

Supervision Instructions

Mathematics Methods (Unit 1-2)

Task #4

13th of June 2023 – Period 4

Task consists of two papers: **Paper 1** and **Paper 2**. Students will have access to only one paper at a time.

Paper 1:

- 15 minutes
- Calculator is not allowed

After 15 minutes **Paper 1** is to be collected and **Paper 2** will be given.

Paper 2:

- 25 minutes
- Calculator is allowed

After 25 minutes **Paper 2** is to be collected.

Check that students put their names.



2023 Mathematical Methods (Unit 1-2)

Task 4

Paper 1 – Calculator not allowed

Number of marks: 10

Writing time: 15 minutes

Name:

Marks:

Instructions

Answer **all** questions in the spaces provided.

In all questions where a numerical answer is required, an exact value must be given unless otherwise specified.

In questions where more than one mark is available, appropriate working **must** be shown.

Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1

1+1+1

In a class of 34 students, it was found that TikTok only users were twice as many as Instagram only users. 4 students used both TikTok and Instagram while 6 students used neither of them. Let T be the set of TikTok users and let I be the set of Instagram users. marks

a) Calculate the number of students that use Instagram only.

b) Draw a Venn diagram to illustrate this situation.

c) Find $\Pr(T' \cup I)$

Question 2

2 marks

Given $\Pr(A) = k$, $\Pr(B) = \frac{1}{7}$ and $\Pr(A \cap B) = \frac{5}{7}$, determine the value of k if the events are independent.

Question 3

1 mark

In how many ways the letters of the word CHEESE can be arranged in a circle?

Question 4

2 marks

If $\Pr(A \cap B) = \frac{1}{5}$ and $\Pr(B) = \frac{7}{10}$, calculate $\Pr(A' | B)$

Question 5

2 marks

A box contains 4 green and 2 red marbles. A sample of two marbles is drawn from the box, without replacement.

a) Find the probability that both marbles are green.

b) Find the probability that the marbles are different in colour in any order.



2023 Mathematical Methods (Unit 1-2)

Task 4

Paper 2 – Calculator allowed

Number of marks: 15

Writing time: 25 minutes

Name:

Marks – Section 1:

Section 2:

SECTION 1

Instructions for Section 1

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

Choose the response that is **correct** for the question.

A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Question 1

A bag contains 4 red pencils and 3 blue pencils. Three pencils are drawn without replacement. The probability that at least one pencil is red:

- A $\frac{4}{35}$
- B $\frac{34}{35}$
- C $\frac{24}{35}$
- D $\frac{17}{210}$
- E $\frac{21}{35}$

Question 2

In a soccer competition, the Australian team's chances of defeating the teams from France and Korea are 0.3 and 0.6 respectively. The probability that Australia loses both matches is:

- A 0.18
- B 0.28
- C 0.45
- D 0.72
- E 0.9

Question 3

How many 4-digit even numbers can be formed using the digits 2,3,4,5 and 6, if the repetitions are not allowed?

- A 24
- B 60
- C 72
- D 120
- E 140

Question 4

If two events A and B are mutually exclusive and $\Pr(A \cap B) = \frac{5}{8}$ and $\Pr(B) = \frac{1}{4}$ then $\Pr(A \cap B')$ is equal to:

- A $\frac{1}{8}$
- B $\frac{2}{5}$
- C $\frac{3}{5}$
- D $\frac{3}{8}$
- E $\frac{7}{8}$

Question 5

In how many ways can a hand of 4 cards be dealt from a deck of 52 cards?

- A 208
- B 1248
- C 54236
- D 270725
- E 6497400

SECTION 2

Instructions for Section 2

Answer **all** questions in the spaces provided.

In all questions where a numerical answer is required, an exact value must be given unless otherwise specified.

In questions where more than one mark is available, appropriate working **must** be shown.

Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

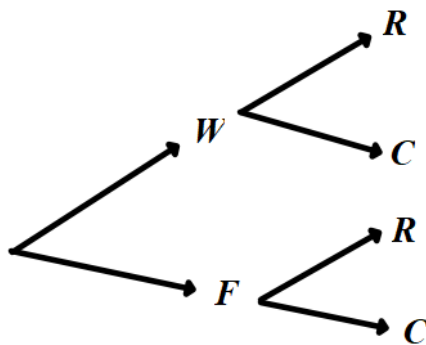
Question 1

Jessica has two main hobbies; she either likes to run or play chess. If the weather is forecast as wet, there is a 60% chance that she will play chess. However, if the weather is forecast as fine, there is an 80% chance that Jessica will go for a run.

The weather bureau forecasts the chance of Sunday being wet as 0.4.

- a. Complete the tree diagram below by writing the probability values on each branch.
Let W = wet, F = fine, R = run and C = chess.

1 mark



- b. Calculate the probability that Sunday is fine and Jessica plays chess.

1 mark

- c. What is the probability that Jessica goes for a run on Sunday?

2 marks

- d. Given that Jessica went for a run, what is the probability that Sunday was wet?

2 marks

Question 2

A panel of 6 is to be selected from a group of 5 girls and 8 boys.

a. How many panels can be formed if there are no restrictions?

1 mark

b. How many panels can be formed if there are at least 4 girls on the panel?

2 marks

c. What is the probability that the oldest person being on the panel?

1 mark