

5. A health centre claims that the time a doctor spends with a patient can be modelled by a normal distribution with a mean of 10 minutes and a standard deviation of 4 minutes.

- (a) Using this model, find the probability that the time spent with a randomly selected patient is more than 15 minutes.

(1)

Some patients complain that the mean time the doctor spends with a patient is more than 10 minutes.

The receptionist takes a random sample of 20 patients and finds that the mean time the doctor spends with a patient is 11.5 minutes.

- (b) Stating your hypotheses clearly and using a 5% significance level, test whether or not there is evidence to support the patients' complaint.

(4)

The health centre also claims that the time a dentist spends with a patient during a routine appointment,  $T$  minutes, can be modelled by the normal distribution where  $T \sim N(5, 3.5^2)$

- (c) Using this model,

- (i) find the probability that a routine appointment with the dentist takes less than 2 minutes

(1)

- (ii) find  $P(T < 2 \mid T > 0)$

(3)

- (iii) hence explain why this normal distribution may not be a good model for  $T$ .

(1)

The dentist believes that she cannot complete a routine appointment in less than 2 minutes.

She suggests that the health centre should use a refined model only including values of  $T > 2$

- (d) Find the median time for a routine appointment using this new model, giving your answer correct to one decimal place.

(5)