1.	The fish in a lake have weights that are normally distributed with a mean of 1.3 kg and a standard deviation of 0.2 kg.

	(a)	Determine the probability that a fish that is caught weighs less than 1.4 kg.

	(1)

	(b)	John catches 6 fish. Calculate the probability that at least 4 of the fish weigh more than 1.4 kg.

	(3)

	(c)	Determine the probability that a fish that is caught weighs less than 1 kg, given that it weighs less than 1.4 kg.

	(2)
	(Total 6 marks)

2.	In a factory producing glasses, the weights of glasses are known to have a mean of 160 grams. It is also known that the interquartile range of the weights of glasses is 28 grams. Assuming the weights of glasses to be normally distributed, find the standard deviation of the weights of glasses.

	(Total 6 marks)

3.	The weight loss, in kilograms, of people using the slimming regime *SLIM3M* for a period of three months is modelled by a random variable *X*. Experimental data showed that 67 % of the individuals using *SLIM3M* lost up to five kilograms and 12.4 % lost at least seven kilograms. Assuming that *X* follows a normal distribution, find the expected weight loss of a person who follows the *SLIM3M* regime for three months.

	(Total 5 marks)

4.	Bob measured the heights of 63 students. After analysis, he conjectured that the height, *H*, of the students could be modelled by a normal distribution with mean 166.5 cm and standard deviation 5 cm.

	(a)	Based on this assumption, estimate the number of these students whose height is at least 170 cm.

	(3)

	Later Bob noticed that the tape he had used to measure the heights was faulty as it started at the 5 cm mark and not at the zero mark.

	(b)	What are the correct values of the mean and variance of the distribution of the heights of these students?

	(3)
	(Total 6 marks)

5. Tim goes to a popular restaurant that does not take any reservations for tables. It has been determined that the waiting times for a table are normally distributed with a mean of 18 minutes and standard deviation of 4 minutes.

(a) Tim says he will leave if he is not seated at a table within 25 minutes of arriving at the restaurant. Find the probability that Tim will leave without being seated.

(2)

(b) Tim has been waiting for 15 minutes. Find the probability that he will be seated within the next five minutes.

(4)
(Total 6 marks)

6. (a) A box of biscuits is considered to be underweight if it weighs less than 228 grams. It is known that the weights of these boxes of biscuits are normally distributed with a mean of 231 grams and a standard deviation of 1.5 grams. What is the probability that a box is underweight?

(2)

(b) The manufacturer decides that the probability of a box being underweight should be reduced to 0.002.

   (i) Bill's suggestion is to increase the mean and leave the standard deviation unchanged. Find the value of the new mean.

   (ii) Sarah's suggestion is to reduce the standard deviation and leave the mean unchanged. Find the value of the new standard deviation.

(6)

(c) After the probability of a box being underweight has been reduced to 0.002, a group of customers buys 100 boxes of biscuits. Find the probability that at least two of the boxes are underweight.

(3)
(Total 11 marks)

7. The speeds of cars at a certain point on a straight road are normally distributed with mean μ and standard deviation σ. 15 % of the cars travelled at speeds greater than 90 km h^{-1} and 12 % of them at speeds less than 40 km h^{-1}. Find μ and σ.

(Total 6 marks)