each wheel being weighed. Wheel #1 supports 500-lb and is 5 ft- from the datum, Wheel #2 supports 400-lb, and wheel #3 supports 350 lb. Wheels #2 and #3 are 15-ft from the centerline of the fuselage. Find the C.G. as measured from the Datum.