4. [8 points] Consider the following function:

$$F(x) = \int_1^{\ln x} \frac{\cos^2(t)}{t}\, dt.$$

a. [2 points] Find a value of a such that $F(a) = 0$. Show your work.

Answer: $a =$ _____

b. [3 points] Calculate $F'(x)$.

Answer: $F'(x) =$ _____

c. [3 points] Find a function $f(t)$ and constants a and C so that we may rewrite $F(x)$ in the form $\int_a^x f(t)\, dt + C$. There may be more than one correct answer.

$f(t) =$ _____ $a =$ _____ $C =$ _____