Question 18 (11 marks)

The mass of chocolate that is placed into each biscuit produced by the BikkiesAreUs company has been observed to be normally distributed with mean $\mu = 7.5$ grams and standard deviation $\sigma = 1.5$ grams.

(a) Determine the probability, correct to 0.01, that the total amount of chocolate used for 50 biscuits is less than 365 grams. (4 marks)

(b)   If the probability that the mean amount of chocolate used per biscuit differs from μ by less than 0.2 grams is 98%, determine n, the number of biscuits that need to be sampled.

(3 marks)

A competitor company called YouBeautChokkies produces similar biscuits. A sample of 144 biscuits was taken and it was found that the standard deviation of the mass of chocolate used in each biscuit was 1.8 grams and the total amount of chocolate used in the sample of 144 biscuits was 1.09 kg.

Charlie Chokka, a representative from the YouBeautChokkies company, stated that "we are using significantly more chocolate for each biscuit than BikkiesAreUs. If you want that real chocolate taste, then buy from us!"

(c)   Perform the necessary calculations to comment on Charlie's claim.   (4 marks)