OCR
Oxford Cambridge and RSA

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Tuesday 20 June 2017 – Afternoon

GCSE METHODS IN MATHEMATICS

B392/01 Methods in Mathematics 2 (Foundation Tier)

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Scientific or graphical calculator
- Geometrical instruments
- Tracing paper (optional)

Duration: 1 hour 30 minutes

* B 3 9 2 0 1 *

* 7 3 4 5 1 4 9 8 0 2 *

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure 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.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

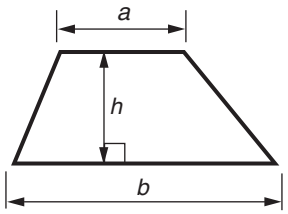
INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Quality of written communication will be assessed in questions marked with an asterisk (*****).
- The total number of marks for this paper is **90**.
- This document consists of **20** pages. Any blank pages are indicated.

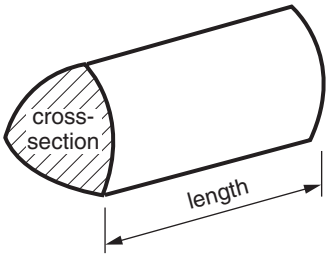
You are permitted to use a calculator for this paper

Formulae Sheet: Foundation Tier

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



Volume of prism = (area of cross-section) × length



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Answer **all** the questions.

1 Calculate.

(a) 1.4^3

(a) ..... **[1]**

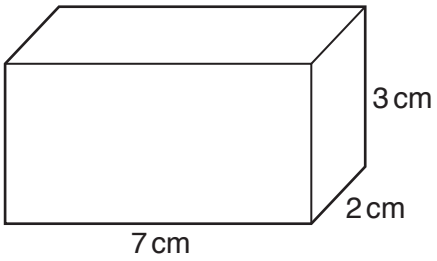
(b) $\dfrac{5}{87 - 74.5}$

(b) ..... **[1]**

(c) $\sqrt{3.6 - 2.16}$

(c) ..... **[2]**

2 Work out the volume of this cuboid.



..... cm^3 **[2]**

3* These are the normal prices for swimming at Greendale leisure centre.

Adult £4.50 Child £2.50

Two special deals are offered for families.

Deal A Monthly family charge of £20 and then adults and children pay half the normal price.

Deal B Monthly family charge of £30 and then adults pay 70% of the normal adult price and children are free.

The Armitage family consists of 2 adults and 3 children.
They expect to go swimming 4 times in a month.

Which is the better deal for the Armitage family?

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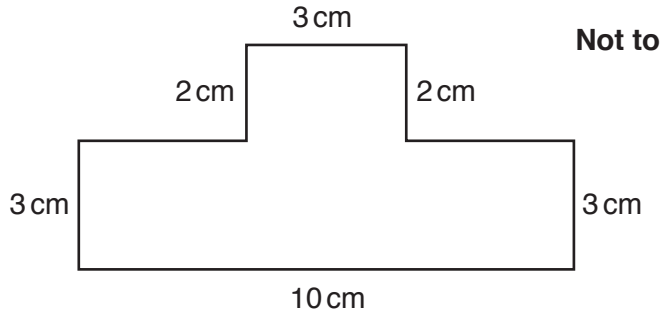
..... **[7]**

4 **(a)** This shape is made of two rectangles.



Not to scale

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

(a) ..... cm^2 **[2]**

(b) A square has the same area as the shape in part **(a)**.

Work out the length of the side of the square.

(b) ..... cm **[2]**

5 Complete the following, writing your answers as fractions.

(a) $\frac{1}{2} \times \frac{1}{2} = \square$

[1]

(b) $1 - \square = \frac{7}{8}$

[1]

(c) $\frac{1}{2} + \frac{1}{8} = \square$

[2]

6 Work out.

(a) $\frac{1}{5}$ of £870

(a) £ ..... **[1]**

(b) 75% of £248

(b) £ ..... **[2]**

7 This is a sequence of star patterns.

Pattern 1	Pattern 2	Pattern 3
*	* *	* * *
* * *	* * * *	* * * * *
* * * * *	* * * * * * *	* * * * * * * *

(a) How many stars are there in Pattern 4?

(a) ..... **[2]**

(b) Isaac thinks that Pattern 10 has 35 stars.

Explain fully why Isaac cannot possibly be correct.

.....

.....

.....

..... **[2]**

8 Adam is playing a number game with cards.

He has four numbers, two addition signs, one multiplication sign and two pairs of brackets on cards.

(a) Adam arranges nine of the cards like this.

Work out (19 + 11 + 13) × 17

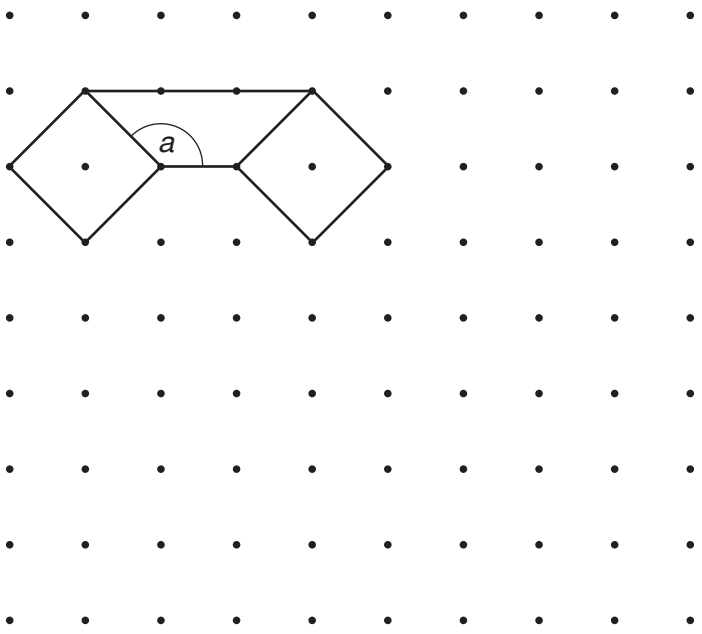
(a) ..... **[1]**

(b) Use **all** of the cards to find the biggest number that Adam can make.

(b) ..... **[3]**

9 **(a)** This tessellation has been started on one-centimetre dotty paper.

Continue the tessellation pattern. You should draw at least four more squares and four more trapeziums.



[2]

(b)* Explain, with reasons, how you can use the tessellation to **calculate** the size of angle *a*.

.....

.....

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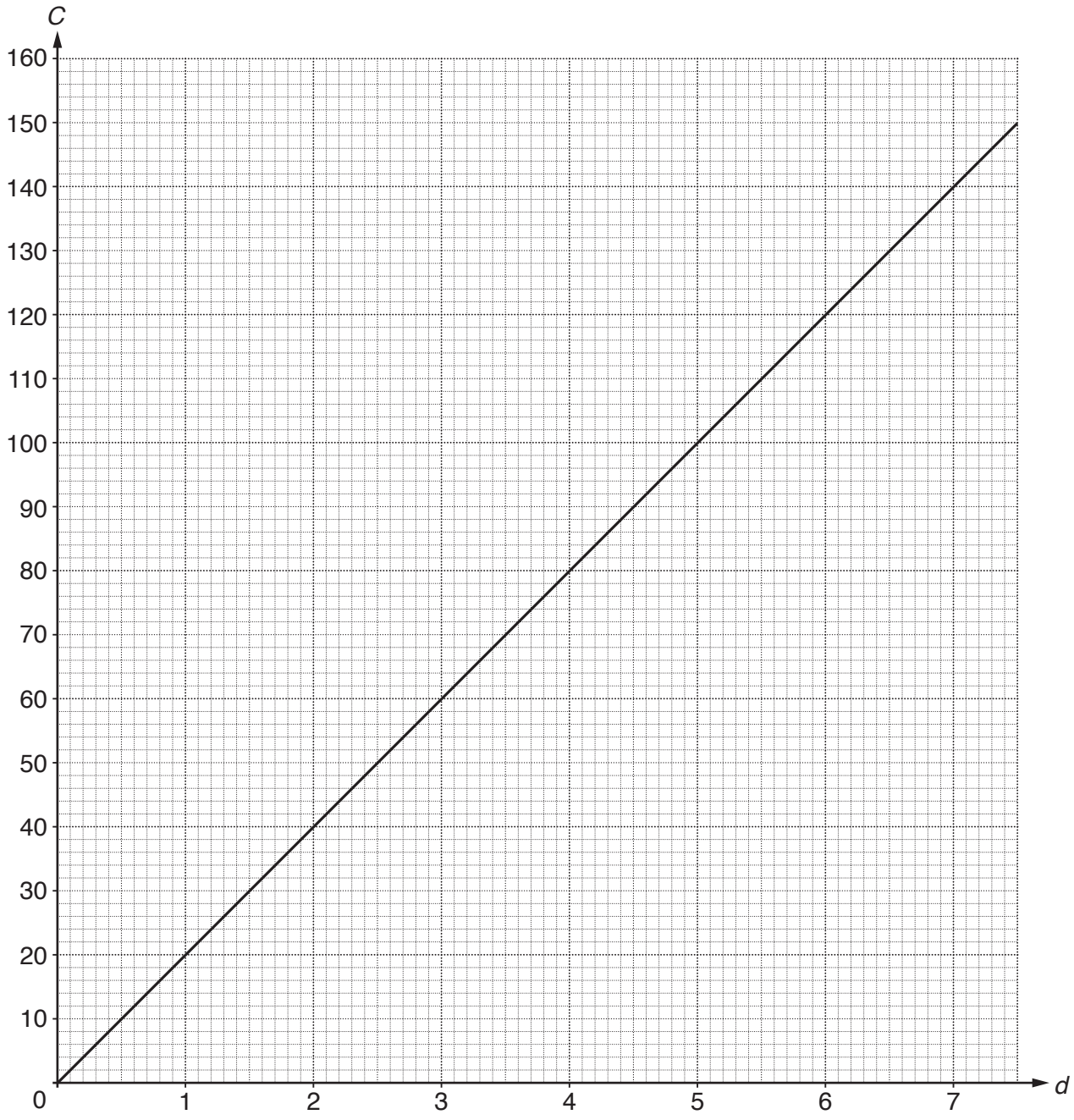
.....

.....

..... **[3]**

10 Liam is on a holiday in Spain. He decides to hire a car.

The graph shows the cost for hiring a car from *Sunshine cars*,
d stands for the number of days,
C stands for the cost in euros.



(a) Write down the formula for C in terms of d for *Sunshine cars*.

(a) C = ... **[1]**

(b) Another company, *Holiday cars*, uses a different formula to work out the cost of hiring the same type of car.

$$C = 15d + 25$$

(i) Complete the table for $C = 15d + 25$

d	0	1	3	5	7
C			70		

[2]

(ii) Draw the graph of $C = 15d + 25$ on the same grid.

[2]

(c) (i) Write down the coordinates of the point of intersection of the two graphs.

(c) (i) (..... , ...) **[1]**

(ii) What does this point of intersection represent?

.....

..... **[1]**

11 This is part of a number grid.

1	2	3	4	5	6	7	8
11	12	13	14	15	16	17	18
21	22	23	24	25	26	27	28
31	32	33	34	35	36	37	38
41	42	43	44	45	46	47	48
51	52	53	54	55	56	57	58

(a) Aisha looks at this 3 by 3 square from the grid.

3	4	5
13	14	15
23	24	25

She says 'in this 3 by 3 square the **sum** of the numbers in the shaded squares is equal to eight times the number in the centre of the square'.

Show that Aisha is correct for this square.

.....

.....

..... **[2]**

(b) This square represents any 3 by 3 square from the number grid.
The numbers in two of the squares are written in terms of *a*.

a	$a + 1$	.....
.....	.....	.....
.....	.....	.....

Write expressions, in terms of *a*, for the numbers in the other squares. **[2]**

(c) **(i)** Find an expression, in terms of *a*, for the **sum** of the numbers in the shaded squares. Write your expression in its simplest form.

(c)(i) ..... **[2]**

(ii) Use your expressions to show that Aisha's statement in part **(a)** is true for any 3 by 3 square from the grid.

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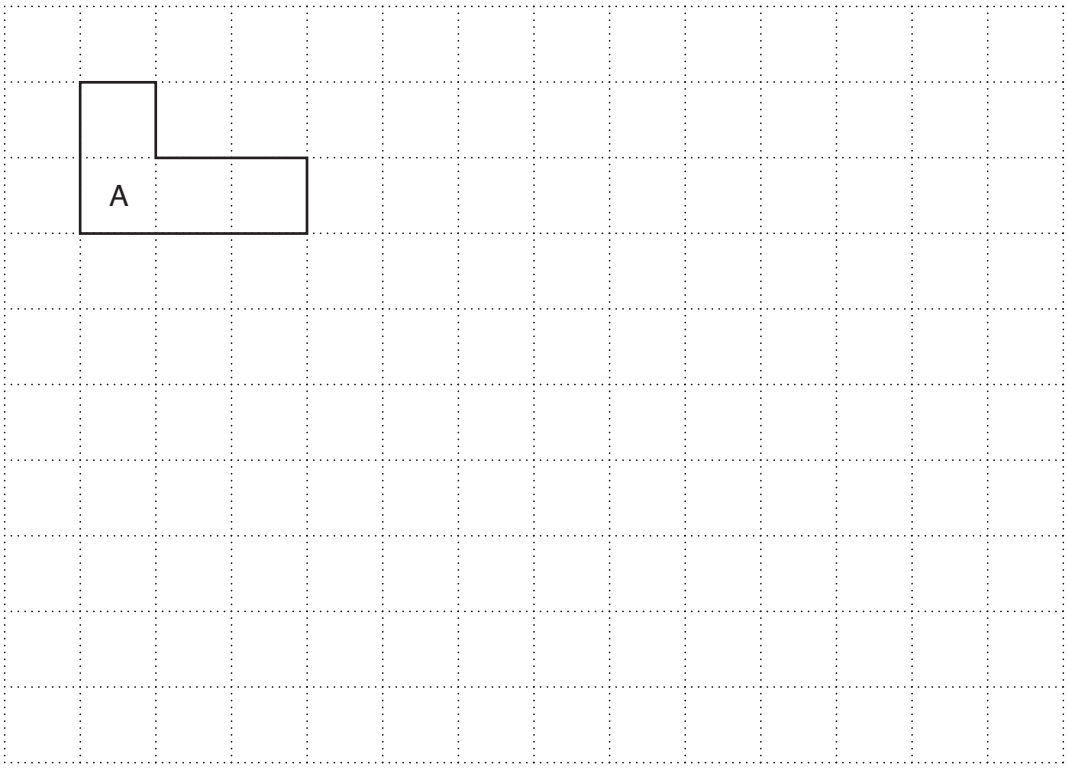
..... **[2]**

12 Shape A is drawn on a one-centimetre square grid.



(a) Work out the perimeter of shape A.

(a) ..... cm **[1]**

(b) Shape B has a perimeter of 30 cm and is an enlargement of shape A.

Draw shape B on the grid above.

[3]

(c) Work out how many times bigger the area of shape B is than the area of shape A.

(c) ..... **[2]**

13 **(a)** Solve.

(i) $\frac{x}{7} = 21$

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

(ii) $3(x - 7) = 12$

(ii) ..... **[2]**

(iii) $2x + 1 > 19$

(iii) ..... **[2]**

(b) Rearrange to make x the subject.

(i) $y = x + 3$

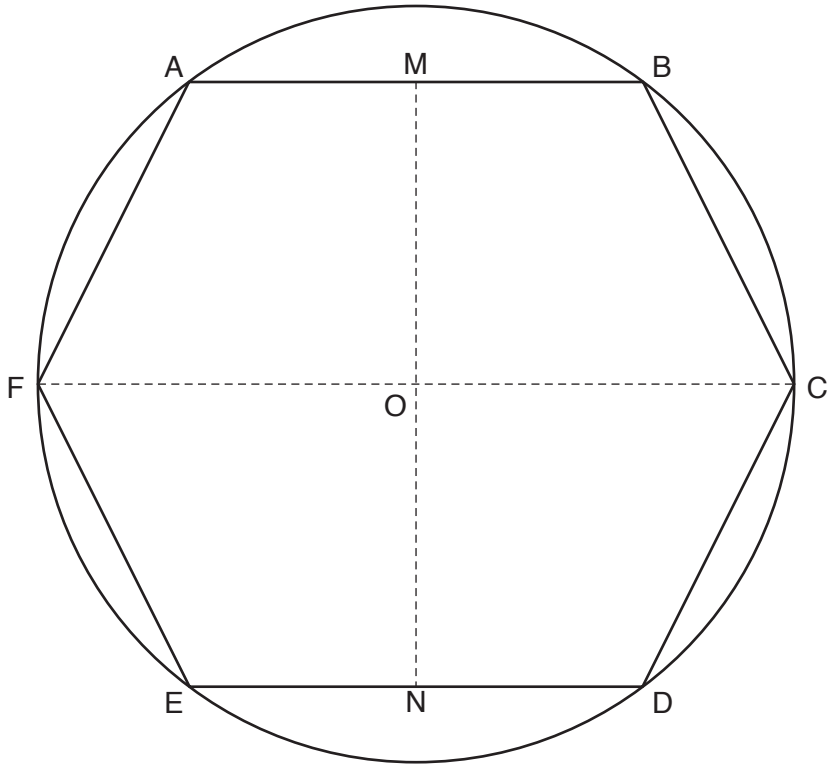
(b)(i) ..... **[1]**

(ii) $y = 9x - 2$

(ii) ..... **[2]**

14 The vertices of this hexagon lie on the circumference of the circle, centre O.
Two lines of symmetry of the hexagon are MN and FC.
The radius of the circle is 5 cm.
The length AB = 6 cm.
M is the midpoint of AB.

Not to scale



(a) Use Pythagoras' theorem to show that MO = 4 cm.

.....

.....

.....

..... **[3]**

(b) Work out the area of the hexagon.

(b) ..... cm^2 **[4]**

(c) Work out the area of the circle.

(c) ..... cm^2 **[2]**

(d) Work out the percentage of the circle that is covered by the hexagon.

(d) ..... % **[2]**

15 Lucy and Naomi own a cake shop.
They decide to share the profits from the shop in the ratio 3 : 2.

(a) They made a profit of £6200 in 2014.

How much did Lucy receive?

(a) £ ..... **[2]**

(b) Lucy received £4320 in 2015.

How much did Naomi receive?

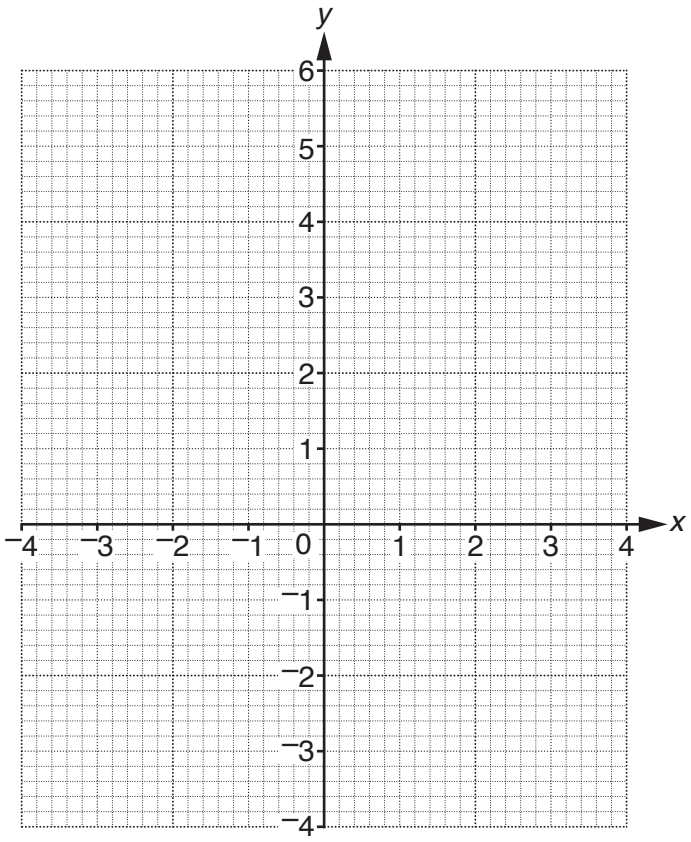
(b) £ ..... **[2]**

16 **(a)** Complete the table for $y = x^2 - 3$.

x	-3	-2	-1	0	1	2	3
y		1		-3			6

[2]

(b) Draw the graph of $y = x^2 - 3$ for $-3 \leqslant x \leqslant 3$.

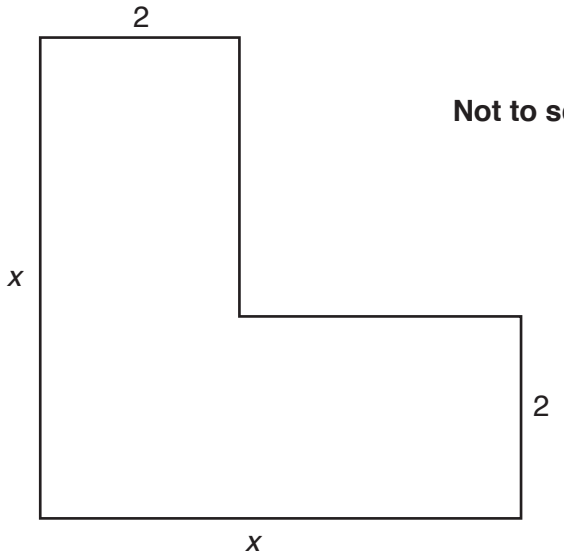


[2]

(c) Use your graph to solve the equation $x^2 - 3 = 4$.
Give your answers correct to 1 decimal place.

(c) ..... **[2]**

17 The L-shape below is made up of horizontal and vertical lines.
The measurements, in cm, of some of the sides are given.



Find an expression for the area of the L-shape.
Give your answer in its simplest form.

..... cm^2 **[3]**

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).