2. A multiple-choice test consists of 25 questions, each having 5 responses, only one of which is correct.

Each correct answer gains 4 marks but each incorrect answer loses 1 mark.

Sam answers all 25 questions by choosing at random one response for each question.

Let X be the number of correct answers that Sam achieves.

(a) State the distribution of X

(1)

Let M be the number of marks that Sam achieves.

(b) (i) State the distribution of M in terms of X

(ii) Hence, show clearly that the number of marks that Sam is expected to achieve is zero.

(4)

In order to pass the test at least 30 marks are required.

(c) Find the probability that Sam will pass the test.

(3)

Past records show that when the test is done properly, the probability that a student answers the first question correctly is 0.5

A random sample of 50 students that did the test properly was taken.

Given that the probability that more than n but at most 30 students answered the first question correctly was 0.9328 to 4 decimal places,

(d) find the value of n

(4)

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Question 2 continued

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Question 2 continued

(Total for Question 2 is 12 marks)

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