Finding the mean and standard deviation

Question Paper 1

Level	A LEVEL
Exam Board	Edexcel
Subject	Mathematics
Module	Mechanics and Statistics
Topic	Normal distribution
Sub-Topic	Finding the mean and standard deviation
Booklet	Question Paper 1

Time Allowed: **36 minutes**

Score: **/31**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 The duration of the pregnancy of a certain breed of cow is normally distributed with mean μ days and standard deviation σ days. Only 2.5% of all pregnancies are shorter than 235 days and 15% are longer than 286 days.

(a) Show that $\mu - 235 = 1.96\sigma$. **(2)**

(*b*) Obtain a second equation in μ and σ. **(3)**

(*c*) Find the value of μ and the value of σ. **(4)**

(*d*) Find the values between which the middle 68.3% of pregnancies lie. **(2)**

(Total 11 marks)

2 A drinks machine dispenses coffee into cups. A sign on the machine indicates that each cup contains 50 ml of coffee. The machine actually dispenses a mean amount of 55 ml per cup and 10% of the cups contain less than the amount stated on the sign. Assuming that the amount of coffee dispensed into each cup is normally distributed find

(a) the standard deviation of the amount of coffee dispensed per cup in ml, **(4)**

(*b*) the percentage of cups that contain more than 61 ml. **(3)**

Following complaints, the owners of the machine make adjustments. Only 2.5% of cups now contain less than 50 ml. The standard deviation of the amount dispensed is reduced to 3 ml.

Assuming that the amount of coffee dispensed is still normally distributed,

(c) find the new mean amount of coffee per cup. **(4)**

(Total 11 marks)

3 The weights of bags of popcorn are normally distributed with mean of 200 g and 60% of all bags weighing between 190 g and 210 g.

(a) Write down the median weight of the bags of popcorn. **(1)**

(b) Find the standard deviation of the weights of the bags of popcorn. **(5)**

A shopkeeper finds that customers will complain if their bag of popcorn weighs less than 180 g.

(c) Find the probability that a customer will complain.

(3)

(Total 9 marks)