Subject 14

Function and sequence

Please, don't write on the exam paper.

Let f be the function defined on $]0;+\infty[$ by : $f(x) = \dfrac{1+\ln x}{x}$.

C_f is its graph in a coordinate system $(O;\vec{i};\vec{j})$.

1) Calculate the abscissas of the 4 following points A,B,C,D.

a) The point A is the intersection point between C_f and the *x*-axis.

b) The point B is such that the tangent to C_f at point B passes through O (origin of the coordinate graph).

c) The point C is the point of C_f where the tangent line to C_f is parallel to the *x*-axis.

d) Let us define f'' the second derivative of *f* as $f'' = (f')'$. The abscissa of D is the number *d* such that $f''(d) = 0$.

2) Prove that the abscissas of A, B, C, D are four terms of a geometric sequence.