AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____
I declare this is my own work.

GCSE
MATHEMATICS

H

Higher Tier Paper 2 Calculator

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments
- the Formulae Sheet (enclosed).

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.

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.

Advice

In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24	
TOTAL	

Do not write outside the box

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

1 Circle the fraction that is equal to 1.25%

[1 mark]

$\frac{1}{8}$ $\frac{1}{25}$ $\frac{1}{80}$ $\frac{1}{125}$

2 Circle the expression that means the probability of A and **not** B.

[1 mark]

P(A' U B) P(A U B') P(A' ∩ B) P(A ∩ B')

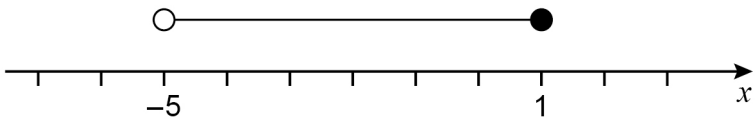
3 Circle the triangular number.

[1 mark]

9 12 15 18

Do not write outside the box

4 Circle the inequality represented by the diagram.



[1 mark]

$-5 < x < 1$ $\quad$ $-5 < x \leqslant 1$ $\quad$ $-5 \leqslant x < 1$ $\quad$ $5 \leqslant x \leqslant 1$

5 Solve $5(2x - 1) = 6x + 9$

[3 marks]

$x =$ _____

7

Turn over ►

Do not write outside the box

6 Show that 2125 can be written as

a cube number **multiplied** by a prime number between 10 and 20

[2 marks]

7 Sam types a constant number of words per minute.

He takes 8 minutes to type a report of 416 words.

How long does it take him to type an essay of 1534 words?

Give your answer in minutes and seconds.

[3 marks]

Answer _____ minutes _____ seconds

Do not write outside the box

8 A school play takes place each day from Monday to Friday.

Here are the attendances on four of the days.

Monday	Tuesday	Wednesday	Thursday
72	83	88	97

For all **five** days, the mean attendance is 90

Work out the attendance on Friday.

[3 marks]

Answer _____

Turn over for the next question

8

Do not write outside the box

9 Rosie makes phone calls to try to sell broadband.

Today, she made 120 calls.

The table shows the results.

Result of call	Frequency
Not answered	33
Answered but sale not made	81
Answered and sale made	6

9 (a) Write down the relative frequency that a call was **not answered**.

[1 mark]

Answer _____

9 (b) During the **rest of the week**, Rosie will make 500 calls.

Using the results in the table, how many sales does she expect to make during the **rest of the week**?

[2 marks]

_____

_____

_____

_____

Answer _____

Do not write outside the box

10 Harry and Ellie each bought a printer and a hard drive.

Here is some information about how much they paid.

	Printer	**Hard drive**
Harry	£80	£25
Ellie	10% less than Harry	20% more than Harry

Ellie says,

"In total, I paid more than Harry because 20% is greater than 10%"

Is she correct?

Tick a box.

Yes ☐ No ☐

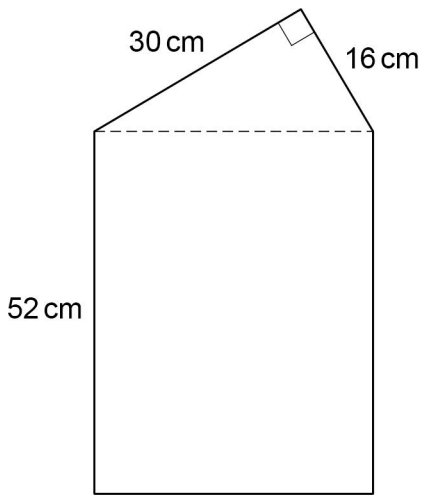
Show calculations to support your answer.

[2 marks]

5

Do not write outside the box

11 A shape is made by joining a right-angled triangle to a rectangle.



Not drawn accurately

Work out the area of the shape.

[5 marks]

Answer _____ cm^2

Do not write outside the box

12 $4y = 5x$

Which statement is correct?

Tick **one** box.

[1 mark]

☐ y is 80% of x

☐ y is 125% of x

☐ x is 20% of y

☐ x is 400% of y

Turn over for the next question

6

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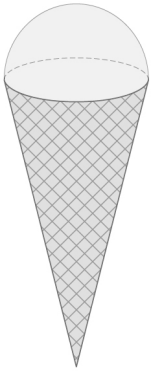
13 Outside a cafe there is a large plastic ice cream cornet.

The cornet is a hemisphere on top of a cone.



The cone and the hemisphere each have radius 24 cm

The cone has perpendicular height 117 cm

Volume of a cone $= \frac{1}{3}\pi r^2 h$ r is the radius h is the perpendicular height	Volume of a hemisphere $= \frac{2}{3}\pi r^3$ r is the radius

13 (a) Work out the total volume of the cornet.

[4 marks]

Answer _____ cm^3

Do not write outside the box

13 (b) The actual cornets that the cafe sells are **similar** to the plastic one.

For the actual cornets, the cone and the hemisphere each have radius 2 cm

How many times greater is the volume of the plastic cornet than an actual cornet?

[3 marks]

Answer _____

Turn over for the next question

7

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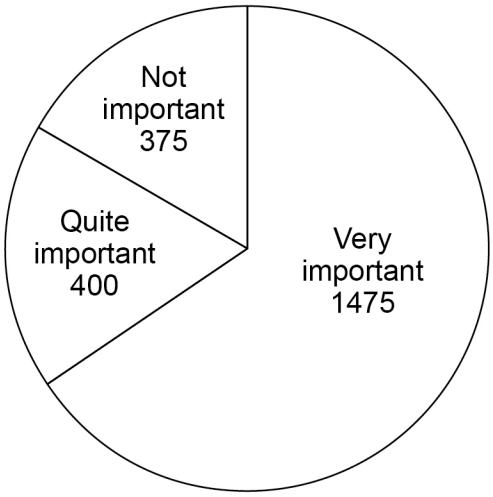
14 A survey was held in a football stadium.

A sample of the crowd was asked about the importance of a family area.

The pie chart represents the answers.



14 (a) The total number of people in the crowd was 29 250

Estimate how many people in the crowd think that a family area is **very important**.

Assume that the sample is representative of the crowd.

[3 marks]

Answer _____

Do not write outside the box

14 (b) In fact,

50% of the **sample** were sitting in the family area

10% of the **crowd** were sitting in the family area.

What is this likely to mean about the actual number of people in the crowd who think that a family area is very important?

Tick **one** box.

[1 mark]

☐ It is larger than the answer to part (a)

☐ It is the same as the answer to part (a)

☐ It is lower than the answer to part (a)

15 In the grid, the **product** of each row, column and diagonal is 1

	$\frac{1}{4}$	
	4	$\frac{1}{8}$

Complete the grid.

[2 marks]

6

Turn over ►

Do not write outside the box

16 Amol owns a sandwich shop.

The shop is open from Monday to Saturday.

In June, Amol sold 3000 sandwiches.

16 (a) Amol wants to work out the mean number of sandwiches he sold per day in June.

His method is $3000 \div 30 = 100$

Make **one** criticism of Amol's method.

[1 mark]

16 (b) Amol received £6660 from selling the 3000 sandwiches in June.

The numbers of sandwiches sold were in the ratio

meat : cheese : vegan = 9 : 4 : 7

The price of a meat sandwich is £2.39

The price of a cheese sandwich is £1.89

Work out the price of a vegan sandwich.

[4 marks]

Answer £ _____

Do not write outside the box

17 Here is the plan of a solid.

Circle the solid that it could be.

[1 mark]

sphere cone hemisphere cylinder

18 Solve $x^2 + 7x - 11 = 0$

Give your solutions as decimals.

[2 marks]

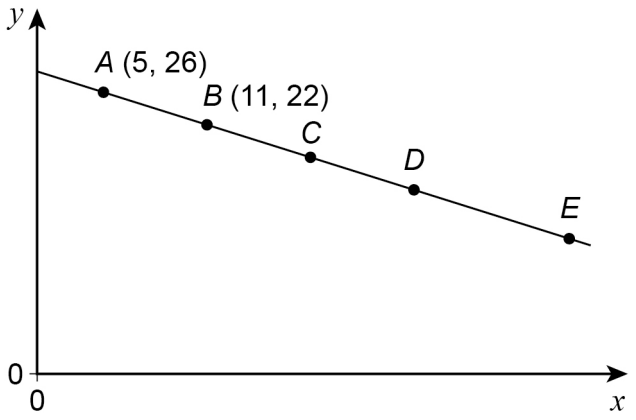
Answer _____

8

Turn over ►

Do not write outside the box

19 *A*, *B*, *C*, *D* and *E* are points on a straight line.



Not drawn accurately

A, *B*, *C* and *D* are equally spaced.

AD : *DE* = 2 : 1

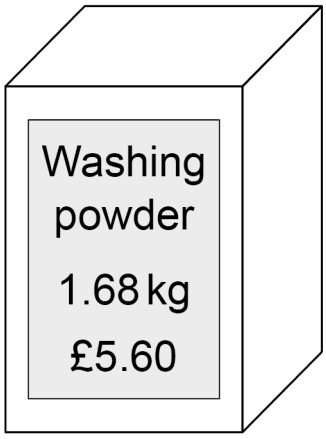
Work out the coordinates of *E*.

[3 marks]

Answer (_____ , _____)

Do not write outside the box

20 A company makes and sells boxes of washing powder.



The company wants to increase the amount of money it receives **per kg** of powder.

To get the required increase it can

increase the price to £5.88

or

reduce the mass of powder in the box by x%

Work out the value of x to 2 decimal places.

[4 marks]

$x =$ _____

7

Turn over ►

Do not write outside the box

21 Which of these is the equation of a circle?

Circle your answer.

[1 mark]

$x^2 - y^2 = 6$ $\quad$ $x^2 + y^2 = 6$ $\quad$ $y = x^2 - 6$ $\quad$ $y = x^2 + 6$

22 Circle the reciprocal of 8^5

[1 mark]

8^{-5} $\quad$ 5^{-8} $\quad$ -8^5 $\quad$ 5^8

23 Factorise $3x^2 - 16x - 12$

[2 marks]

Answer _____

Do not write outside the box

24 A straight line

is perpendicular to the straight line through (2, 8) and (6, 15)

and

passes through (0, 9) and (x, 17)

Work out the value of x.

[4 marks]

$x =$ _____

8

Turn over ►

Do not write outside the box

25 $f(x) = 2x + 5$

Show that $3f(x) - 12f^{-1}(x)$ simplifies to an integer.

[4 marks]

Do not write outside the box

26 Two objects, J and K, are applying pressure to areas of ground.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

For J, the force is 18.9 newtons and the area is $0.45\,\text{m}^2$

pressure for J : pressure for K = 7 : 8

area for J : area for K = 9 : 5

Work out the force for K.

[4 marks]

Answer _____ newtons

8

Turn over ►

Do not write outside the box

27 To be rented, a bedroom must have a floor area of at least 6.51 m^2

A bedroom has a rectangular floor.

The floor measures 2.4 m by 2.9 m, each correct to 2 significant figures.

Show that the bedroom can be rented.

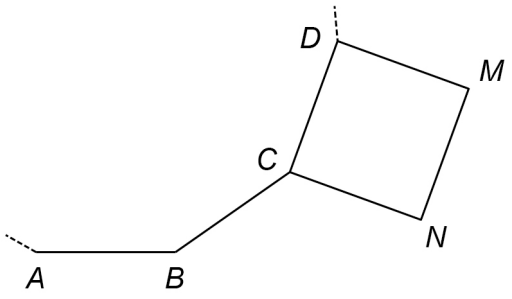
[3 marks]

Do not write outside the box

28 *AB*, *BC* and *CD* are sides of a regular 12-sided polygon.

CDMN is a square.

Not drawn accurately



Prove that points *A*, *B* and *N* lie on a straight line.

[4 marks]

7

Turn over ►

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29 The equation of a curve is $y = x^2 - 18x + 70$

By completing the square, work out the coordinates of the turning point.

You **must** show your working.

[3 marks]

Answer (_____ , _____)

END OF QUESTIONS

3

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ANSWER IN THE SPACES PROVIDED

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Question number	**Additional page, if required.** **Write the question numbers in the left-hand margin.**

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