

AQA style

GCSE (9-1) Mathematics

Paper 1 (Non-Calculator) Higher Tier – Practice Paper 1

8300/1H · Higher Tier · Practice paper

Time allowed: 1 hour 30 minutes

Candidate name	
Centre number	
Candidate number	

Materials

- Mathematical instruments
- A formulae sheet (provided)
- You must not use a calculator.
- You must not use a calculator.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

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Answer all questions

Answer all questions in the spaces provided. Time allowed: 1 hour 30 minutes.

01 Circle the value of 5^0

[1 mark]

A	0	
B	1	
C	5	
D	$\frac{1}{5}$	

02 Circle the expression that is equal to $(x^3)^4$

[1 mark]

A	x^7	
B	$4x^3$	
C	x^{12}	
D	x^{81}	

03 Circle the gradient of the line $2y = 6x + 5$

[1 mark]

A	6	
B	3	
C	5	
D	2.5	

04 Which number is equal to 3.06×10^5 ?

Circle your answer.

[1 mark]

A	30 600	
B	306 000	
C	3 060 000	
D	0.000 030 6	

05 Work out $4\frac{1}{5} \div 1\frac{3}{4}$

Give your answer as a mixed number.

[2 marks]

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06

06.1 Write 4.7×10^{-3} as an ordinary number.

[1 mark]

06.2 Work out $(9 \times 10^7) \div (3 \times 10^{-2})$

Give your answer in standard form.

[2 marks]

[Total: 3 marks]

07 Green paint is made by mixing blue paint and yellow paint in the ratio 3 : 5

Ruby has 240 ml of blue paint and 350 ml of yellow paint.

What is the greatest amount of green paint she can make?

[3 marks]

08 A regular pentagon, a square and a regular polygon P meet at a point.

There are no gaps or overlaps between the three shapes.

Work out the number of sides of polygon P.

[4 marks]

09 A spinner can land on red, blue, green or yellow.

The probability it lands on red is 0.2

The probability it lands on blue is 0.35

It is twice as likely to land on yellow as on green.

The spinner is spun 120 times.

Work out an estimate for the number of times it lands on yellow.

[3 marks]

10 Solve $(3x - 1)/4 = (x + 5)/2$

[3 marks]

11 Show that $(2x - 3)(x + 4) - 2(x^2 - 1) \equiv 5(x - 2)$

[3 marks]

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12 Jo invests £2000 for 2 years at 5% per year compound interest.
Kai invests £2000 for 2 years at 5.5% per year simple interest.

Who has more money at the end of the 2 years, and by how much?
You must show your working.

[4 marks]

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13 At a café, 4 coffees and 3 teas cost £13.30
2 coffees and 5 teas cost £11.90

Work out the cost of one coffee and the cost of one tea.

[4 marks]

14

14.1 The side length, s cm, of a square is 7.6 cm, correct to 1 decimal place.

Write down the error interval for s .

[2 marks]

14.2 Work out the upper bound for the perimeter of the square.

[1 mark]

[Total: 3 marks]

15 The table gives information about the marks scored in a test by students in Class A and Class B.

	Lower quartile	Median	Upper quartile
Class A	24	31	38
Class B	27	35	40

15.1 Work out the interquartile range of the marks for Class A.

[1 mark]

15.2 Compare the distributions of the marks for the two classes.

[2 marks]

[Total: 3 marks]

16 Solve $3x^2 + 10x - 8 = 0$

[3 marks]

17 y is directly proportional to $\sqrt{x}$

When $x = 16$, $y = 12$

Work out the value of y when $x = 49$

[3 marks]

18 $f(x) = 3x - 4$

$g(x) = x^2 + 1$

18.1 Work out $gf(3)$

[1 mark]

18.2 Solve $ff(x) = 23$

[2 marks]

[Total: 3 marks]

19 A solid metal sphere has radius 6 cm.

The sphere is melted down and all the metal is made into a solid cylinder of radius 4 cm.

Work out the height of the cylinder.

[Volume of sphere = $(4/3)\pi r^3$]

[3 marks]

20 A, B and C are points on a circle, centre O.

C is on the major arc AB.

Angle AOB = $(5x - 10)^\circ$

Angle ACB = $(2x + 10)^\circ$

Work out the size of angle ACB.

Give a reason for your answer.

[4 marks]

21 n is a positive integer.

Prove that $(n + 5)^2 - (n + 1)^2$ is always a multiple of 8

[3 marks]

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22 Show that $\sin 60^\circ \times \tan 30^\circ + \cos 60^\circ = 1$

[3 marks]

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23 Solve $x^2 - x - 12 > 0$

[3 marks]

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24 Prove algebraically that $0.13636\ldots$ (0.136 with the digits 36 recurring) $= \frac{3}{22}$

[3 marks]

25 Show that $\frac{3}{x+2} - \frac{2}{x-1}$ can be written as $\frac{(x-7)}{(x+2)(x-1)}$ **[3 marks]**

26 Expand and simplify $(\sqrt{5} + 3)^2$
Give your answer in the form $a + b\sqrt{5}$, where a and b are integers. **[2 marks]**

27 OAB is a triangle.
OA = $\mathbf{a}$ and OB = $\mathbf{b}$ (vectors)
P is the point on AB such that AP : PB = 1 : 3
27.1 Work out the vector OP in terms of $\mathbf{a}$ and $\mathbf{b}$.
Give your answer in its simplest form. **[2 marks]**

27.2 The point Q is such that $\mathbf{OQ} = 3\mathbf{a} + \mathbf{b}$
Prove that O, P and Q lie on a straight line. **[2 marks]**

28 There are 60 students in Year 11.

35 study French.

28 study Spanish.

9 study neither French nor Spanish.

28.1 Work out the number of students who study both French and Spanish. **[2 marks]**

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28.2 A student who studies Spanish is chosen at random.

Work out the probability that this student also studies French. **[2 marks]**

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END OF QUESTIONS