2. A spinner can land on the numbers 2, 4, 5, 7 or 8 only.
The random variable X represents the number that this spinner lands on when it is spun once. The probability distribution of X is given in the table below.

x	2	4	5	7	8
$\mathbf{P}(X = x)$	0.25	0.3	0.2	0.1	0.15

(a) Find $P(2X - 3 > 5)$

(1)

Given that $E(X) = 4.6$

(b) show that $Var(X) = 4.14$

(3)

The random variable $Y = aX - b$ where a and b are positive constants.

Given that

$$E(Y) = 13.4 \quad \text{and} \quad Var(Y) = 66.24$$

(c) find the value of a and the value of b

(4)

In a game Sam and Alex each spin the spinner once, landing on X_1 and X_2 respectively.

Sam's score is given by the random variable $S = X_1$
Alex's score is given by the random variable $R = 2X_2 - 3$

The person with the higher score wins the game. If the scores are the same it is a draw.

(d) Find the probability that Sam wins the game.

(4)

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Question 2 continued

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Question 2 continued

(Total for Question 2 is 12 marks)