2. The length of pregnancy for a randomly selected pregnant sheep is D days where

$$D \sim \mathrm{N}(112.4, \sigma^2)$$

Given that 5% of pregnant sheep have a length of pregnancy of less than 108 days,

(a) find the value of σ

(3)

Qiang selects 25 pregnant sheep at random from a large flock.

(b) Find the probability that more than 3 of these pregnant sheep have a length of pregnancy of less than 108 days.

(2)

Charlie takes 200 random samples of 25 pregnant sheep.

(c) Use a Poisson approximation to estimate the probability that at least 2 of the samples have more than 3 pregnant sheep with a length of pregnancy of less than 108 days.

(3)

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Question 2 continued

(Total for Question 2 is 8 marks)