Paper Reference 4MA1/2H
Pearson Edexcel
International GCSE

Mathematics A
Level 1/2
Unit 2H
(Calculator)

Tuesday 15 January 2019 – Morning

Time: 2 hours plus your additional time allowance.

In the boxes below, write your name, centre number and candidate number.

Surname	
Other names	
Centre Number	
Candidate Number	

Y59019A

YOU MUST HAVE

Ruler, protractor, compasses, writing and drawing equipment, calculator. Tracing paper may be used.

YOU WILL BE GIVEN

Diagram Book
Formulae Pages
Models for Questions 16 and 22

Turn over

INSTRUCTIONS

Answer ALL questions.

Without sufficient working, correct answers may be awarded no marks.

Answer the questions in the spaces provided in this Question Paper or on the separate diagrams – there may be more space than you need.

CALCULATORS MAY BE USED.

You must NOT write anything on the Formulae Pages. Anything you write on the Formulae Pages will gain NO credit.

INFORMATION

The total mark for this paper is **100**

The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.

There may be spare copies of some diagrams.

ADVICE

Read each question carefully before you start to answer it.

Check your answers if you have time at the end.

Answer ALL TWENTY THREE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1.   A plane has a length of **73** metres.

A scale model is made of the plane.

The scale of the model is **1 : 200**

Work out the length of the scale model.

Give your answer in centimetres.

(3 marks)

Answer space continues on the next page.

1.   continued.

_____ **cm**

(Total for Question 1 is 3 marks)

2. **Here are the first five terms of an arithmetic sequence.**

7   11   15   19   23

Write down an expression, in terms of n, for the nth term of this sequence.

_____

(Total for Question 2 is 2 marks)

3. There are **90** counters in a bag.

Each counter in the bag is either red or blue so that

the number of red counters : the number of blue counters $= \mathbf{2 : 13}$

Li is going to put some more red counters in the bag so that

the probability of taking at random a red counter from the bag is $\dfrac{1}{3}$

Work out the number of red counters that Li is going to put in the bag.

(4 marks)

Answer space is on the next three pages.

3. **continued.**

3. **continued.**

3.   **continued.**

(Total for Question 3 is 4 marks)

4. **Look at the diagram for Question 4 in the Diagram Book.**

    It shows an incomplete Venn diagram.

$\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$A = \{\text{odd numbers}\}$

$A \cap B = \{1, 3\}$

$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 9, 11, 12\}$

Complete the Venn diagram to show this information.

(Total for Question 4 is 4 marks)

5.   Look at the diagram for Question 5 in the Diagram Book.

It is NOT accurately drawn.

Calvin has **12** identical rectangular tiles.

He arranges the tiles to fit exactly round the edge of a shaded rectangle, as shown in the diagram.

Work out the area of the shaded rectangle.

(5 marks)

Answer space continues on the next two pages.

5. **continued.**

5. **continued.**

_____ **cm^2**

(Total for Question 5 is 5 marks)

6. (a) Find the highest common factor (HCF) of **96** and **120**

(2 marks)

_____

(continued on the next page)

Turn over

6.   continued.

$$A = 2^3 \times 5 \times 7^2 \times 11$$

$$B = 2^4 \times 7 \times 11$$

$$C = 3 \times 5^2$$

(b)   Find the lowest common multiple (LCM) of **A**, **B** and **C**

(2 marks)

_____

(Total for Question 6 is 4 marks)

7. Jenny invests **$8500** for **3** years in a savings account.

She gets **2·3%** per year compound interest.

(a) How much money will Jenny have in her savings account at the end of **3** years?

Give your answer correct to the nearest dollar.

(3 marks)

Answer space continues on the next page.

7. **(a)** **continued.**

$_____

(continued on the next page)

Turn over

7.   continued.

Rami bought a house on **1**st January **2015**

In **2015**, the house increased in value by **15%**

In **2016**, the house decreased in value by **8%**

On **1**st January **2017**, the value of the house was **$687 700**

(b) What was the value of the house on **1**st January **2015**?

(3 marks)

Answer space is on the next two pages.

7. **(b)** **continued.**

7. **(b)** **continued.**

$\text{\$}\underline{\hspace{5cm}}$

(Total for Question 7 is 6 marks)

8. A block of wood has a mass of

3·5 kg

The wood has density **0·65 kg/m^3**

(a) Work out the volume of the block of wood.

Give your answer correct to

3 significant figures.

(3 marks)

Answer space continues on the next page.

8. **(a)** **continued.**

_____ m^3

(continued on the next page)

8.   continued.

(b) Change a speed of

630 kilometres per hour to a

speed in metres per second.

(3 marks)

Answer space continues on the

next page.

8. **(b)** **continued.**

_____ **m/s**

(Total for Question 8 is 6 marks)

9. Solve the simultaneous equations

$$4x + 5y = 4$$
$$2x - y = 9$$

Show clear algebraic working.

(3 marks)

Answer space continues on the next page.

9.   continued.

x = _____

y = _____

(Total for Question 9 is 3 marks)

10. **Look at the diagram for Question 10 in the Diagram Book.**

It shows the line L drawn on a grid.

Find an equation for L

_____

(Total for Question 10 is 3 marks)

11. Look at the table for Question 11 in the Diagram Book.

   Twenty students took a Science test and a Maths test.

   Both tests were marked out of **50**

   The table gives information about their results.

   (continued on the next page)

11. **continued.**

Use this information to compare the Science test results with the Maths test results.

Write down TWO comparisons.

1 _____

_____

_____

2 _____

_____

_____

(Total for Question 11 is 2 marks)

Turn over

12. (a) Simplify

$$n^0$$

(1 mark)

_____

(continued on the next page)

12. continued.

   (b) Simplify

$$(3x^2y^5)^3$$

(2 marks)

_____

(continued on the next page)

Turn over

12. continued.

(c) **Factorise fully**

$$2e^2 - 18$$

(2 marks)

_____

(continued on the next page)

Turn over

12. continued.

(d) Make **r** the subject of

$$m = \sqrt{\dfrac{6a+r}{5r}}$$

(4 marks)

Answer space continues on the next page.

12. (d) continued.

_____

(Total for Question 12 is 9 marks)

13. **Look at the table for Question 13 in the Diagram Book.**

The frequency table gives information about the numbers of mice in some nests.

The mean number of mice in a nest is 7

Work out the value of x

(4 marks)

Answer space continues on the next page.

13. continued.

X = _____

(Total for Question 13 is 4 marks)

Turn over

14. **Look at the diagram for Question 14 in the Diagram Book.**

It shows an incomplete probability tree diagram.

Marcus plays two games of tennis.

For each game, the probability that Marcus wins is $0 \cdot 35$

(a) **Complete the probability tree diagram.**

There are five spaces to fill.

(2 marks)

(continued on the next page)

Turn over

14. continued.

(b) Work out the probability that Marcus wins at least one of the two games of tennis.

(3 marks)

Answer space continues on the next page.

14. (b) continued.

_____

(Total for Question 14 is 5 marks)

15. Look at the diagram for Question 15 in the Diagram Book.

It is NOT accurately drawn.

It shows a trapezium **ABCD**

All measurements shown on the diagram are in centimetres.

$AB = (y + 5)$

$DC = (3y - 2)$

The perpendicular height $= (2y - 3)$

The area of the trapezium is $133 \, cm^2$

(continued on the next page)

15. continued.

(a) Show that $8y^2 - 6y - 275 = 0$

(3 marks)

Turn over

15. continued.

   (b) Find the value of y

   Show your working clearly.

   (3 marks)

   y = _____

(Total for Question 15 is 6 marks)

16. Look at the models or at the diagrams for Question 16 in the Diagram Book. They are NOT accurate.

The diagrams and models show two mathematically similar vases, **A** and **B**

Vase **A** has a volume of $405\,\text{cm}^3$

Vase **B** has a volume of $960\,\text{cm}^3$

Vase **B** has a surface area of $928\,\text{cm}^2$

Work out the surface area of Vase **A**

(3 marks)

Answer space continues on the next page.

16. continued.

_____ **cm^2**

(Total for Question 16 is 3 marks)

17. **f** is the function such that

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

(a) Work out $f(5)$

(1 mark)

_____

(continued on the next page)

17. continued.

g is the function such that

$$g(x) = \frac{1}{1-2x}$$

(b) Find the value of x that cannot be included in any domain of g

(1 mark)

_____

(continued on the next page)

17. continued.

(c) Work out $\mathbf{fg(-1\cdot 5)}$

(2 marks)

Answer space continues on the next page.

17. (c)   continued.

_____

(Total for Question 17 is 4 marks)

18. $P = \dfrac{a}{m - x}$

$x = 8$ correct to **1** significant figure

$a = 4 \cdot 6$ correct to **2** significant figures

$m = 20$ correct to the nearest **10**

Calculate the lower bound of P

Show your working clearly.

(4 marks)

Answer space continues on the next two pages.

18. continued.

18. continued.

(Total for Question 18 is 4 marks)

Turn over

19. Look at the diagram for Question 19 in the Diagram Book.

The histogram shows information about the numbers of minutes some people waited to be served at a Post Office.

Work out an estimate for the proportion of these people who waited longer than **20** minutes to be served.

(3 marks)

Answer space continues on the next two pages.

19. continued.

19. continued.

_____

(Total for Question 19 is 3 marks)

20. Look at the diagram for Question 20 in the Diagram Book.

It is NOT accurately drawn.

A, B, C and D are points on a circle.

PCQ is a tangent to the circle.

AB = CB

Angle BCQ = x°

Prove that angle CDA = 2x°

Give reasons for each stage in your working.

(5 marks)

Answer space is on the next two pages.

20. continued.

20. continued.

(Total for Question 20 is 5 marks)

21. Line **L** has equation $4y - 6x = 33$

Line **M** goes through the point **A** $(5, 6)$

and the point **B** $(-4, k)$

L is perpendicular to **M**

Work out the value of **k**

(4 marks)

Answer space continues on the next

two pages.

21. **continued.**

21. continued.

_____

(Total for Question 21 is 4 marks)

22. Look at the model and at the diagram for Question 22 in the Diagram Book.

They are **NOT** accurate.

The model shows a cone.

The diagram shows a simplified **2D** diagram of the cone.

AB is a diameter of the cone.

M is the midpoint of **AB**

V is the vertex of the cone.

(continued on the next page)

22. **continued.**

Given that

the area of the base of the cone : the total surface area of the cone $= 3 : 8$

work out the size of angle AVB

Give your answer correct to

1 decimal place.

(6 marks)

Answer space continues on the next two pages.

22. **continued.**

22. continued.

°

_____

(Total for Question 22 is 6 marks)

23. **ABCD** is a trapezium.

$$\overrightarrow{DC} = 3\overrightarrow{AB}$$

$$\overrightarrow{DA} = \begin{pmatrix} -2 \\ 3 \end{pmatrix} \qquad \overrightarrow{DB} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$$

Find the exact magnitude of $\overrightarrow{BC}$

(5 marks)

Answer space continues on the next two pages.

23. continued.

23. continued.

(Total for Question 23 is 5 marks)

Turn over

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER