1. Compute the area of the ellipse \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \).

Hints:

(i) Solve for \( y \) to get a function.

(ii) Express the area as an integral.

(iii) Evaluate the integral by using the substitution

\[
x = a \cos \theta.
\]

Also, recall the half-angle formula:

\[
\sin^2 \theta = \frac{1 - \cos 2\theta}{2}.
\]

2. Express the area of the ellipse as a double integral. Do this in two different ways.