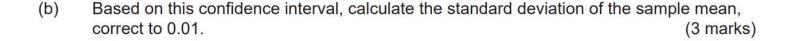**Question 17** (8 marks)

Members of a random sample of $n$ shoppers at the El Cheepo shopping centre were asked by a consumer researcher how much they had spent in the shopping centre that day. Let $\mu$ denote the mean and $\sigma$ the standard deviation of the amount spent. The standard deviation $\sigma$ is known from previous research.

A 95% confidence interval for $\mu$ based on the sample is $150 \leq \mu \leq 200$ dollars.

(a) Determine the sample mean for this sample. (1 mark)

(b) Based on this confidence interval, calculate the standard deviation of the sample mean, correct to 0.01. (3 marks)

The following week, the researcher again took a random sample of shoppers from the El Cheepo shopping centre, but this time the sample size was doubled.

(c) What is the probability that the difference between $\mu$ and the sample mean from this sample will be less than \$10? (4 marks)