

**Name:**

**Matricule number:**

Regular end-term test  
Business Mathematics 1  
Groups 6 and 7  
Spring 2014

<i>example</i>	<i>max.pts.</i>	<i>pts.</i>
1	3	...
2	3	...
3	3	...
4	3	...
<i>total :</i>	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 first derivative of the following function.

$$f(x) = \frac{1}{\ln(1 + 2\sqrt{x})}.$$

b) Calculate the second derivative of the following function.

$$f(x) = \cos(x^2) \ln(x).$$

2) a) Study the monotony of the following function

$$f(x) = e^{2x} - 4e^x.$$

b) Find *one* critical point of the following function. [You do not have to say which type of critical point it is.]

$$f(x) = \sin(e^x).$$

3) a) Let  $a = 1$ . Find the Taylor expansion of order 3 at  $x = a$  of the following function.

$$f(x) = \ln(x).$$

b) Show that

$$\log_2(33) \approx 5 + \frac{1}{32 \ln(2)}.$$

Indication: you can use  $32 = 2^5$  and  $33 = 32(1 + 1/32)$ .

4) a) Find an antiderivative of the following function

$$f(x) = \frac{(1 + \sqrt{x})^2}{5\sqrt{x}}.$$

b) Calculate the following integral.

$$\int_0^1 (2x + x^2)e^x dx.$$

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):