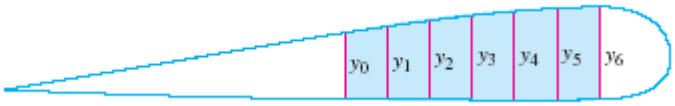
Student: Arfaz Hossain **Date:** 12/05/21	**Instructor:** UVIC Math **Course:** MATH 100 (A01, A02, A03) Fall 2021 **Assignment:** Assignment 10

The fuel tanks for airplanes are in the wings, cross section below. The tank must hold 5400 lb of fuel with density 42 lb/ft^3. Estimate the length of the tank using Simpson's Rule.



Horizontal spacing = 1.2 ft

$y_0 = 1.3$ ft, $y_1 = 1.5$ ft, $y_2 = 1.7$ ft, $y_3 = 1.9$ ft, $y_4 = 2.1$ ft, $y_5 = 2.3$ ft, $y_6 = 2.1$ ft

Use Simpson's Rule to estimate the cross-sectional area of the tank. The Simpson's Rule says that the area is approximately $\frac{\Delta x}{3}\left(y_0 + 4y_1 + 2y_2 + 4y_3 + 2y_4 + 4y_5 + y_6\right)$ with Δx the length of the subinterval. Thus, the cross-sectional area is found as shown below.

$$\frac{1.2 \text{ ft}}{3}(1.3 \text{ ft} + 4(1.5 \text{ ft}) + 2(1.7 \text{ ft}) + 4(1.9 \text{ ft}) + 2(2.1 \text{ ft}) + 4(2.3 \text{ ft}) + 2.1 \text{ ft}) = 13.52 \text{ ft}^2$$

Density is the weight divided by volume, so volume equals the weight divided by density. Since the tank must hold 5400 lb of fuel with a density of 42 lb/ft^3, the volume of the tank must be approximately 128.57 ft^3.

The volume is the cross-sectional area times the length, so the length is the volume divided by the cross-sectional area. Since the volume must be 128.57 ft^3 with a constant cross-sectional area of 13.52 ft^2, the length of the tank is approximately 9.5 ft.