Probability Laws

Question Paper

Level	Pre U
Subject	Maths
Exam Board	Cambridge International Examinations
Topic	Statistics- Probability Laws
Booklet	Question Paper

Time Allowed: **53 minutes**

Score: **/44**

Percentage: **/100**

Grade Boundaries:

1 The times for a motorist to travel from home to work are normally distributed with a mean of 24 minutes and a standard deviation of 4 minutes. Find the probability that a particular trip from home to work takes

(i) more than 27 minutes, [3]

(ii) between 20 and 25 minutes. [3]

2 **(a** A music club has 200 members. 75 members play the piano, 130 members like Elgar, and 30 members do not play the piano, nor do they like Elgar.

(i) Calculate the probability that a member chosen at random plays the piano but does not like Elgar. [3]

(ii) Calculate the probability that a member chosen at random plays the piano given that this member likes Elgar. [2]

(b) The music club is organising a concert. The programme is to consist of 7 pieces of music which are to be selected from 9 classical pieces and 6 modern pieces. Find the number of different concert programmes than can be produced if

(i) there are no restrictions, [2]

(ii) the programme must consist of 5 classical pieces and 2 modern pieces, [2]

(iii) there are to be more modern pieces than classical pieces. [3]

3 A and B are two events. You are given that $P(A) = 0.6$, $P(B) = 0.5$ and $P(A \cup B) = 0.8$.

(i) Find $P(A \cap B)$. [2]

(ii) Find $P(B \mid A)$. [2]

(iii) Explain whether the events A and B are independent or not. [1]

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Events A and B are such that $P(A) =$, $P(A \cup B) =$ and $P(B \mid A) =$.

Find $\frac{1}{2}$ $\frac{5}{6}$ $\frac{1}{4}$

(i) $P(A \cap B)$, [2]

(ii) $P(B)$. [2]

5 In an archery competition, competitors are allowed up to three attempts to hit the bulls-eye. No one who succeeds may try again.

45% of those entering the competition hit the bulls-eye first time. For those who fail to hit it the first time, 60% of those attempting it for the second time succeed in hitting it. For those who fail twice, only 15% of those attempting it for the third time succeed in hitting it. By drawing a tree diagram, or otherwise,

(i) find the probability that a randomly chosen competitor fails at all three attempts, [2]

(ii) find the probability that a randomly chosen competitor fails at the first attempt but succeeds at either the second or third attempt, [3]

(iii) find the probability that a randomly chosen competitor succeeds in hitting the bulls-eye, [2]

(iv) find the probability that a randomly chosen competitor requires exactly two attempts given that the competitor is successful. [3]

6 **(a)** Events A and B are such that $\mathrm{P}(A' \cap B') = \frac{1}{6}$.

(i) Find $\mathrm{P}(A \cup B)$. [2]

(ii) Given that $\mathrm{P}(A \mid B) = \frac{1}{3}$ and $\mathrm{P}(B) = \frac{1}{4}$, find $\mathrm{P}(A \cap B)$ and $\mathrm{P}(A)$. [3]

(b) In playing the UK Lottery, a set of 6 different integers is chosen irrespective of order from the integers 1 to 49 inclusive. How many different sets of 6 integers can be chosen? [2]