Logarithmic Functions

Exercise 1:

Solve the following:

1) 2Ln(x+1) = 8

2) ln ($x^2 - 3x + 2$) = Ln(x+2)

3) ln (x-2) $\leq$ 2

4) (x-3)Ln(x-1) = 0

Exercise 2:

Simplify:

1) $\ln\left(\frac{e}{a}\right) + \ln\,(ae^3)$ - 2

2) $\ln\left(\sqrt{3}+1\right)^2 + \ln\left(\sqrt{3}-1\right)^2$

3) $ln25 - \ln\frac{1}{5} + \ln\,(5e)$- 2ln$\sqrt{5}$ - 1

Exercise 3:

A: Consider the function f defined over]-1, +∞ [by: f(x) = $\frac{1}{x+1}$ – ln(x+1)

1) Calculate $\lim\limits_{x\to+\infty} \boldsymbol{f(x)}$ and $\lim\limits_{x\to-1} \boldsymbol{f(x)}$. Deduce an asymptote to (C).
2) Determine f'(x) and set up the table of variation of f.
3) Show that f(x) =0 admits a unique root $\propto$ and 0.7 <$\propto$ < 0.8.
4) Plot (C).

B: Consider the function g defined on]-1, +∞ [by: g(x) = x + 1 –x ln(x+1)

1) Calculate $\lim\limits_{x\to-1} \boldsymbol{f(x)}$. Deduce an asymptote to (C).
2) Calculate $\lim\limits_{x\to+\infty} \boldsymbol{f(x)}$.
3) Show that g'(x) = f(x) and set up the table of variation of g.
4) Show that g($\propto$)= $\frac{\boldsymbol{\propto^2+\propto+1}}{\boldsymbol{\propto+1}}$.
5) **Plot (Cg). Take** $\propto$ = 0.77