

Mathematics A
PAPER 1F
Foundation Tier
(Calculator)

Total Marks

Thursday 16 May 2024 – Morning

Time: 2 hours

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

Surname					
Other names					
Centre Number					
Candidate Number					

YOU MUST HAVE

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

YOU WILL BE GIVEN

A separate Formulae Booklet

A separate Diagram Booklet

You may be provided with a model for Question 23. It is not accurate.

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 in the separate Diagram Booklet – there may be more space than you need.

Calculators may be used.

You must NOT write anything in the Formulae Booklet.

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 SIX questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Look at the table for Question 1 in the separate Diagram Booklet.

The table gives information about the lengths, in kilometres, of the shorelines of seven lakes.

- (a) Which of these seven lakes has the longest shoreline?

(1 mark)

- (b) Write the number **6124** in words.

(1 mark)

(continued on the next page)

1. continued.

- (c) The shoreline of Lake Nasser is longer than the shoreline of Lake Inari.

How much longer?

(1 mark)

_____ km

- (d) Write down the value of the 6 in the number 4763
(1 mark)

- (e) Two numbers in the table round to 4000 when written correct to the nearest thousand.

Write down these two numbers.

(1 mark)

_____ and _____

(Total for Question 1 is 5 marks)

2. (a) Simplify $10p - 4p + 9p$
(1 mark)
-

- (b) Simplify $9 \times 4q$
(1 mark)
-

(continued on the next page)

2. continued.

(c) Solve $4r = 15$

(1 mark)

$r =$ _____

(Total for Question 2 is 3 marks)

3. A box contains 10 balls.

5 balls are black

3 balls are green

2 balls are red

(a) Rema is going to take at random a ball from the box.

Look at the diagram for Question 3 (a) in the separate Diagram Booklet.

The diagram shows a probability scale. On the probability scale, mark with a cross (X) the probability that the ball is black.

(1 mark)

(b) Look at the diagram for Question 3 (b) in the separate Diagram Booklet.

The diagram shows a probability scale. On the probability scale, mark with a cross (X) the probability that the ball is orange.

(1 mark)

(continued on the next page)

3. continued.

(c) Johan has three bags of counters, A, B and C

He tries to find the probability of taking at random a white counter from each bag.

He writes his probabilities in a table. His table is shown below.

Bag	A	B	C
Probability	0·7	0·45	1·2

The probability that Johan writes for bag C is incorrect.

Explain how you know that it is incorrect.

(1 mark)

(Total for Question 3 is 3 marks)

4. (a) Look at the diagram for Question 4 (a) in the separate Diagram Booklet.

The diagram shows a polygon.

Write down the mathematical name of this polygon.

(1 mark)

- (b) Look at the diagram for Question 4 (b) in the separate Diagram Booklet.

The diagram shows a number line.

Write down the number marked with the arrow.

(1 mark)

(continued on the next page)

4. continued.

(c) Look at the diagram for Question 4 (c) in the separate Diagram Booklet.

The diagram shows four clock faces, A, B, C and D.

Write down the letter of the clock face that shows quarter to five.

(1 mark)

(d) Complete the following sentence by writing a suitable metric unit on the answer line.

(1 mark)

The height of

the Eiffel Tower is 300 _____

(Total for Question 4 is 4 marks)

5. Look at the list of six numbers below.

2 8 9 18 24 28

(a) From the numbers in the list, write down

(i) an odd number

(1 mark)

(ii) a number that is a multiple of both 4 and 6

(1 mark)

(continued on the next page)

5. (a) continued.

Look at the list of six numbers below.

2 8 9 18 24 28

From the numbers in the list, write down

(iii) a cube number

(1 mark)

(iv) a prime number

(1 mark)

(continued on the next page)

5. continued.

(b) Work out the value of the expression given below.

$$6^2 + 2^3 \times 5$$

(1 mark)

(Total for Question 5 is 5 marks)

6. (a) Look at the diagram for Question 6 (a) in the separate Diagram Booklet.

The diagram is NOT accurately drawn.

- (i) Work out the value of x

(1 mark)

$x =$ _____ °

- (ii) Give a reason for your answer.

(1 mark)

(continued on the next page)

6. continued.

(b) Look at the diagram for Question 6 (b) in the separate Diagram Booklet.

The diagram is NOT accurately drawn.

The diagram shows a shape made from a quadrilateral, **ABDE**, and an isosceles triangle, **BCD**.

In the diagram:

ABC is a straight line.

Angle **DEA** = 98°

Angle **DCB** = 54°

Angle **EDB** = y°

Work out the value of **y**

(3 marks)

Answer space continues on the next page.

6 (b). continued.

$$y = \text{_____}^{\circ}$$

(Total for Question 6 is 5 marks)

7. Harold works in a factory.

His normal hourly rate of pay is £14

His overtime hourly rate of pay is £21

**Harold is paid the normal hourly rate of pay for
35 hours in one week.**

His total pay for this week is £679

**Work out the number of hours of overtime he works in
this week.**

(4 marks)

Answer space continues on the next page.

7. continued.

(Total for Question 7 is 4 marks)

8. (a) Simplify the expression given below.

$$10m - 7q - 6m + 4q$$

(2 marks)

- (b) Given that $T = 4n - 6w$

work out the value of T when $n = 13$ and $w = 7$

(2 marks)

$T =$ _____

8. continued.

(c) Solve the equation below.

$$5p + 11 = 28$$

(2 marks)

$p =$ _____

(Total for Question 8 is 6 marks)

Turn over

9. Look at the diagram for Question 9 in the separate Diagram Booklet.

The diagram shows a line **AB** with length 9 cm.

ABC is an equilateral triangle with sides of length 9 cm.

Use a ruler and compasses only to **CONSTRUCT** the triangle **ABC**

The side **AB** has been drawn for you.

You must show all your construction lines.

(Total for Question 9 is 2 marks)

10. There are **29** cars in a car park.

10 of the cars are red.

The rest of the cars are white or blue.

Sasha selects at random one of these cars.

(a) Write down the probability that she selects a red car.

(1 mark)

(continued on the next page)

10. continued.

(b) The probability that Sasha selects a white car is $\frac{7}{29}$

Work out the probability that she selects a blue car.

(2 marks)

(Total for Question 10 is 3 marks)

11. David is going to make some biscuits.

A list of ingredients for making 24 biscuits is given below.

Ingredients for 24 biscuits

120 g butter

60 g sugar

200 g flour

David has the following ingredients:

- five 250 g packs of butter**
- 750 g of sugar**
- 1.4 kg of flour**

Work out the maximum number of biscuits that David can make.

Show your working clearly.

(4 marks)

Answer space continues on the next page.

11. continued.

(Total for Question 11 is 4 marks)

Turn over

12. The table below shows information about the number of school lunches each of 30 students had in one week.

Number of school lunches	Frequency
0	2
1	5
2	11
3	7
4	4
5	1

- (a) Work out the mean number of school lunches.
(3 marks)

Answer space continues on the next page.

12. (a) continued.

(b) The probability that Alex takes a packed lunch to school is 0.79

Work out the probability that Alex does NOT take a packed lunch to school.

(1 mark)

(Total for Question 12 is 4 marks)

Turn over

13. Look at the diagram for Question 13 in the separate Diagram Booklet.

The diagram shows a coordinate grid.

On the grid, draw the graph of $y = 2x - 3$ for values of x from -2 to 4

You may wish to use this table.

x	y
-2	
-1	
0	
1	
2	
3	
4	

(Total for Question 13 is 3 marks)

14. (a) Chaviv makes **490** loaves of bread each week for his shop.

86 of the loaves are sourdough.

Write **86** as a percentage of **490**

Give your answer correct to one decimal place.

(2 marks)

_____ %

(continued on the next page)

14. continued.

- (b) A loaf of sourdough bread weighs 375 grams before it is baked.**

The loaf loses 12% of its weight when it is baked.

Work out the weight of the loaf after it is baked.

(3 marks)

_____ grams

(Total for Question 14 is 5 marks)

Turn over

15. Look at the diagram for Question 15 in the separate Diagram Booklet.

The diagram is NOT accurately drawn.

The diagram shows a shape **ABCDE** made from a right-angled triangle **ABE** and a square **BCDE**

In the diagram:

ABC is a straight line

AB = 15 cm

AE = 17 cm

The perimeter of triangle **ABE** is 40 cm

Work out the area of the shape **ABCDE**.

(4 marks)

Answer space continues on the next page.

15. continued.

_____ cm^2

(Total for Question 15 is 4 marks)

16. (a) Look at the list of numbers below.

The numbers are the first four terms of an arithmetic sequence.

1 4 7 10

Find an expression, in terms of n , for the n th term of this sequence.

(2 marks)

(continued on the next page)

Turn over

16. continued.

(b) The n th term of a different arithmetic sequence is $5n + 17$

Find the 12th term of this sequence.

(1 mark)

(Total for Question 16 is 3 marks)

17. 450 students were asked how they travelled to school on Monday.

Each student walked or travelled by bus or travelled by car or travelled by bicycle.

Each student used just one method of travel.

One of these students is chosen at random.

The table below shows information about the probability of each method of travel.

Method of travel	Probability
walk	0.20
bus	x
car	2x
bicycle	0.26

Work out how many of the 450 students travelled by car.

(4 marks)

Answer space continues on the next page.

17. continued.

(Total for Question 17 is 4 marks)

- 18. Find the highest common factor (HCF) of 72 and 108**
Show your working clearly.

(Total for Question 18 is 2 marks)

19. Ava records the number of kilometres she drives each month.

In April, Ava drove **943** kilometres.

This is **15%** more than the number of kilometres she drove in March.

Work out the number of kilometres Ava drove in March.

_____ kilometres

(Total for Question 19 is 3 marks)

Turn over

20. Look at the diagram for Question 20 in the separate Diagram Booklet.

The diagram is NOT accurately drawn.

In the diagram:

ABCDE is a regular pentagon.

Angle **AEF** = 96°

Work out the size of the obtuse angle **FED**

Show your working clearly.

(4 marks)

Answer space continues on the next page.

20. continued.

FED = _____ °

(Total for Question 20 is 4 marks)

21. (a) Expand and simplify the following expression.

$$(m + 5)(m - 8)$$

(2 marks)

(continued on the next page)

21. continued.

(b) Solve the equation given below.

$$3n - 4 = \frac{5n + 6}{3}$$

Show clear algebraic working.

(3 marks)

n = _____

(Total for Question 21 is 5 marks)

Turn over

22. Look at the information given below.

$$\mathcal{E} = \{23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34\}$$

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

$$B = \{23, 29, 31\}$$

$$C = \{\text{multiples of } 3\}$$

(a) List the members of the set

(i) $B \cup C$

(1 mark)

(continued on the next page)

22. (a) continued.

$$\mathcal{E} = \{23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34\}$$

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

$$B = \{23, 29, 31\}$$

$$C = \{\text{multiples of } 3\}$$

List the members of the set

(ii) $A' \cap C$

(1 mark)

(continued on the next page)

22. continued.

$$\mathcal{E} = \{23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34\}$$

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

$$B = \{23, 29, 31\}$$

$$C = \{\text{multiples of 3}\}$$

(b) Is it true that $B \cap C = \emptyset$?

Tick (✓) one of the boxes below.

Yes

☐

No

☐

Give a reason for your answer.

(1 mark)

(continued on the next page)

Turn over

22. continued.

$$\mathcal{E} = \{23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34\}$$

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

$$B = \{23, 29, 31\}$$

$$C = \{\text{multiples of } 3\}$$

(c) The set **D** has 4 members and is such that

$$D \cap (A \cup C) = \emptyset$$

List the members of set **D**

(2 marks)

(Total for Question 22 is 5 marks)

23. Look at the diagram for Question 23 in the separate Diagram Booklet.

The diagram is NOT accurately drawn.

You may be given a model.

A cylinder is placed on a table.

The height of the cylinder is 21 cm

The volume of the cylinder is 1575 cm³

The force exerted by the cylinder on the table is 84 newtons.

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

Work out the pressure on the table due to the cylinder.

(3 marks)

Answer space continues on the next page.

23. continued.

_____ newtons/cm²

(Total for Question 23 is 3 marks)

24. The table below gives the amount of rice produced by each of two countries in 2020

Country	Amount of rice (tonnes)
Indonesia	3.5×10^7
Argentina	8.2×10^5

- (a) Write 3.5×10^7 as an ordinary number.
(1 mark)

(continued on the next page)

24. continued.

- (b) In 2020, Japan produced 6 780 000 more tonnes of rice than Argentina.**

Work out the amount of rice Japan produced in 2020

Give your answer in standard form.

(2 marks)

_____ tonnes

(Total for Question 24 is 3 marks)

25. (a) Simplify the expression $(2p)^0$ where $p > 0$
(1 mark)

- (b) Find the value of n , when:

$$y^9 \times y^{-3} = y^n$$

(1 mark)

$n =$ _____

(continued on the next page)

25. continued.

(c) Simplify fully the expression below.

$$(5t^4v^2)^3$$

(2 marks)

(Total for Question 25 is 4 marks)

26. Look at the diagram for Question 26 in the separate Diagram Booklet.

The diagram is NOT accurately drawn.

The diagram shows a roof support.

The roof support is made from four lengths of wood, **AB, AC, BC and MC**

In the diagram:

$$AC = BC = 9 \text{ m}$$

$$AB = 12 \text{ m}$$

$$\text{angle } AMC = 90^\circ$$

Lewis is going to buy lengths of wood to make the roof support.

The wood costs **21.50** euros per metre.

Each length of wood he buys has to be a whole number of metres.

Work out the total cost of the wood Lewis needs to buy.

Show your working clearly.

(4 marks)

26. continued.

_____ euros

(Total for Question 26 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER
