

N5

National Qualifications

2022

Mathematics

Paper 2

Wednesday, 4 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 - 50

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.

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.

An owl in the margin indicates a new question.

A separate formula sheet is provided.

[Braille page 2] Total marks – 50

Attempt ALL questions

ow 1. Expand and simplify

$$(3x-2)(2x^2 + 5x -1). [3 marks]$$

ow 2. A company's annual profit at the end of 2021 was £215,000.

The profit is expected to increase by 3% each year.

Calculate the company's expected annual profit by the end of 2025.

Give your answer correct to the nearest thousand pounds. [3 marks]

ow*3. Refer to the diagram for Question 3. A concrete gatepost is made in the shape of a cuboid with a sphere on top.

The sphere has diameter 0.4 metres.

The cuboid has a square base of length 0.48 metres.

The total height of the gatepost is 2.4 metres.

Calculate the volume of concrete needed to make a gatepost. [3 marks]

ow 4. Moira buys 4 mangoes and 3 apples at a fruit shop. The total cost is £4.25.

ow 4. (a) Write down an equation to illustrate this information. [1 mark]

Sami buys 5 mangoes and 2 apples in the same fruit shop.

The total cost is £4.70.

ow 4. (b) Write down an equation to illustrate this information. [1 mark]

ow 4. (c) Calculate, algebraically, the cost of a mango and the cost of an apple. [4 marks]

ow 5. A school netball team recorded the number of sit-ups each player completed in a minute.

The numbers for the seven players were:

29 27 24 31 22 19 30

ow 5.(a) Calculate the mean and standard deviation of the numbers of sit-ups. [4 marks]

Some players in the school's hockey team also recorded the number of sit-ups they completed in a minute.

Their numbers gave a mean of 29 and a standard deviation of 3.2.

ow 5.(b) Make two valid comments comparing the numbers of sit-ups of the players in the netball team and the hockey team. [2 marks]

ow *6. Refer to the diagram for Question 6. The diagram shows triangle FGH.

- $FG = 25$ centimetres
- $FH = 32$ centimetres
- Angle $GFH = 58^\circ$

Calculate the area of triangle FGH. [2 marks]

ow 7. Solve the equation $4x^2 + 2x - 7 = 0$.

Give your answers correct to 2 significant figures. [4 marks]

ow *8. Refer to the Diagram 1 and Diagram 2 for Question 8. A train tunnel has a circular cross-section with a horizontal floor, shown in Diagram 1.

Diagram 2 shows a cross-section.

- The centre of the circle is O.
- [Braille page 3] Chord is 4 metres.
- The radius OA is 2.9 metres.

Calculate the height of the tunnel. [4 marks]

ow 9. Solve the equation $3\sin x^\circ + 4 = 6$, for $0 \leq x \leq 360$. [3 marks]

ow *10. Refer to the diagram for Question 10. An attraction at a theme park has a carriage attached to an arm.

The arm swings from A to B along the arc of a circle, centre C, as shown in the diagram.

- The length of the arm, CB, is 15 metres.
- The length of the major arc, AB, is 69.4 metres.

Calculate the size of the reflex angle ACB. [3 marks]

ow *11. Refer to Diagram 1 and Diagram 2 for Question 11. The diagram shows a cuboid, ABCDEFGH.

Diagram 1 shows the base of the cuboid ABCDEFGH. The corners of the base are at points EFGH, the top of the cuboid (not shown) has corners at points ABCD; point A is above point E; B is above F; C is above G and D is above H.

Diagram 2 shows the triangle CEG where C is the corner of the top surface of the cuboid directly above G

- The length of the cuboid, EH, is 24 centimetres.
- The breadth of the cuboid, HG, is 6 centimetres.
- The height of the cuboid, CG, is 8 centimetres.

Calculate the length of EC, the space diagonal of the cuboid. [3 marks]

ow 12. Simplify

$$(2ab + 6a)/b^2 - 9. [3 marks]$$

ow 13. Simplify

$$\sin x^\circ + 2\cos x^\circ \cos x^\circ. [2 marks]$$

ow *14. Refer to the diagram for Question 14. The width of a river is represented by BC in the diagram.

AB represents a tree on the river bank.

- From C, the angle of elevation to A is 28° .
- From D, the angle of elevation to A is 12° .
- The distance from C to D is 15 metres.
- BCD is a straight line.

Calculate BC, the width of the river. [5 marks]