Consider a continuous random variable $X$ with the uniform probability density function

$$f(x) = \begin{cases} \frac{1}{B-A} & A < x < B \\ 0 & \text{otherwise} \end{cases}$$

a. Verify that $f(x)$ is normalized, i.e., that

$$\int_{-\infty}^{\infty} f(x) \, dx = 1$$

b. Sketch the graph of $f(x)$. Label the axes.
Consider a continuous random variable with the uniform probability density function

\[ f(x) = \begin{cases} \frac{1}{B-A} & A < x < B \\ 0 & \text{otherwise} \end{cases} \]

c. Find the cumulative distribution \( F(x) \).
d. Sketch the graph of \( F(x) \). Label the axes.

e. Calculate the expected value \( E(X) \) in terms of \( A \) and \( B \).
f. Calculate the variance \( V(X) \) in terms of \( A \) and \( B \).