AQA

Surname

Other Names

Centre Number

Candidate Number

Candidate Signature

I declare this is my own work.

GCSE

MATHEMATICS

H

Higher Tier   **Paper 2 Calculator**

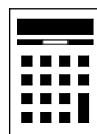# 8300/2H

Time allowed: 1 hour 30 minutes

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

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.**

- **Answer ALL questions.**

- **You must answer the questions in the spaces provided. Do not write 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.

DO NOT TURN OVER UNTIL TOLD TO DO SO

Answer ALL questions in the spaces provided.

1   **Circle the fraction that is equal to 1.25%**
     [1 mark]

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

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

4 **Circle the inequality represented by the diagram.**
[1 mark]

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

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

[Turn over]

5   **Solve** $5(2x - 1) = 6x + 9$ **[3 marks]**

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$x =$ _____

6 **Show that 2125 can be written as**

a cube number MULTIPLIED by a prime number between 10 and 20 [2 marks]

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[Turn over]

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]

_____

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Answer _____ minutes _____ seconds

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 _____

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

[Turn over]

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.

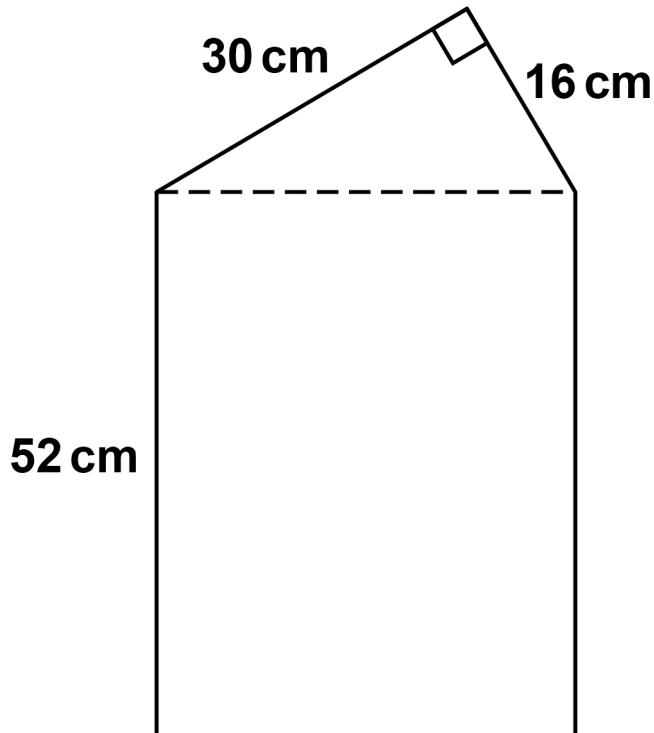**Yes** ☐   **No** ☐

Show calculations to support your answer.
[2 marks]

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[Turn over]

5

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

The diagram is not drawn accurately.

30 cm

16 cm

52 cm

Work out the area of the shape. [5 marks]

_____

_____

_____

_____

_____

_____

1 4

Answer _____ cm^2

[Turn over]

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

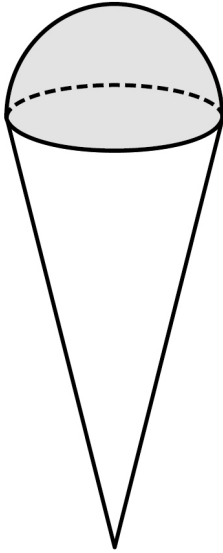☐ x **is 400% of** y

$$\boxed{\frac{}{6}}$$

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[Turn over]

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 = $\dfrac{1}{3}\pi r^2 h$

r is the radius

h is the perpendicular height

Volume of a hemisphere = $\dfrac{2}{3}\pi r^3$

r is the radius

13(a) **Work out the total volume of the cornet.**
[4 marks]

_____

_____

_____

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Answer _____ **cm^3**

[Turn over]

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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

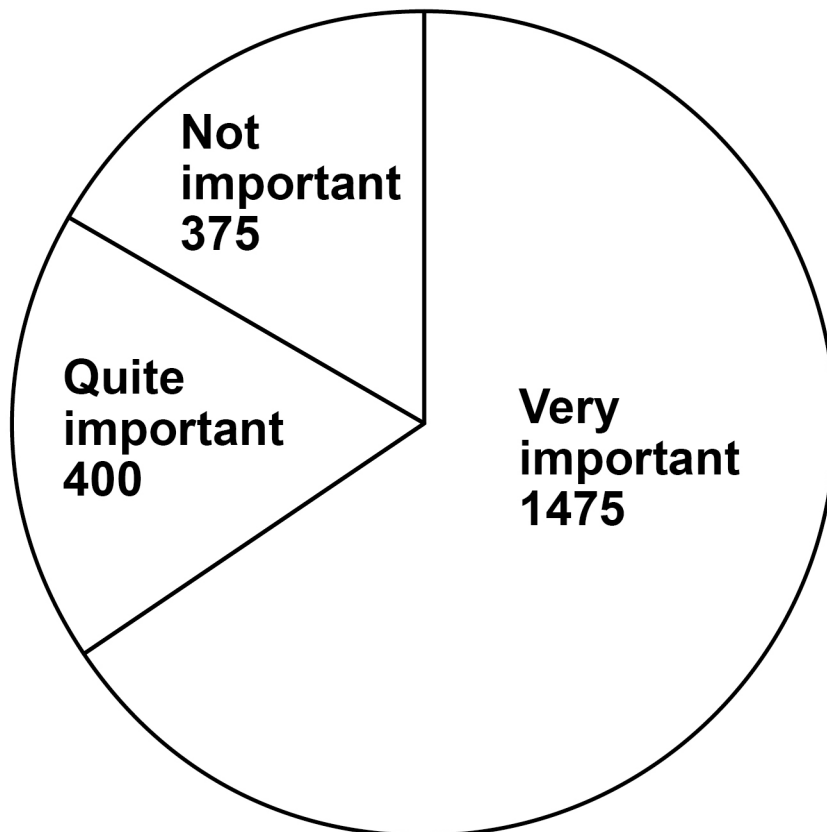How many times greater is the volume of the plastic cornet than an actual cornet? [3 marks]

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Answer _____

[Turn over]

7

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]

_____

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Answer _____

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)**

[Turn over]

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

	$\dfrac{1}{4}$	
	4	$\dfrac{1}{8}$

Complete the grid. [2 marks]

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[Turn over]

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 ÷ 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 £

17   Here is the plan of a solid.

[ ]

Circle the solid that it could be. [1 mark]

sphere   cone

hemisphere   cylinder

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

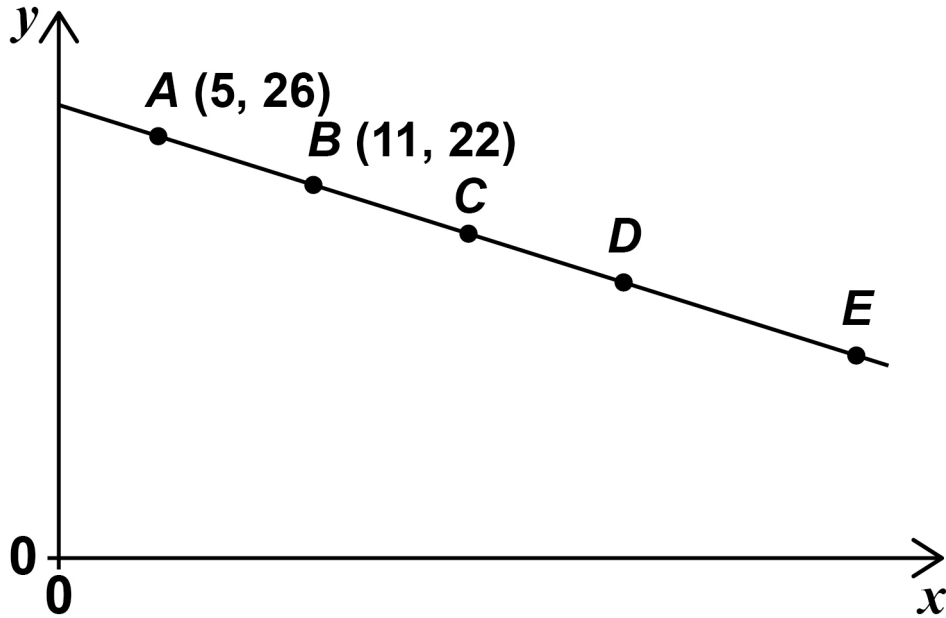Give your solutions as decimals. [2 marks]

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Answer

[Turn over]

8

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

The diagram is not drawn accurately.

A, *B*, *C* and *D* are equally spaced.
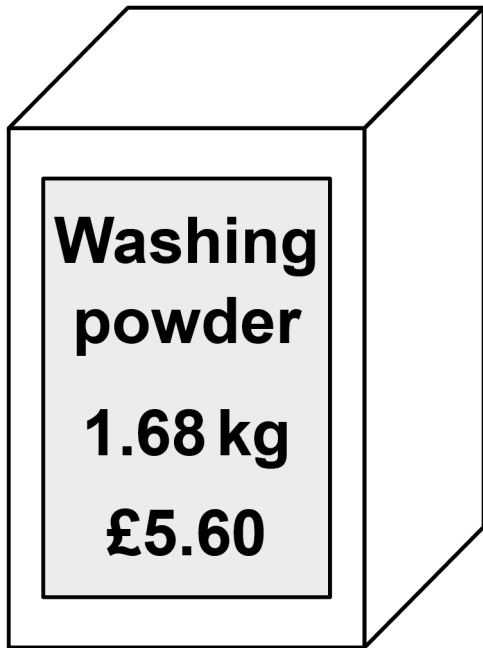
AD : *DE* = 2 : 1

Work out the coordinates of *E*. [3 marks]

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Answer (_____ , _____)

[Turn over]

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

21   **Which of these is the equation of a circle?**

Circle your answer. [1 mark]

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

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

22   **Circle the reciprocal of 8^5 [1 mark]**

8^{-5} 5^{-8} -8^5 5^8

23 **Factorise** $3x^2 - 16x - 12$ **[2 marks]**

Answer _____

[Turn over]

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]

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$x =$ _____

8

25   f(x) = 2x + 5

Show that   3f(x) – 12f^{-1}(x)   simplifies to an integer.   [4 marks]

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

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

For J, the force is 18.9 newtons and the area is 0.45 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]

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Answer _____ newtons

8

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]

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[Turn over]

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

CDMN is a square.

The diagram is not drawn accurately.
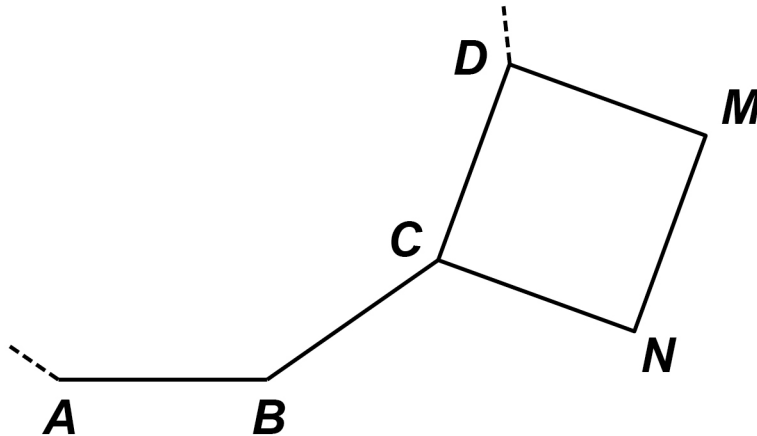
Prove that points *A*, *B* and *N* lie on a straight line. [4 marks]

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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]**

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Answer (_____ , _____)

END OF QUESTIONS

3

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

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