Name:

Matricule number:

Alternative mid-term test
Business Mathematics 1
Groups 6 and 7
Spring 2014

example	max.pts.	pts.
1	3	...
2	3	...
3	4	...
4	2	...
total :	12	...

Instructions:

- No documents, no calculators

- Write your answers to an example in the corresponding indicated blank spaces

- All the answers must be justified

- The clarity and readability of the copy will be taken into account in the final mark

1) a) Calculate the limit as $n \to +\infty$ of
$$a_n = \frac{2n^2 + 1}{(n-1)(n+1)}.$$

b) Give an example of a sequence that is both arithmetic and geometric.

2) a) Calculate
$$\sum_{k=3}^{+\infty} \frac{2}{3^k}.$$

b) Let $(a_n)_{n \in \mathbb{N}}$ be an arithmetic sequence so that
$$\sum_{k=1}^{6} a_k = \sum_{k=3}^{6} a_k + 6$$

and
$$\sum_{k=1}^{3} a_k = 18.$$

Calculate a_k for $k \in \mathbb{N}$.

3) a) Sketch the graph of the function
$$f(x) = 2|x+1| - |x|$$

b) Sketch the graph of the function
$$g(x) = x^2 - 4x + 3.$$

Deduce from this graph the definition domain of the function
$$h(x) = \frac{1}{\sqrt{g(x)}}.$$

4) a) calculate
$$\log_4 \left(\frac{1}{4} \right)$$

b) Prove that there does not exist a $a \in \mathbb{R}$ so that the following function f is continuous
$$f(x) = \begin{cases} 1 + x & \text{if } x \leq 1 \\ 3 + |ax| & \text{if } x > 1 \end{cases}.$$

Answer to 1) a):

Answer to 1) b):

Answer to 2) a):

Answer to 2) b):

Answer to 3) a):

Answer to 3) b):

Answer to 4) a):

Answer to 4) b):