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TUTGATHER PRACTICE PAPER

HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2027

Candidate Number

MATHEMATICS Compulsory Part
PAPER 1

Question-Answer Book

TUTGATHER
PRACTICE PAPER · NOT AN OFFICIAL HKEAA PAPER

1 hour 5 minutes

This paper must be answered in English

Topic practice: More about Probability

INSTRUCTIONS

(1) This paper consists of THREE sections, A(1), A(2) and B.

(2) Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins.

(3) Unless otherwise specified, all working must be clearly shown.

(4) Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.

(5) The diagrams in this paper are not necessarily drawn to scale.

(6) Calculators and mathematical drawing instruments may be used.

(7) The marks for each question are shown in brackets.

(8) No extra time will be given after the 'Time is up' announcement.

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SECTION A(1) (16 marks)

1. In a class of 40 students, 25 students study Physics, 18 study Chemistry, and 10 study both Physics and Chemistry. A student is selected at random. Using a Venn diagram or otherwise, find the probability that the selected student studies neither Physics nor Chemistry. **(3 marks)**

2. Let A and B be two events such that $P(A) = 0.5$, $P(B) = 0.4$ and $P(A \cup B) = 0.7$. Find $P(A \cap B)$ and $P(A' \cap B')$. **(3 marks)**

3. A fair six-sided die is rolled once. Let A be the event that the number obtained is even, and B be the event that the number obtained is a multiple of 3. (a) Are A and B mutually exclusive? Explain briefly. (b) Find $P(A \cup B)$. **(4 marks)**

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4. In a game, two independent spinners are used. Spinner X lands on red with probability 0.3; spinner Y lands on red with probability 0.6. (a) Find the probability that both spinners land on red. (b) Find the probability that exactly one spinner lands on red. (c) Find the probability that at least one spinner lands on red. **(6 marks)**

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SECTION A(2) (24 marks)

5. A bag contains 5 red balls and 3 blue balls. Two balls are drawn at random one after another without replacement. (a) Find the probability that the second ball is blue given that the first ball is red. (b) Find the probability that both balls are blue. (c) Find the probability that the second ball is blue. **(7 marks)**

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6. In a survey of 100 students, 60 like Mathematics, 45 like Physics, and 30 like both Mathematics and Physics. A student is chosen at random. (a) Draw a Venn diagram showing the numbers of students in each region. (b) Find the probability that the student likes exactly one of the two subjects. (c) Given that the student likes Mathematics, find the probability that the student also likes Physics. **(8 marks)**

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7. In a certain city, the probability that it rains on a given day is 0.25. The probability that a student is late for school is 0.10 on a rainy day and 0.04 on a non-rainy day. **(9 marks)**

(a) Find the probability that a randomly chosen day is rainy and the student is late.

(b) Find the probability that the student is late on a randomly chosen day. (c)

Given that the student is late, find the probability that it is a rainy day.

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SECTION B (10 marks)

8. A fair coin is tossed three times. Let A be the event that at least two heads are obtained, B be the event that exactly one head is obtained, and C be the event that the first toss is a head. (a) List the sample space and find $P(A)$, $P(B)$ and $P(C)$. (b) Show that A and B are mutually exclusive, and find $P(A \cup B)$. (c) Determine whether A and C are independent. Justify your answer. (d) Find $P(A \cup C)$. **(10 marks)**

END OF PAPER

Answers written in the margins will not be marked.

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