1. Find the value of the function

\[ f(x) = \begin{cases} \frac{1}{2}x^2 - \frac{1}{2} + 4, & x \leq 1 \\ x^3 - 6x^2 + 8x, & x > 1 \end{cases} \]

at its critical points and determine the local extreme values.

2. Find absolute extrema of \( f(x) = \frac{1}{x} + \ln x \) on the interval \([1/2, 4]\).

3. Find where the function \( f(x) = x\sqrt{8 - x^2} \) is increasing, decreasing, concave up, concave down, and identify any local extreme values and inflection points.