N5

National Qualifications

2025

Applications of Mathematics

Paper 2

Friday, 16 May

Instructions to Candidates

Candidates should enter their surname, forename(s), date of birth, Scottish candidate number and the name and level of the subject at the top of their first answer sheet.

Total marks – 55

Attempt ALL questions.

You may use a calculator.

To earn full marks you must show your working in your answers.

State the units for your answer where appropriate.

You must clearly identify the question number you are attempting on your answer sheet.

Questions marked with an asterisk differ in some respects from those in the printed paper.

Marks are shown in square brackets at the end of each question or part question.

An ow in the margin indicates a new question.

Tactile diagrams are produced in a separately bound booklet.

[Braille page 2] A separate formula sheet is provided.

[Braille page 3] Total marks — 55

Attempt ALL questions

ow 1. A Body Mass Index (BMI) is calculated using mass in KILOGRAMS and height in METRES.

It is calculated using the formula:

$$BMI = mass/height^2$$

A patient's mass is 93.5 KILOGRAMS and their height is 182 CENTIMETRES.

Calculate the BMI of the patient. [2 marks]

ow 2. Ayesha earns an annual salary of £46,900.

Following a pay deal, it is agreed that her annual salary will increase by 1.7% in each of the following 3 years.

Calculate Ayesha's annual salary after 3 years.

Give your answer rounded to 3 significant figures. [4 marks]

[Braille page 4] ow 3. Refer to the diagram for Question 3. Alastair works in a factory that makes chocolate.

He carried out a survey to determine the preferred type of chocolate.

The results are shown in the pie chart.

240 people were surveyed.

Determine the number of people who chose milk as their favourite type of chocolate. [3 marks]

ow 4. Allana earns £800 gross pay per week.

National Insurance is calculated on a person's pay before deductions such as pension contributions.

[In the table below for National Insurance rates per week, earnings' band is followed by: Percentage rate.]

Up to £242: 0.

From £242 to £967: 8.

Over £967: 2.

(a) Calculate Allana's weekly National Insurance payment. [2 marks]

Allana pays 7.5% of her gross pay into her pension.

Allana's weekly income tax is £92.06.

[Braille page 5] (b) Calculate Allana's weekly net pay. [2 marks]

ow 5. Refer to the diagram for Question 5(a). A sports company sells squash balls.

The balls are in the shape of a sphere with a diameter of 4 cm.

They are sold in cardboard boxes in the shape of a cuboid with dimensions length 8.6cm, width 4.2cm and depth 4.2cm.

Each box contains 2 squash balls.

The diagram shows a 2D representation of the cuboid with 2 squash balls inside.

(a) Calculate the volume of empty space in the box. [4 marks]

Refer to the diagrams for Question 5(b). The boxes are packed into crates for transportation. The boxes must be aligned in the same direction with the arrows on the boxes pointing upwards.

Each box has length 8.6cm, width 4.2cm and height 4.2cm.

The crate has internal dimensions as follows: length 100cm, width 75cm and height 40cm.

The internal dimensions of a crate are shown.

[Braille page 6] Diagram 1 shows the front and side view of a box.

Diagram 2 shows the front and side view of the internal section of the crate.

(b) Calculate the maximum number of boxes that can be packed into a crate. [3 marks]

The company looked at the length of squash matches.

A sample of times, in minutes, for PROFESSIONAL matches are shown.

52 68 45 52 58

For these times, calculate:

(c) (i) the mean [1 mark]

(ii) the standard deviation. [3 marks]

The mean length of time for an AMATEUR match is 42 minutes and standard deviation is 17.2 minutes.

(d) Make two valid comments comparing the length of professional matches with amateur matches. [2 marks]

ow 6. Refer to the diagram for Question 6. A badge has been designed in the shape of a right-angled triangle and a semi-circle.

The outside edge of the badge will be made of silver.

Calculate the length of silver needed for the outside edge of the badge. [4 **[Braille page 7]** marks]

ow 7. James travelled from Southampton to New York by ship.

It took 180 hours to sail from Southampton to New York.

The local time in New York is 5 hours behind the local time in Southampton.

The ship arrives in New York at 04:00 on 18 November.

(a) Calculate the date and local time that the ship left Southampton. [3 marks]

James spent time in New York then travelled to Toronto, Canada.

[In the table below showing the Rate of Exchange, Pounds sterling (£) is followed by: US dollars.]

1: 1.28.

• James changed £1500 into US dollars.

• He spent an average of 130 US dollars each day for 7 days.

• He changed his remaining US dollars into Canadian dollars.

• He received 1363.50 Canadian dollars.

(b) Calculate the rate of exchange for US dollars into **[Braille page 8]** Canadian dollars. [3 marks]

ow * 8. Refer to diagram for Question 8. The start of an orienteering course is being planned.

Competitors leave the start point and run for 500 metres to checkpoint A.

From checkpoint A they then run for 350 metres to checkpoint B.

A scale drawing was constructed using a scale of 1 cm = 50 m.

Determine the length of the line on the scale drawing from:

the start point to checkpoint A and

checkpoint A to check point B [1 mark]

The route from checkpoint B, to checkpoint C and then onto to checkpoint D are shown in the diagram.

Determine the bearing of:

Checkpoint C from checkpoint B and

Checkpoint D from checkpoint C [2 marks]

[Braille page 9] ow 9. McKay Marketplace is a grocery shop.

All tills in the shop have a weighing scale.

An object weighing 800 grams is placed on the scale.

Regulations say the scale should display a reading of 800 grams±0.05%.

The scale displayed a reading of 800.6 grams.

(a) Determine if the reading met the regulations. [2 marks]

The shop sells lemonade.

There are two options.

• Option A — 24 pack of 250 ml cans of lemonade cost £7.50.

• Option B — 10 pack of 330 ml cans of lemonade cost £3.89.

(b) Determine which option offers the best value for money. [2 marks]

At Christmas the shop puts up decorations.

Last Christmas it took 6 workers 5 hours to decorate the shop.

This Christmas there are 8 workers available to complete the same task.

All workers decorate at the same rate.

(c) Calculate how long it will take to decorate the store.

[Braille page 10] Give your answer in hours and minutes. [2 marks]

Freya works for McKay Marketplace.

She is contracted to work 35 hours each week.

Her basic hourly rate of pay is £10.60.

She is paid DOUBLE TIME for any overtime she works.

Last week she worked 39.5 hours.

(d) Calculate her gross pay for last week. [2 marks]

ow 10. Andy runs 3.4 miles in a time of 33 minutes.

(a) Calculate Andy's average speed.

Give your answer in KILOMETRES PER HOUR. [3 marks]

1 mile = 1.609 km

Refer to the diagram for Question 10(b). To improve his fitness Andy wants to complete hill sprints.

The hill closest to his house has the following measurements:

• The horizontal distance between the top and the bottom of the hill is 250 metres.

• The bottom of the hill is 48 metres above sea level.

• The top of the hill is 71 metres **[Braille page 11]** above sea level.

His training programme states that the hill must have a gradient greater than 0.1.

(b) Determine if the gradient of this hill meets this requirement. [3 marks]

Before starting the training programme Andy could run 5.6 miles in an hour.

After completing the training programme he could run 7.2 miles in an hour.

(c) Calculate the percentage increase in the distance that Andy can run in an hour after completing the training programme. [2 marks]

[END OF QUESTION PAPER]