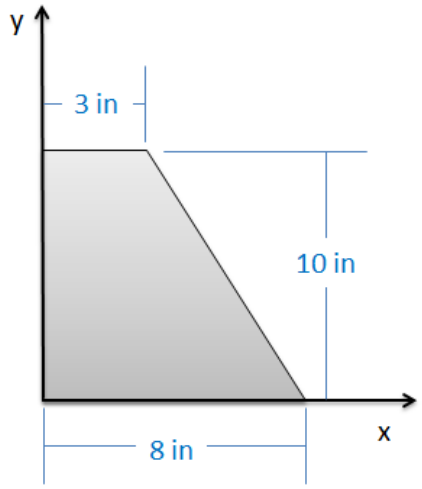
Appendix 2 Homework Problems

Problem A2.1

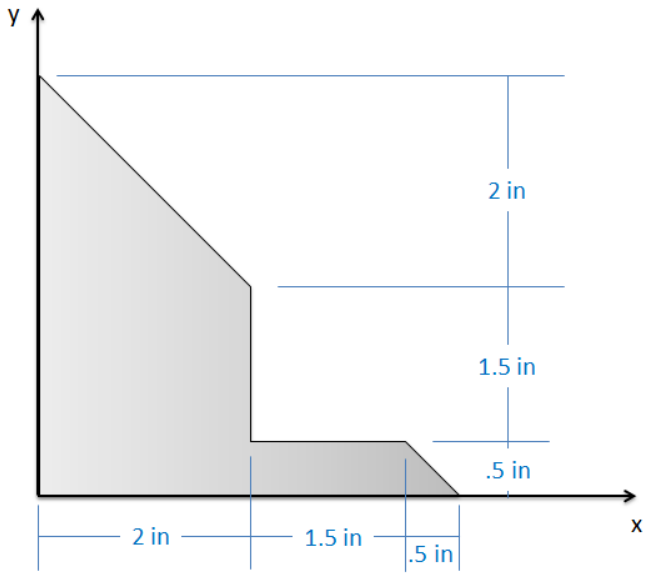
Determine the x and y coordinates of the centroid of the shape shown below via integration.



Solution: X_C = 2.94 in, Y_C = 4.24 in

Problem A2.2

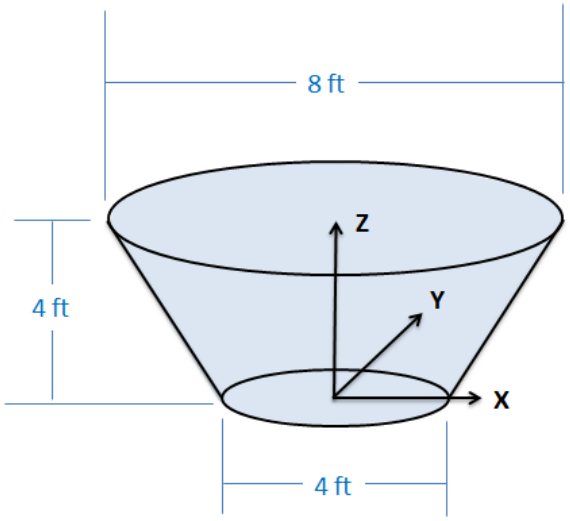
Use the method of composite parts to determine the centroid of the shape shown below.



Solution: X_C = 1.14 in, Y_C = 1.39 in

Problem A2.3

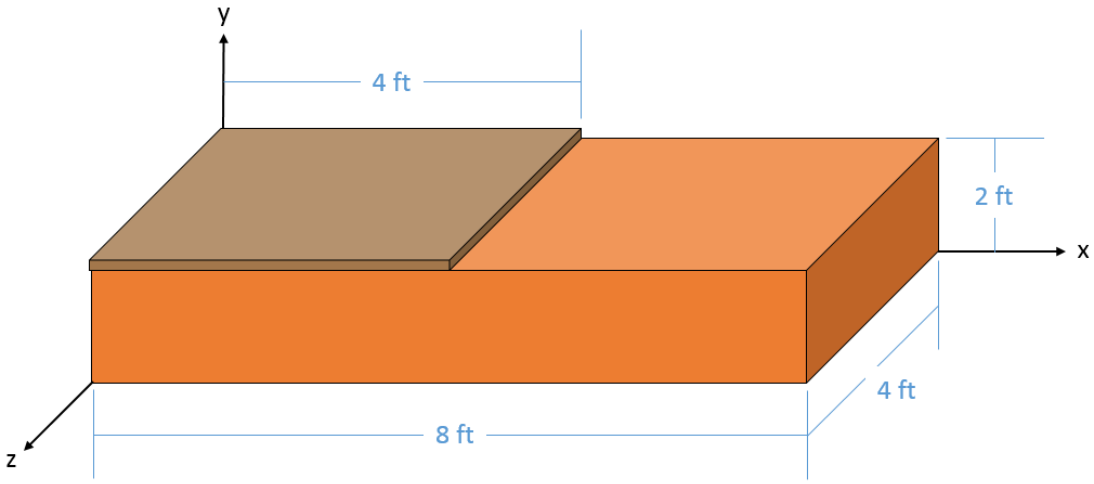
A water tank as shown below takes the form of an inverted, truncated cone. The diameter of the base is 4 ft while the diameter of the top is 8 ft. The height of the tank is 4 ft. If the tank is filled with water (assume a constant density) what is the z position of the center of mass of the water in the tank?



Solution: Z_C = 2.43 ft

Problem A2.4

A floating platform consists of a square piece of plywood weighing 50 lbs with a negligible thickness on top of a rectangular prism of a foam material weighing 100 lbs as shown below. Based on this information, what is the location of the center of mass for the floating platform?



Solution: X_C = 3.33 ft, Y_C = 1.33 ft, Z_C = 2 ft