OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS A

Unit C (Foundation)

A503/01

Candidates answer on the Question Paper	**SPECIMEN**

OCR Supplied Materials:
None

Other Materials Required:
* Geometrical instruments
* Tracing paper (optional)
* Scientific or graphical calculator

Duration: 1 hours 30 minutes

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number					

INSTRUCTIONS TO CANDIDATES

* Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
* Use black ink. Pencil may be used for graphs and diagrams only.
* Read each question carefully and make sure that you know what you have to do before starting your answer.
* Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
* Answer **all** the questions.
* Do **not** write in the bar codes.
* Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

* The number of marks is given in brackets **[ ]** at the end of each question or part question.
* Use the π button on your calculator or take π to be 3·142 unless the question says otherwise.
* Your Quality of Written Communication is assessed in questions marked with an asterisk (*).
* The total number of marks for this paper is **100**.
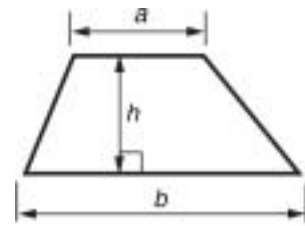* This document consists of **24** pages. Any blank pages are indicated.

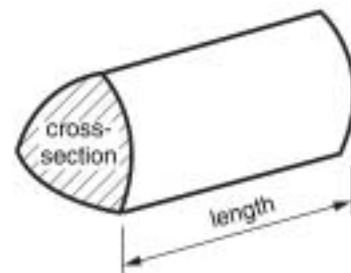**You are permitted to use a calculator for this paper.**

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SPECIMEN

Turn over

2

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a+b)h$

Volume of prism = (area of cross-section) $\times$ length

PLEASE DO NOT WRITE ON THIS PAGE

SPECIMEN

1 Work out.

(a) $\dfrac{1}{7}$ of £56

(a) £ _____ **[1]**

(b) $\dfrac{3}{5}$ of 45 kg

(b) _____ kg **[2]**

(c) 15% of £80

(c) £ _____ **[2]**

(d) $\dfrac{1}{3} \times \dfrac{2}{5}$

(d) _____ **[1]**

2 (a) Sanjiv has these five numbered discs.

$$(2) \quad (4) \quad (5) \quad (4) \quad (4)$$

He takes one without looking.

```
0                                                        1
|_____|
↑         ↑         ↑         ↑         ↑         ↑
a         b         c         d         e         f
```
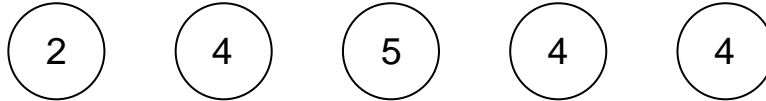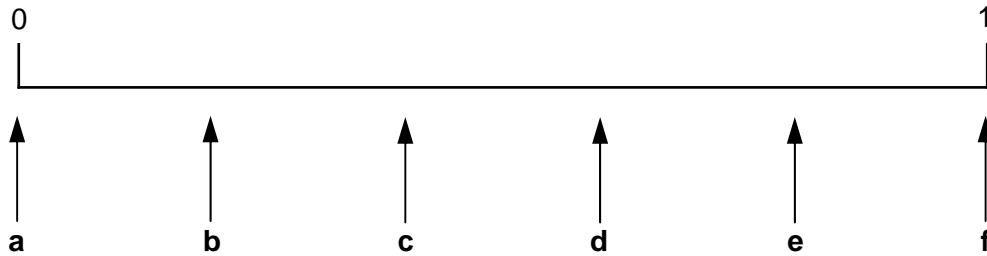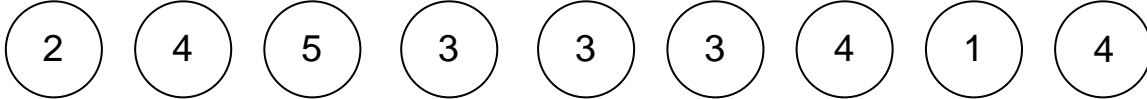
Complete these sentences.

Arrow _____ points to the probability that he chooses a **5**.

Arrow **d** points to the probability that Sanjiv chooses a _____.

Arrow _____ points to the probability that he chooses a number less than 2. **[3]**

(b) Katie has these nine numbered discs.

$$(2) \ (4) \ (5) \ (3) \ (3) \ (3) \ (4) \ (1) \ (4)$$

She takes one without looking.

What is the probability that

(i) she takes a 3,

(b)(i) _____ **[1]**

(ii) she takes a number **less than** 6?

(ii) _____ **[1]**

(c) Does Katie or Sanjiv have the greater chance of picking an even number?
Explain your reasoning.

_____

_____ **[2]**
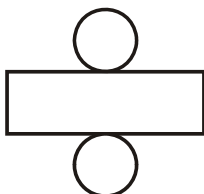
SPECIMEN
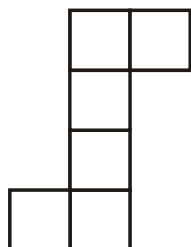
3 Here are the names of some solids.

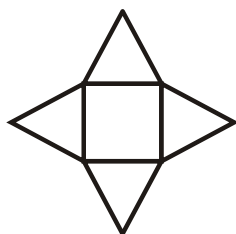sphere   cuboid   pyramid   cone   cube   cylinder

Choose a word from the list to complete each of these statements.

is the net of a _____

is the net of a _____

is the net of a _____

[3]

4 The table shows the coldest temperatures in some places of the UK recorded in March last year.

London	5°C
Manchester	⁻1°C
Sheffield	⁻2°C
Fort William	⁻7°C
Plymouth	7°C

(a) Write down the lowest of these temperatures.

(a) _____ °C **[1]**

(b) Which two places had a difference of 9°C?
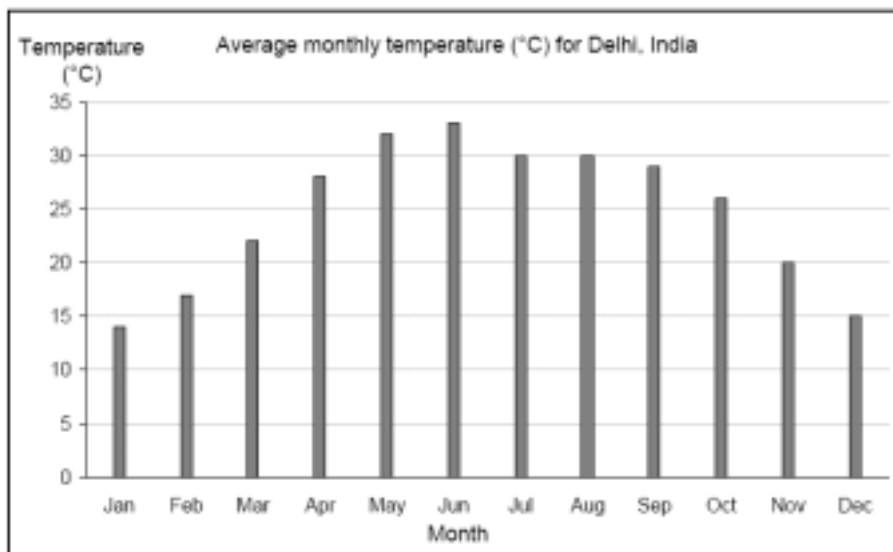
(b) _____ and _____ **[1]**

(c) In May, the coldest temperature in Sheffield was 5°C higher than the temperature in March.

What was the coldest temperature in Sheffield in May?

(c) _____ °C **[1]**

SPECIMEN

(d) Here is a collection of tables and charts about the average monthly weather for Delhi, India.

Average monthly temperature (°C) for Delhi, India

Average number of days with thunderstorms											
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Days	1	2	3	2	4	5	6	5	2	1	1	1

Average rainfall (cm)											
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rain	2	2	1	1	1	6	20	20	12	1	1	1

Mikal has a gap year before going to college.
He wants to visit a friend in Delhi.
He likes an average temperature above 25°C but not above 30°C.
Unfortunately he is not too keen on thunderstorms or too much rain either.

Looking at the weather data, which would be the best month for Mikal to visit Delhi?
State values from the tables and charts to support your answer.

_____ because _____

_____

_____ **[5]**

SPECIMEN   **Turn over**

5 Rhiannon wishes to make a patio in her garden.
The patio must be **rectangular** and must have a perimeter of exactly 16 m.

(a) On the grid below sketch three **different** patios for Rhiannon.
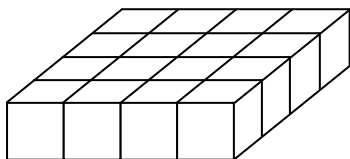
Scale: 1 cm represents 1 m

[3]

(b) Rhiannon will pave her patio using square slabs of side length 1 m.
Each slab costs £3·60.

Compare the costs of paving each of your three patios in part **(a)**.

[3]

6 Heather is stacking boxes.
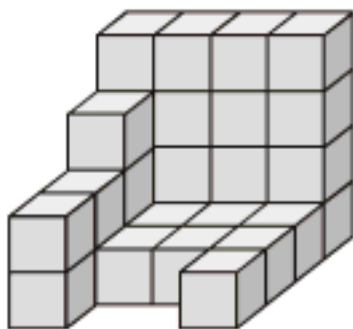
(a) This is the first layer.

(i) How many boxes are there in this layer?

(a)(i) _____ **[1]**

(ii) How many boxes would there be in 4 of these layers?

(ii) _____ **[1]**
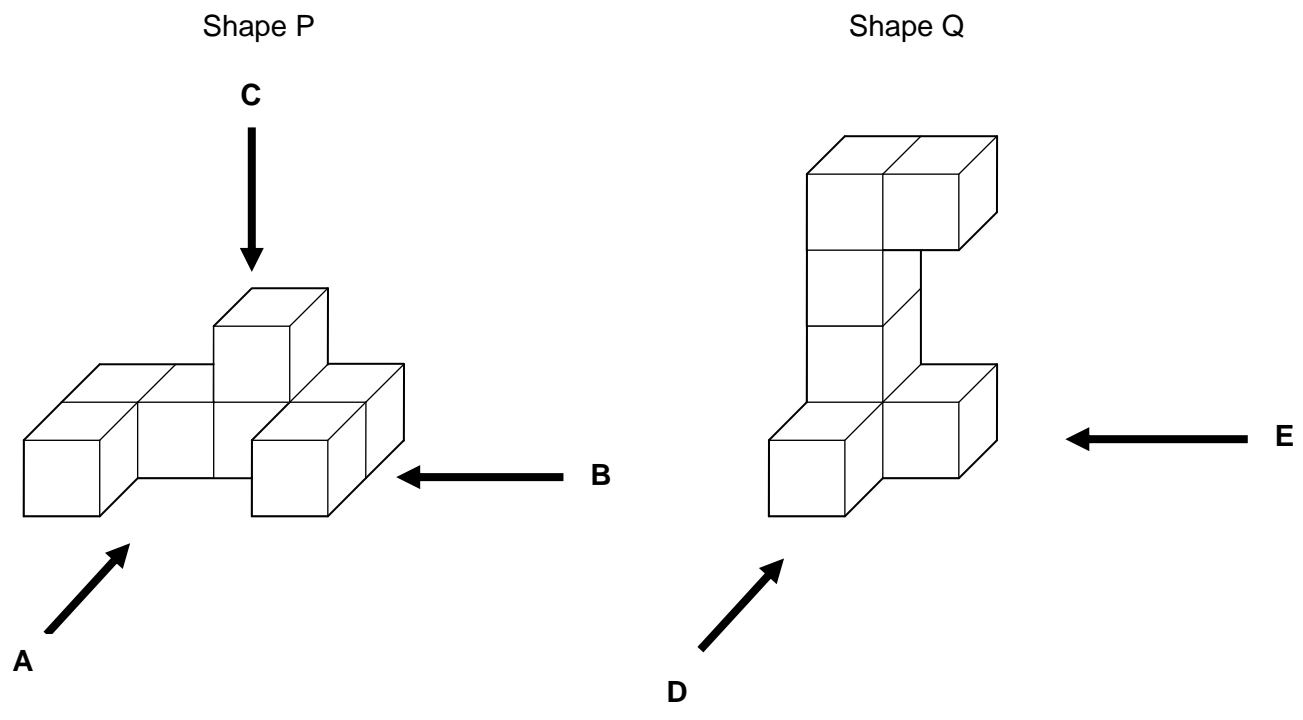
(b) Here are some boxes in another stack.

(i) How many boxes are in this stack?

(b)(i) _____ **[1]**

(ii) How many more boxes are needed to make an exact cube?

(ii) _____ **[2]**

SPECIMEN

7

Shape P   Shape Q

C

B

E

A

D

Match the arrows with the views shown below.
Write the correct letter underneath each view.
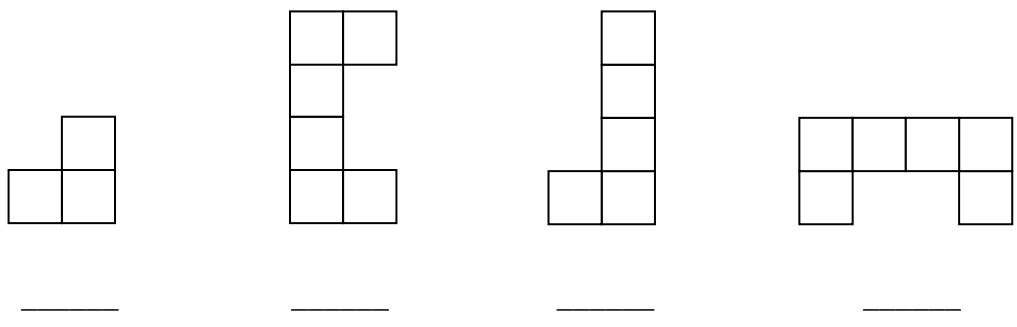
_____   _____   _____   _____   **[4]**

8 Use your calculator to work these out.

(a) $\dfrac{8 \cdot 7 + 3 \cdot 9}{2 \cdot 1 \times 5 \cdot 4}$

(a) _____ [2]

(b) $\dfrac{4}{5} - \dfrac{3}{7}$

(b) _____ [1]

(c) $\sqrt{6 \cdot 3^2 + 5 \cdot 2^2}$

(c) _____ [2]

SPECIMEN

9 The timetable below shows the times of boat trips run from the Pier Head during one day.

The boat takes passengers on round trips, starting and finishing at the Pier Head with stops at Seacome and Woodside.

River Explorer Cruise

SUMMER ROUTE

SEACOME FERRY

WOODSIDE FERRY TERMINAL BIRKENHEAD

PIER HEAD FERRY TERMINAL LIVERPOOL

RIVER MERSEY

Pier Head (Depart)	Seacome (Arrive/Depart)	Woodside (Arrive/Depart)	Pier Head (Arrive)
10.00 am	10.30 am	10.40 am	10.50 am
11.00 am	11.30 am	11.40 am	11.50 am
12.00 pm	12.30 pm	12.40 pm	12.50 pm
1.00 pm	1.30 pm	1.40 pm	1.50 pm
2.00 pm	2.30 pm	2.40 pm	2.50 pm
3.00 pm	3.30 pm	3.40 pm	3.50 pm

(a) (i) At what time does the second boat of the day leave the Pier Head?

(a)(i) _____ **[1]**

(ii) How long does each round trip from the Pier Head last?

(ii) _____ minutes **[1]**

(b) Rasheed catches the 10.00 am boat from the Pier Head to Seacome.
He needs to be back at the Pier Head by 3.00 pm.

What is the longest time Rasheed could spend in Seacome?

(b) _____ **[2]**

 Turn over

10 Pam gives her cat $\frac{2}{3}$ of a tin of cat food at each meal.
The cat has 2 meals each day.

How many tins of cat food will Pam need to buy to feed her cat for 7 days?

[3]

11 In a school there are 5 House teams, A, B, C, D and E.
In a football competition, each team plays every other team once.

(a) Complete the table to show all the games to be played.
The game when B plays D has been entered for you.
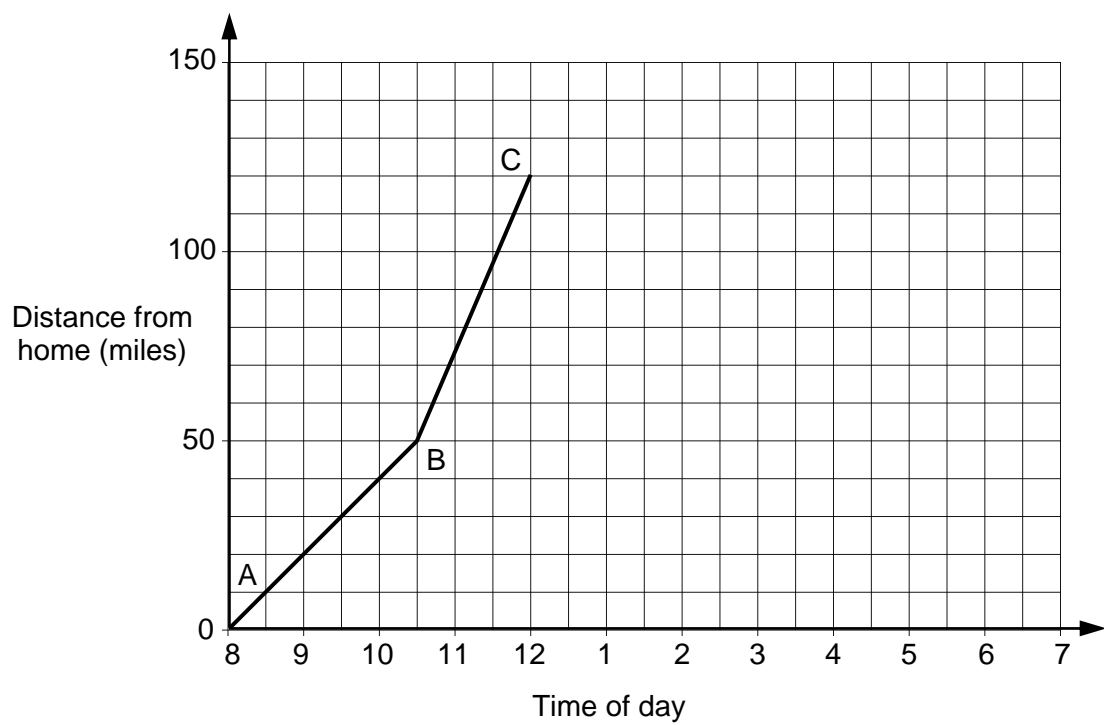
	A	B	C	D	E
A					
B				B,D	
C					
D					
E					

[2]

(b) Explain why parts of the table are shaded.

(i) Some parts are shaded [   ] because _____

_____ **[1]**

(ii) Other parts are shaded [   ] because _____

_____ **[1]**

12 The Khan family went on a day trip to a theme park.
The graph represents their car journey to the theme park.

(a) Work out the speed of the car on the section of the journey AB.

(a) _____ mph **[2]**

(b) On which part of the journey was the car travelling faster?
How can you tell this?

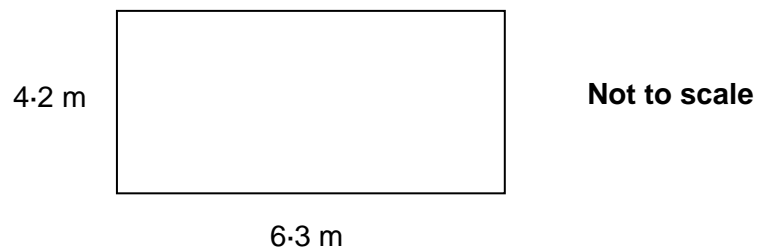_____ because _____

_____ **[1]**

(c) The family stayed at the theme park for 4 hours.
The return car journey took 2 hours.

Complete the graph to show the rest of their day out.　　　　　**[2]**

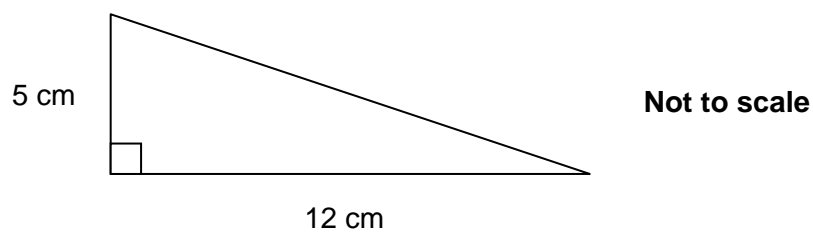**13 (a)** Calculate the areas of the following shapes.

(i)

4·2 m   [rectangle] 6·3 m   **Not to scale**

(a)(i) _____ m² **[2]**

(ii)

5 cm   [right-angled triangle] 12 cm   **Not to scale**

(ii) _____ cm² **[2]**

SPECIMEN   **Turn over**

(iii)

Not to scale

3 m

1 m

80 cm

4 m
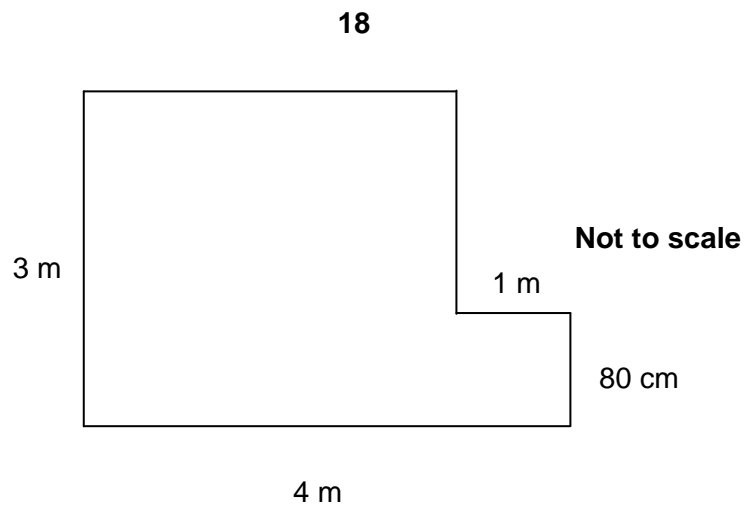
(iii) _____ m² **[3]**

(b) Calculate the volume of this cuboid.
Give the units of your answer.

3·5 cm

2·2 cm

5 cm

(b) _____ **[3]**

SPECIMEN
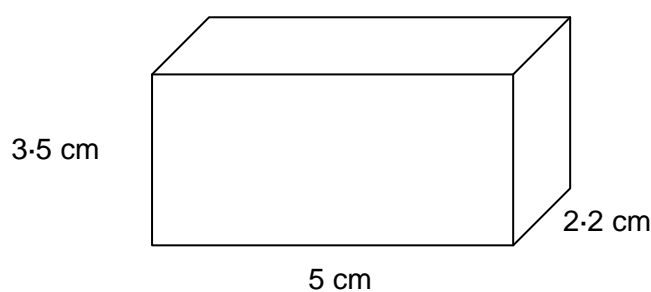
14 (a) Simplify.

    (i) $5x + 3x + 4x$

<div align="right">

(a)(i) _____ **[1]**

</div>

    (ii) $4x + 3y - 5x + 2y$

<div align="right">

(ii) _____ **[2]**

</div>

(b) Multiply out.

        $4(5a + 2)$

<div align="right">

(b) _____ **[1]**

</div>

(c) Factorise.

        $6x - 9xy$

<div align="right">

(c) _____ **[2]**

</div>

15 Tina and Ifelayo wish to hire a minibus.
They check the rates of two minibus hire companies.

```
Smoothstyle buses
   £75 hire fee
 + 50p per mile
```

```
Econospeed buses
   £50 hire fee
 + 60p per mile
```

The total cost of the hire will depend on the mileage.

(a) For a trip of 50 miles, calculate the hire cost for
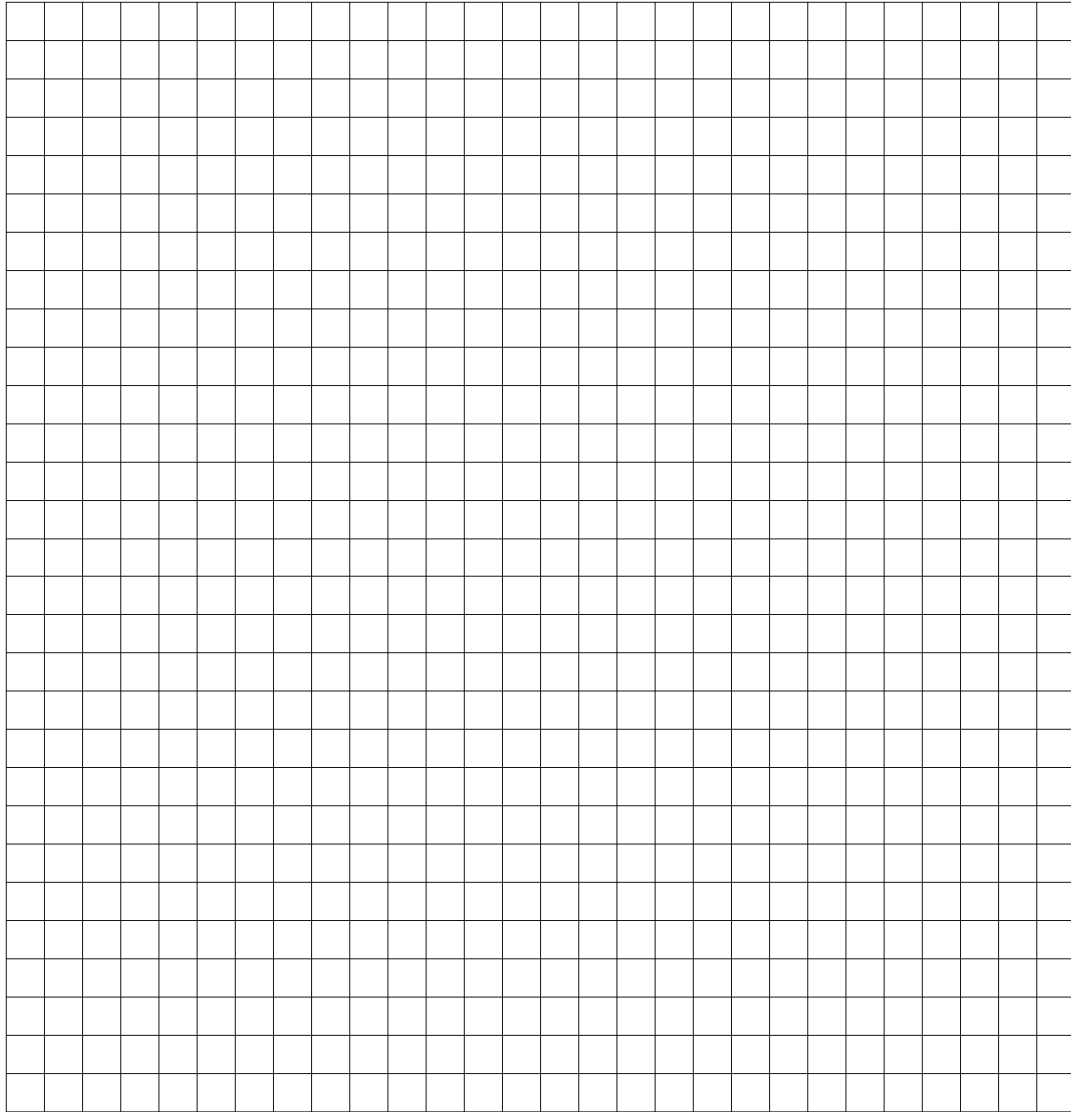
  (i) Smoothstyle buses,

  (a)(i) £ _____ **[1]**

  (ii) Econospeed buses.

  (ii) £ _____ **[1]**

(b)*Tina and Ifelayo think they will travel between 100 and 350 miles on their trip.
They wish to use the company that will give them the better value for money.

Write a short report comparing the two companies.
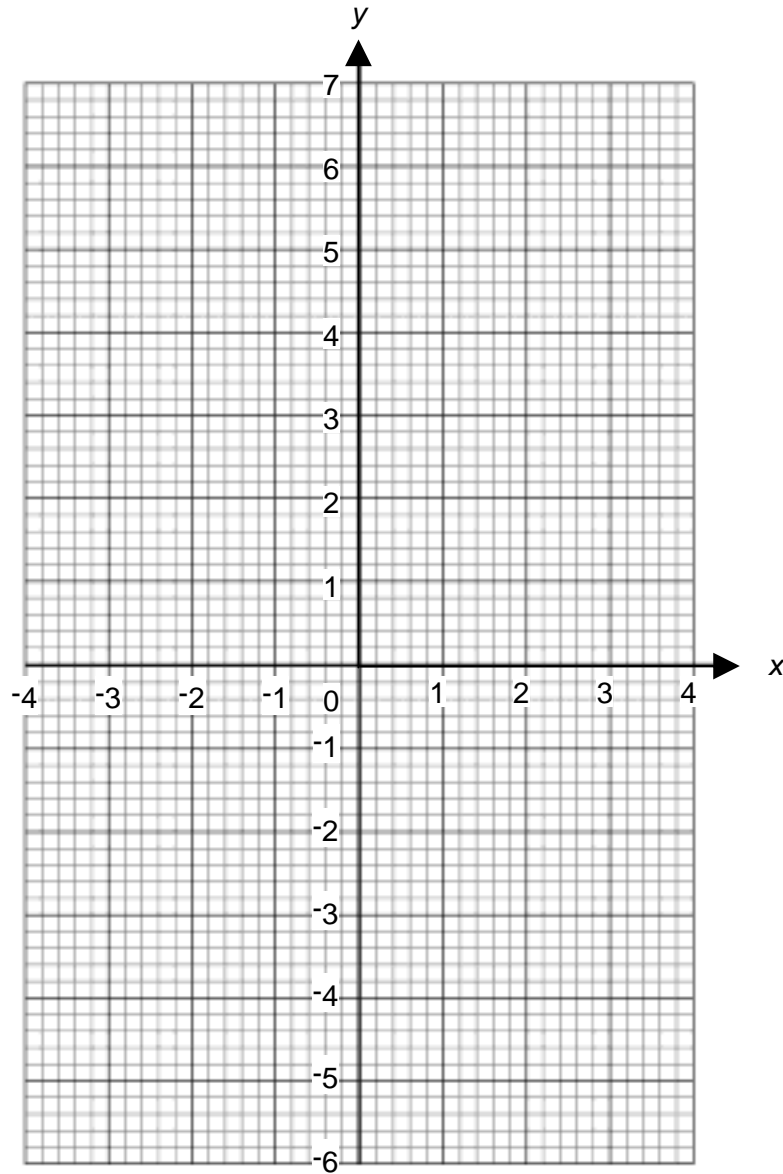You may use this graph paper if you wish to.

SPECIMEN

Report:

_____ **[6]**

SPECIMEN

Turn over

16 (a) Complete the table of values for $y = x^2 - 2$.

x	-3	-2	-1	0	1	2	3
y	7		-1	-2	-1	2	

[1]

(b) On the grid, draw the graph of $y = x^2 - 2$ for values of x from -3 to 3.

[2]

(c) Use your graph to solve the equation $x^2 - 2 = 1$.

(c) _____ and _____ **[1]**

SPECIMEN

17 (a) Michael throws a fair normal dice.

What is the probability that he gets a 5?

(a) _____[1]

(b) Michael plays a game with Henna. They take it in turns to throw two dice, one red and one blue, and add the scores on the dice.

Complete the table below to show all of the different totals.

		Red dice					
		1	**2**	**3**	**4**	**5**	**6**
Blue dice	**1**			4			
	2						
	3		5				
	4						
	5		7				
	6						

[2]

(c) Michael wins if his total is either 7 or 11.
Henna wins if she throws the same number on each dice.

(i) What is the probability that Michael wins?

(c)(i) _____[2]

(ii) What is the probability that Henna wins?

(ii) _____[1]

(d) They play the game 144 times.

How many games would you expect each of them to win?

(d) Michael _____[1]

Henna _____[1]

TURN OVER FOR QUESTION 18

SPECIMEN **Turn over**

18 Use trial and improvement to find the solution of this equation correct to 1 decimal place.

$$x^3 + 2x^2 = 13$$

Show all your trials and their outcomes.

_____[4]

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

General Certificate of Secondary Education

MATHEMATICS A   A503/01

Unit C (Foundation)

Specimen Mark Scheme

The maximum mark for this paper is **100**.

This document consists of **6** printed pages and **2** blank pages.

SPECIMEN

2

1	(a)	8	**1**	
	(b)	27	**2**	**M1** for 45 ÷ 5 × 3 soi
	(c)	12	**2**	**M1** for $\frac{15}{100}$ × 80 soi
	(d)	$\frac{2}{15}$	**1**	
2	(a)	**b** 4 **a**	**1** **1** **1**	
	(b)	(i) $\frac{3}{9}$ oe	**1**	
		(ii) 1 oe	**1**	
	(c)	$\frac{4}{5}$ > $\frac{4}{9}$ (Sanjiv)	**2**	**M1** for $\frac{4}{5}$ **or** $\frac{4}{9}$ shown
3		Cylinder Cube Pyramid	**1** **1** **1**	
4	(a)	-7	**1**	
	(b)	Plymouth **and** Sheffield	**1**	
	(c)	3	**1**	
	(d)	October 1 for each (correct) supporting piece of evidence cited from chart or table	**1** **4**	With no explanation May not necessarily be numerical Max. 4 e.g. Apr/Jul/Aug/Sep/Oct are 25−30°C April/September have 2 stormy days and October has 1 stormy day April and October have 1 cm of rain
5	(a)	Three rectangles drawn where length add width = 8 cm	**3**	**1** for each correct. Extras count as choice
	(b)	Calculates the area of each of *their* rectangles and multiplies by £3·60 Makes comment about costs	**2ft** **1ft**	**1** for two correct dep on at least two costs found
6	(a)	(i) 16	**1**	
		(ii) 64	**1ft**	ft 4 × *their* (a)
	(b)	(i) 30	**1**	
		(ii) 34	**2ft**	*Their* (a)(ii) − *their* (b)(i) NB alternative answers possible **M1** for cube number shown e.g. 64, 125, etc Accept answers for bigger cubes eg 125 − 30 = 95, 216 − 30 = 186

7		B D E C	4	**1** for each correct
8	(a)	1·11(11…) oe	2	**B1** for 12·6 ÷ 11·34
	(b)	$\frac{13}{35}$ or 0·371…	1	
	(c)	8·169 or 8·17 or 8·2	2	**B1** for 66·73 seen
9	(a)	(i) 11.00 am	1	
		(ii) 50 minutes	1	
	(b)	4 hours oe	2	**M1** for identifying the 2.30 boat from Seacombe
10		10	3	**B2** for 9·3 or better **Or M1** for $\frac{2}{3}$ × 2 × 7
11	(a)	All 9 pairs correct	2	**B1** for 4 correct pairs Ignore entries in shaded sections
	(b)	(i) Cannot play themselves oe	1	
		(ii) Play each other once only	1	
12	(a)	20	2	**M1** for 50 ÷ 2·5 oe Condone 2.30 for **M1**
	(b)	BC, steeper line	1	
	(c)	Horizontal line to (4,120) Line from *their* (4,120) to (6,0)	1 **1ft**	By eye May be curve as long as no vertical part
13	(a)	(i) 26·46	2	**M1** for 4·2 × 6·3
		(ii) 30	2	**M1** for $\frac{1}{2}$ (5 × 12) oe
		(iii) 9·8	3	**M2** for complete correct method shown **M1** for 0·8 or 2·2 seen
	(b)	38·5 cm³	2 1	**M1** for 2·2 × 5 × 3·5 Indep
14	(a)	(i) 12*x*	1	
		(ii) ⁻*x* + 5*y* final answer	2	**B1** for either term
	(b)	20*a* + 8 final answer	1	
	(c)	3*x* (2 – 3*y*)	2	**M1** for 3*x* (...) or 3(2*x* – 3*xy*) or *x*(6 – 9*y*)

15	(a)	(i) 100	**1**	
		(ii) 80	**1**	
	(b) *	A clear comprehensive answer that addresses the major issues (costs the same for both companies for 250 miles, Econospeed cheaper for below 250 miles and Smoothstyle cheaper for greater than 250 miles). Answer is coherent and uses correct spelling, punctuation and grammar and perhaps uses accurate graphs, tables or algebra.	**5-6**	For the lower mark – there may be a slight slip in the mathematics **or** minor errors in spelling, punctuation or grammar.
		Some understanding of the problem shown – some values either side of 250 miles correctly calculated for both companies – with a structure and strategy evident without clear conclusions – could be on graph, table or written. No more than two errors in spelling, punctuation and grammar.	**3-4**	For the lower mark – look for a weaker structure, more random attempts at values and weak comments not addressing the original costs problem.
		At least two correct values found for different mileages between 100 and 350 for at least one company with a comment. Weaker communication and little structure to solution with possible errors in spelling, punctuation and grammar.	**1-2**	For the lower mark – random attempts to find at least two values but with one error – no conclusions or comments made.
		No relevant content	**0**	
16	(a)	2 **and** 7	**1**	
	(b)	7 correct points plotted Curve within 2mm of their points Parabola shape	**1ft** **1**	
	(c)	Reads both values from curve at $y = 1$ within 1 mm	**1ft**	

5

17	(a)	$\frac{1}{6}$		1	
	(b)			2	**B1** for 20 correct entries
	(c)	(i) $\frac{8}{36}$ oe		2	**1** for numerator or denominator
		(ii) $\frac{6}{36}$ oe		1	
	(d)	Michael 32 Henna 24		**1ft** **1ft**	ft 4 times *their* (c)(i) numerator ft 4 times *their* (c)(ii) numerator
18		Value between 1 and 2 inclusive 1·8 or 1·9 Value between 1·8 and 1·9 1·8		1 1 1 1	Or after 1·8 **and** 1·9 used, mention of closer to 1·8

For 17(b):

		Red dice					
		1	**2**	**3**	**4**	**5**	**6**
Blue dice	**1**	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

Assessment Objectives and Functional Elements Grid

GCSE MATHEMATICS A

A503/01: Unit C (Foundation)

Qn	Topic	AO1	AO2	AO3	Functional
1	Calculations	6			
2	Probability	5		2	2
3	Nets of shapes and names	3			
4	Negatives and temperature		3	5	7
5	Rectangular patios		3	3	6
6	Counting cubes	2	1	2	2
7	Views	4			
8	Calculator work	5			
9	Timetable and costings		4		2
10	Fractions			3	3
11	Listing		4		2
12	Dist/time graph		3	2	
13	Areas and volumes	10			
14	Collect like terms, expand, factorise	6			
15	Hire costs problem	2		6	6
16	Quadratic graph	4			
17	Sample space and probability dice game		8		
18	Trial and improvement	4			
	TOTAL	51	26	23	30

7

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8

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