

Probability formulae

Question Paper 1

Level	A LEVEL
Exam Board	Edexcel
Subject	Mathematics
Module	Mechanics and Statistics
Topic	Conditional probability
Sub-Topic	Probability formulae
Booklet	Question Paper 1

Time Allowed: 43 minutes

Score: /38

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

- 1 A contractor bids for two building projects. He estimates that the probability of winning the first project is 0.5, the probability of winning the second is 0.3 and the probability of winning both projects is 0.2.
- (a) Find the probability that he does not win either project. (3)
- (b) Find the probability that he wins exactly one project. (2)
- (c) Given that he does not win the first project, find the probability that he wins the second. (2)
- (d) By calculation, determine whether or not winning the first contract and winning the second contract are independent events. (3)

(Total 10 marks)

2 The events A and B are such that $P(A) = \frac{2}{5}$, $P(B) = \frac{1}{2}$ and $P(A | B') = \frac{4}{5}$

(a) Find

(i) $P(A \cap B')$,

(ii) $P(A \cap B)$,

(iii) $P(A \cup B)$,

(iv) $P(A | B)$. (7)

(b) State, with a reason, whether or not A and B are

(i) mutually exclusive, (2)

(ii) independent. (2)

(Total 11 marks)

- 3 A group of office workers were questioned for a health magazine and $\frac{2}{5}$ were found to take regular exercise. When questioned about their eating habits $\frac{2}{3}$ said they always eat breakfast and, of those who always eat breakfast $\frac{9}{25}$ also took regular exercise.

Find the probability that a randomly selected member of the group

- (a) always eats breakfast and takes regular exercise, (2)
- (b) does not always eat breakfast and does not take regular exercise. (2)
- (c) Determine, giving your reason, whether or not always eating breakfast and taking regular exercise are statistically independent. (4)

(2)

(Total 8 marks)

- 4 (a) State in words the relationship between two events R and S when $P(R \cap S) = 0$ (1)

The events A and B are independent with $P(A) = \frac{1}{4}$ and $P(A \cup B) = \frac{2}{3}$

Find

- (b) $P(B)$ (4)

- (c) $P(A' \cap B)$ (2)

- (d) $P(B' | A)$ (2)

(Total 9 marks)