

IEB Probability and counting practice — Questions

4 newly generated questions across all 9 probability and counting topics the IEB examines in Paper I — 62 marks in all. Every answer is worked in the memorandum booklet. Nothing here is taken from a past paper.

The fundamental counting principle

1

[14]

- (a) A lock code is made of 5 digits chosen from 1 to 9. How many different lock codes can be made if digits may be repeated? (2)

Answer: _____

- (b) How many different lock codes can be made if no digit may be used more than once? (2)

Answer: _____

- (c) A lock code is chosen at random, digits allowed to repeat. What is the probability that at least one digit appears more than once? Give your answer as a decimal, correct to four decimal places where needed. (3)

Answer: _____

- (d) How many lock codes, digits allowed to repeat, start with a digit greater than 5 and end with an odd digit? (3)

Answer: _____

- (e) How many 5-letter arrangements can be made from the letters of the word CRYSTAL, if no letter is used more than once? (2)

Answer: _____

- (f) How many of these arrangements start with a vowel? (2)

Answer: _____

-
- (a) In how many different ways can the letters of the word BALLOON be arranged? (3)

Answer: _____

- (b) The letters of BALLOON are arranged at random. What is the probability that the arrangement starts with A and ends with O? (3)

Answer: _____

- (c) 5 different people are arranged in a queue. In how many ways can this be done? (1)

Answer: _____

- (d) In how many ways can this be done if 3 particular people must be next to each other, in any order? (3)

Answer: _____

- (e) The digits 1; 2; 3; 5; 8 are used to form 5-digit numbers, without repetition (a number cannot start with 0). How many such numbers can be formed? (2)

Answer: _____

- (f) How many of these numbers are even and greater than 80000? (4)

Answer: _____

The probability rules

3

[18]

-
- (a) $P(A) = 0.45$ and $P(B) = 0.4$. Determine $P(A \text{ or } B)$ if A and B are mutually exclusive. (2)

Answer: _____

- (b) Determine $P(A \text{ or } B)$ if A and B are independent. (3)

Answer: _____

- (c) A spinner lands on red (R), blue (B) or green (G) with probabilities 0.2, 0.45 and 0.35. It is spun twice, and the spins are independent. Draw a tree diagram to show all the outcomes and their probabilities. (3)

Answer: _____

- (d) Calculate the probability of one red and one blue, in any order. (3)

Answer: _____

- (e) Calculate the probability of at least one red. (2)

Answer: _____

- (f) In a group of 48 learners, 21 take chess, 9 take drama and 2 take both. A learner is chosen at random. Calculate the probability that the learner takes chess or drama. (2)

Answer: _____

- (g) Are the events 'takes chess' and 'takes drama' independent? Show your calculation. (3)

Answer: _____

-
- (a) For two events A and B, $P(A) = 0.55$, $P(B) = 0.15$ and $P(A \text{ or } B) = 0.6175$. (2)
Determine $P(A \text{ and } B)$.

Answer: _____

- (b) Are A and B mutually exclusive? Are they independent? Give reasons. (3)

Answer: _____

- (c) A bag holds 2 red and 5 blue balls. Two balls are taken out one after the other, (3)
without replacement. Draw a tree diagram to show all the outcomes and their probabilities.

Answer: _____

- (d) Calculate the probability that the two balls are the same colour. (2)

Answer: _____

- (e) In a group of 36 learners, 22 take History, 14 take Geography and 3 take neither. (2)
How many take both?

Answer: _____

- (f) A learner is chosen at random. Calculate the probability that the learner takes (2)
exactly one of the two subjects.

Answer: _____