Homework 2

Question 1: Let us consider a mixture of normal distribution that can be written as:

where , , and , , and x is a real number.

1. Give the likelihood function
2. Give the formula for the estimation of the parameters

Hints: You need to use the method of Lagrange multipliers and newton method.

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Question 2: The data D={, …,} taken by a random variable x are generated from the pdf defined by:

where is a non-negative real number and a > 0.

1. Find so that is a probability density function.
2. Find the expectation and the variance of the random variable. You should provide all the computation details.
3. Let us consider that the prior pdf is a Gamma pdf defined by p(a|=, give the posterior pdf. You should provide all the computation details.

Question 3: Calculate the following

1. The derivative of
2. The integral of .

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