Multiple Integration
Iteration of Double Integrals

Question
Find the volume for the solid defined by
The space over the triangle defined by the vertices $(0,0)$, $(a,0)$ and $(0,b)$, and below the plane $z = 2 - (x/a) - (y/b)$.
Answer

$$\begin{aligned}
V &= \iint_Y \left(2 - \frac{x}{a} - \frac{y}{b}\right) dA \\
&= \int_0^{b(1-(x/a))} \left(2 - \frac{x}{a} - \frac{y}{b}\right) dy \\
&= \int_0^a \left[\left(2 - \frac{x}{a}\right) b \left(1 - \frac{x}{a}\right) - \frac{1}{2b} b^2 \left(1 - \frac{x}{a}\right)^2\right] dx \\
&= \frac{b}{a} \int_0^a \left(3 - \frac{4x}{a} + \frac{x^2}{a^2}\right) dx \\
&= \frac{b}{2} \left(3x - frac2x^2a + \frac{x}{3a^2}\right)\Big|_0^a \\
&= \frac{2}{3} ab \text{cu. units}
\end{aligned}$$