

4. [10 points] After walking in the woods, Flora is making juice with the fruit she picked up at the next hour. The volume of juice in the jar (in gallons) t minutes after she starts making juice is given by the function

$$F(t) = \int_{\sin t}^{2t} \frac{50}{100 - \ln(x + 2)} dx.$$

- a. [3 points] Calculate $F'(t)$.
- b. [3 points] What is the volume of juice (in gallons) in the jar when Flora starts making the juice? Briefly explain your answer using the function $F(t)$.
- c. [4 points] Nile wants to know the volume of juice in the jar, yet she is confused by the function $F(t)$. She knows she can write $F(t)$ using $F'(t)$ and the initial volume of juice in the jar. Help her by rewriting $F(t)$ in the form

$$F(t) = \int_a^t \underline{\hspace{2cm}} d\underline{\hspace{2cm}} + \underline{\hspace{2cm}}.$$

Write the above integral with the blanks filled in, and also give the value of a .