N5

National Qualifications

2023

Mathematics

Paper 1 (Non-calculator)

Wednesday, 3 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 – 40

Attempt ALL Questions

You must NOT use a calculator.

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

State the units for your answer where appropriate.

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

Write your answers clearly on your answer sheet.

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

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

[Braille page 2]

An ow in the margin indicates a new question.

A separate formula sheet is provided.

[Braille page 3] Total marks — 40

Attempt ALL questions

ow 1. Evaluate

$$2\frac{1}{6} \div \frac{8}{9}.$$

Give your answer in its simplest form. [2 marks]

ow 2. Expand and simplify

$$(x+7)^2 + 6(x^2-10). \text{ [3 marks]}$$

ow 3. Solve, algebraically, the system of equations [3 marks]

$$2x + 3y = 8$$

$$5x + 2y = -2.$$

ow * 4. Refer to the diagram for Question 4. The graph shows part of a parabola of the form $y = (x+a)^2 + b$.

(a) (i) State the value of a. [1 mark]

(ii) State the value of b. [1 mark]

(b) P is the point $(0, c)$.

Find the value of c. [1 mark]

ow 5. Determine the nature of the roots of the function

$$f(x) = 4x^2 + 6x - 1. \text{ [2 marks]}$$

[Braille page 4]

ow * 6. Refer to the diagram for Question 6. In triangle ABC:

• AC = 5 metres

• BC = 6 metres

• cos C = $\frac{1}{5}$.

Calculate the length of AB. [3 marks]

ow * 7. Refer to the diagram for Question 7. A business recorded the salaries of a sample of its employees and the length of time they have worked for the business.

The scattergraph shows the relationship between their salary, P pounds, and the length of time, T years, they have worked.

A line of the best fit has been drawn.

(a) Find the equation of the line of best fit in terms of P and T.

Give the equation in its simplest form. [3 marks]

(b) Use your equation from part (a) to estimate the salary of an employee who has worked for the business for 8 years. [1 mark]

ow 8. Express $\dfrac{12}{\sqrt{15}}$ with a rational denominator.

Give your answer in its simplest form. [2 marks]

[Braille page 5]

ow 9. A magazine company conducted a survey of the ages of its readers.

A sample of ten readers' ages, in years, are shown below.

33 55 38 47 36 41 42 41 35 31

(a) Calculate the median and interquartile range of the ages of readers for this sample. [3 marks]

A newspaper company also conducted a survey of the ages of its readers.

The median age of a sample of its readers was 41 years and the interquartile range was 9 years.

(b) Make two valid comments comparing the ages of the readers of the magazine and the ages of the readers of the newspaper. [2 marks]

ow* 10. Refer to the diagram for Question 10. Alan buys some identical paving slabs to make a path.

Each slab is part of a circle.

The diagram shows a single slab.

The circle, centre C, has a radius of 50 centimetres.

Length AB is 60 centimetres.

Calculate the width of the paving slab. [4 marks]

[Braille page 6]

ow 11. Given that sin30° = 0.5, state the value of sin330°. [1 mark]

ow 12. Simplify

$$\frac{5c - 2}{c^3 \times c^4}.$$

Give your answer with a positive power. [3 marks]

ow *13. Refer to the diagram for Question 13. Part of the graph of

$y = \cos (x + a)° + b$ is shown.

(a) State the value of a. [1 mark]

(b) State the value of b. [1 mark]

ow 14. Solve, algebraically, the inequation

$$\frac{x+1}{3} - 2 > \frac{3x}{5}.$$ [3 marks]

[END OF QUESTION PAPER]