4. A bag contains a large number of beads of the same size and shape. The beads are either black or white.

Black beads and white beads occur in the ratio 2 : 5 respectively.

In a game a player takes a random sample of 3 beads from the bag.

The player scores

- 4 points for each black bead taken
- 1 point for each white bead taken

The random variable X represents the total number of points for the 3 beads.

(a) Find the sampling distribution of X

(6)

A random sample of n sets of 3 beads is taken. The random variable Y represents the number of these n sets that have a total of exactly 9 points.

(b) Calculate the minimum value of n such that $P(Y \geqslant 1) > 0.95$

(3)

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Question 4 continued

(Total for Question 4 is 9 marks)