Surname	Centre Number	Candidate Number
Other Names		0

GCSE

3300U30-1

S19-3300U30-1

MATHEMATICS
UNIT 1: NON-CALCULATOR
INTERMEDIATE TIER

TUESDAY, 21 MAY 2019 – MORNING

1 hour 45 minutes

ADDITIONAL MATERIALS

The use of a calculator is not permitted in this examination.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet. Question numbers must be given for all work written on the continuation page.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

In question **8**, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**3**	
2.	**5**	
3.	**3**	
4.	**5**	
5.	**3**	
6.	**4**	
7.	**6**	
8.	**6**	
9.	**4**	
10.	**5**	
11.	**4**	
12.	**4**	
13.	**4**	
14.	**3**	
15.	**6**	
16.	**5**	
17.	**4**	
18.	**6**	
Total	**80**	

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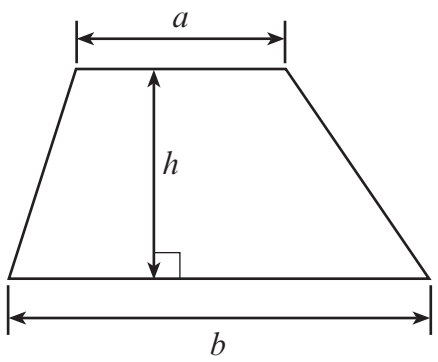
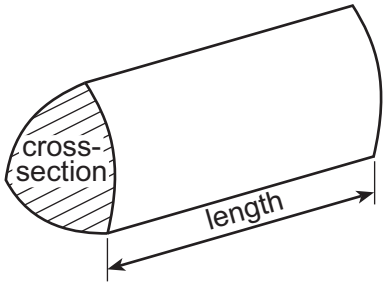
Formula List – Intermediate Tier

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



Volume of prism = area of cross-section × length



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1. Circle either TRUE or FALSE for each calculation given below. [3]

CALCULATION		
$23 - (4 + 2) \times 3 = 5$	TRUE	FALSE
$\frac{7}{10} + \frac{2}{5} = \frac{9}{15}$	TRUE	FALSE
$\frac{1}{2}$ of $\frac{1}{8} = \frac{1}{4}$	TRUE	FALSE
25% of 0·4 = 0·1	TRUE	FALSE
$28 - 3 \times 2 + 5 = 55$	TRUE	FALSE

Space for working:

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2. Twenty-five balls have numbers printed on them.
Some of the balls are coloured yellow (Y), the others are coloured blue (B).
The list below shows both the colour of each ball and the number printed on it.

Y 76	Y 217	B 54	B 126	Y 21
Y 438	Y 32	B 561	B 194	Y 69
B 37	B 518	Y 94	Y 157	Y 208
Y 382	B 56	B 234	Y 72	B 84
Y 68	Y 271	Y 53	B 100	Y 321

(a) Complete the frequency table. [2]

Type of ball	Yellow		Blue	
	Number < 100	Number $\geqslant 100$	Number < 100	Number $\geqslant 100$
Frequency	8			

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(b) How can you use your table to check that all the balls have been counted? [1]

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(c) The 25 balls are placed in a box.
One ball is chosen at random.
What is the probability that it is a yellow ball numbered less than 100? [2]

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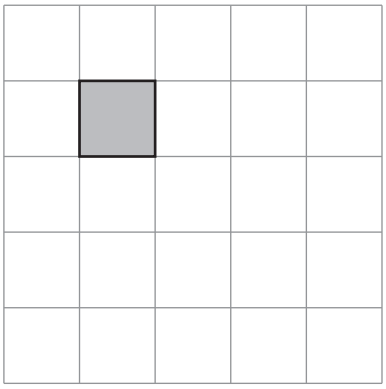
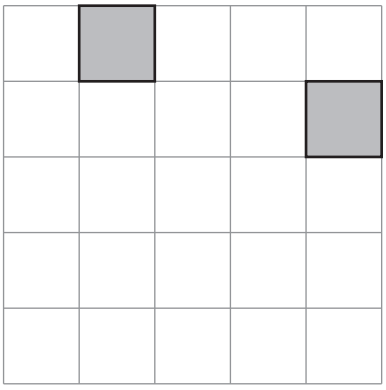
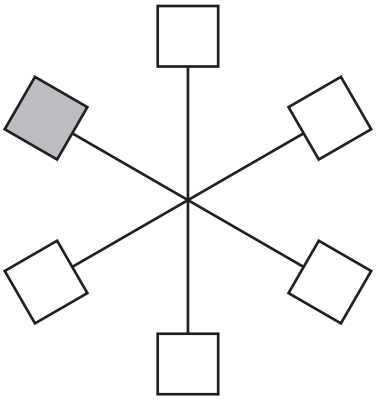
3. *(a)* Shade **one square** so that the diagram below has rotational symmetry of order 2. [1]



(b) Shade **two squares** so that the diagram below has rotational symmetry of order 4. [1]



(c) Shade **two squares** so that the diagram below has rotational symmetry of order 3. [1]



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4. *(a)* Write down the next two numbers in the following sequence. [2]

−19 −15 −11 −7 ……. ……

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(b) Rods are used to make a sequence of patterns as shown below.

Pattern 1 Pattern 2 Pattern 3

Pattern 1 uses six rods.

(i) How many rods are required to draw Pattern 4? [1]

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(ii) Pattern 37 requires 186 rods.
How many rods are required to draw Pattern 38? [1]

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(c) Describe in words the rule used in the following sequence. [1]

243 81 27 9 …….

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5. In this question, you must use only the numbers 3 and 7 to make other numbers.
You must only add or subtract.

For example, if we wanted an answer of 11, we could write

$$7 + 7 - 3 = 11.$$

Show how you can get each of the following answers.

(a) 2 [1]

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Write your solution in the box below.

= 2

(b) 8 [1]

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Write your solution in the box below.

= 8

(c) 19 [1]

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Write your solution in the box below.

= 19

Examiner only

6. A Venn diagram is used to show the following information:

- The Universal set, **Ɛ**, is the set of numbers from 10 to 20 inclusive.
- Set A = {11, 13, 14, 18, 20}.
- Set B = {multiples of 3}.

Draw the Venn diagram that shows the above information. [4]

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Examiner only

7. *(a)* Factorise $10a - 15$. [1]

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(b) Solve the following equations.

(i) $\frac{x}{7} = 21$ [1]

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(ii) $13f + 2 = 6f + 5$. [3]

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(c) n is an integer.

Tick the correct statement below.
You must give an explanation for your decision. [1]

$5n - 3$ is always an even number.	$5n - 3$ is always an odd number.	$5n - 3$ can be an even number or an odd number.

Explanation: .....

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8. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

In the diagram below, *ABCE* is a square and *CDE* is a right-angled triangle.
The length of *DE* is 4 cm and the area of triangle *CDE* is 14 cm^2.

Calculate the area of the **whole shape** *ABCDE*.
You must show all your working. [4 + 2 OCW]

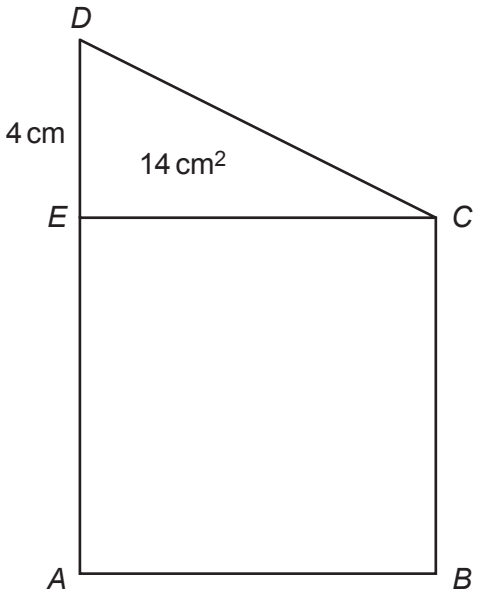

Diagram not drawn to scale

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9. *ABCD* is a rectangle.
AB is parallel to *EF*.
AC, *CE* and *DG* are straight lines.

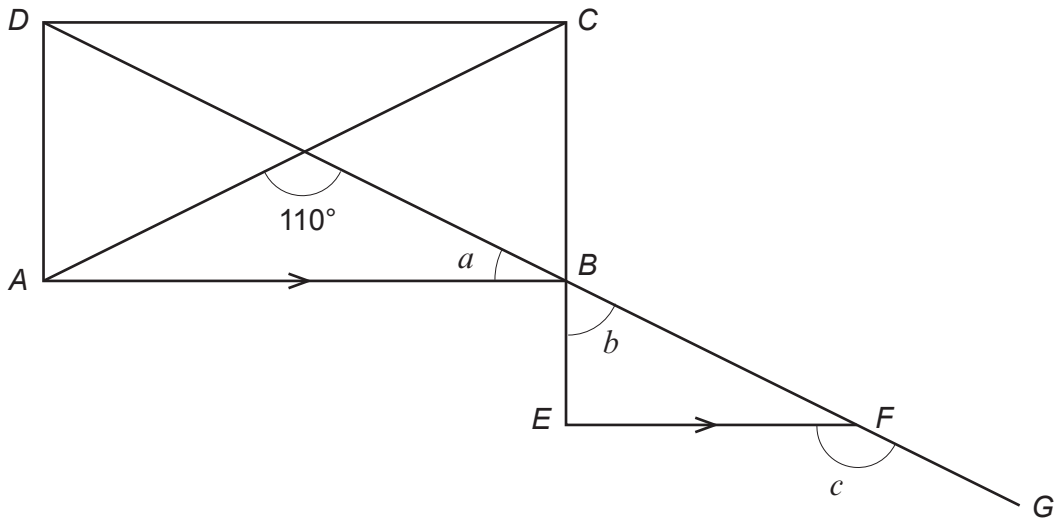

Diagram not drawn to scale

Find the size of each of the angles a, b and c. [4]

a = ... ° b = ... ° c = ... °

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Turn over.

Examiner only

10. *(a)* Express 315 as a product of its prime factors in index form. [3]

(b) What is the Highest Common Factor (HCF) of 315 and 42? [2]

Examiner only

11. Complete the table below.
Draw the graph of $y = 3x^2 - 25$ for values of x between −3 and 4.
Use the graph paper below.
You must choose a suitable scale for the y-axis. [4]

x	–3	–2	–1	0	1	2	3	4
$y = 3x^2 - 25$	2		–22	–25	–22	–13	2	23

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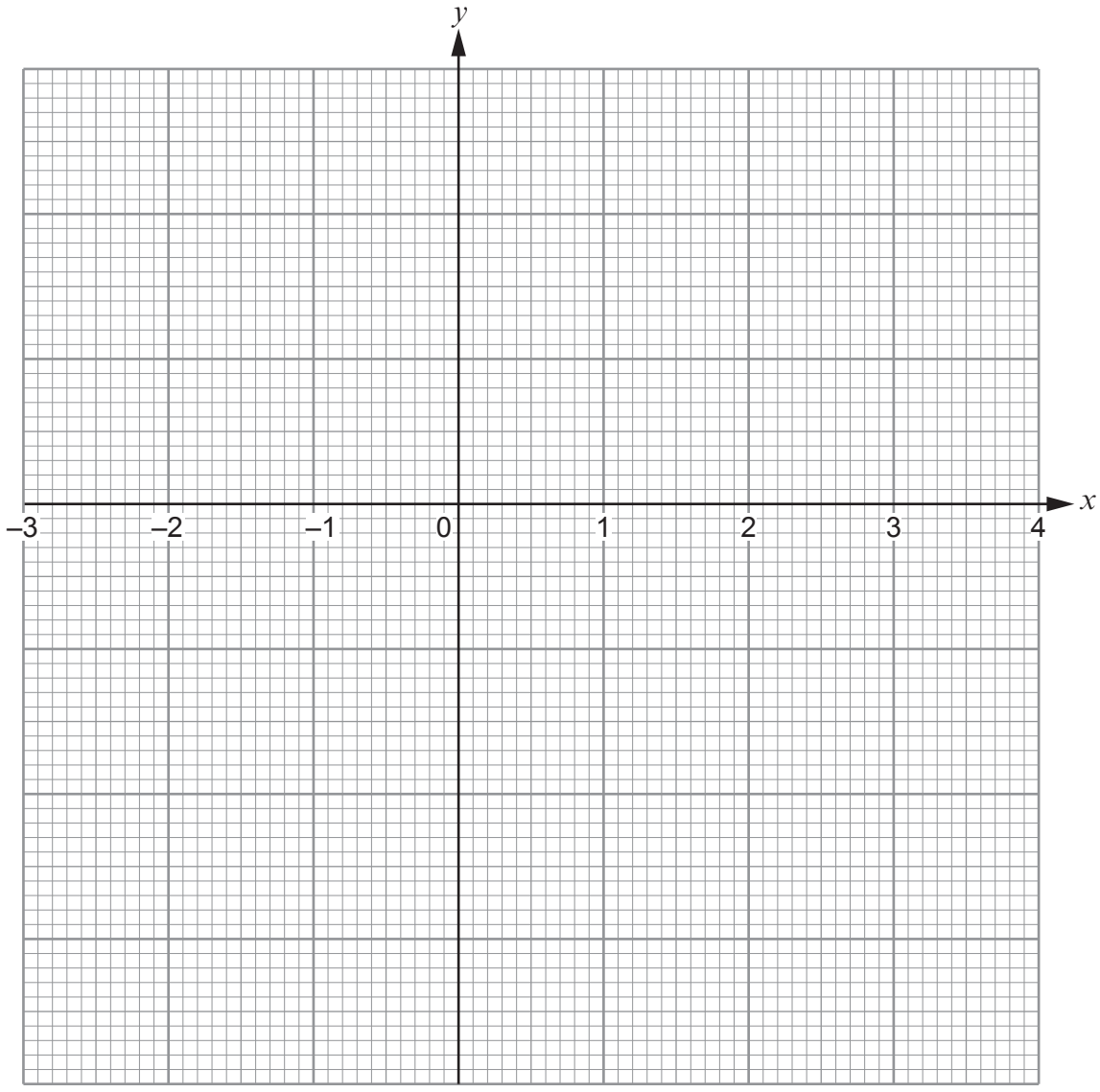

Turn over.

Examiner only

12. A **regular** octagon with centre O is shown below.

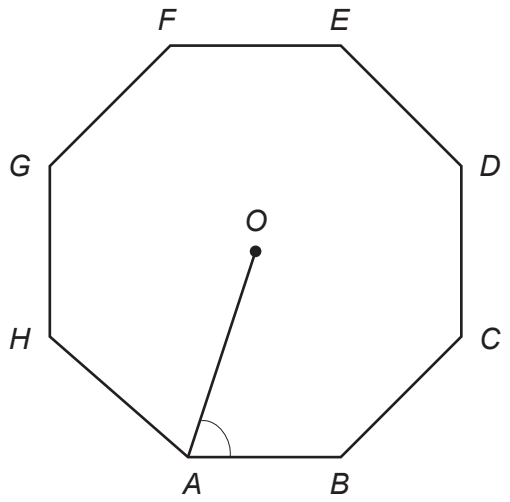

Diagram not drawn to scale

Calculate the exact size of $O\hat{A}B$.
You may choose to draw additional lines on the diagram to help you.
You must show all your working. [4]

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13. The point P is such that:

- P lies on the perpendicular bisector of the line AB,
- $B\hat{A}P = 30°$.

Using only a ruler and a pair of compasses, show one of the possible positions of P.
All construction lines and arcs must be shown. [4]

Examiner only

14. Estimate the value of

$$\frac{30{\cdot}21 \times 1{\cdot}98^3}{0{\cdot}49}$$

[3]

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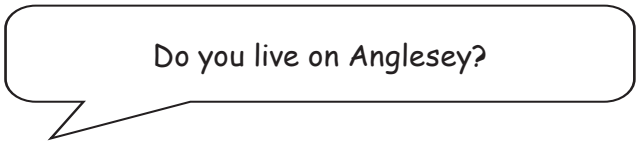
15. The Anglesey Show is a two-day event held every August.

(a) On the first day, a random sample of 2000 visitors at the show were asked:



640 of them answered 'Yes'.

What was the relative frequency of those who answered 'Yes'?
Give your answer as a decimal. [1]

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(b) On the second day a random sample of 3000 visitors at the show were asked the same question.
The relative frequency of those who answered 'Yes' on this day was 0·42.

Calculate the relative frequency of those who said they lived on Anglesey when the samples for **both** days were combined.
Give your answer as a decimal. [4]

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(c) Which of the following is most likely to give the best estimate for the relative frequency of visitors to the show living on Anglesey?
Circle your answer.

Your answer to part *(a)*	0·42	Your answer to part *(b)*

You **must** give an explanation for your choice. [1]

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16. *(a)* (i) A mass is written as 430 kg, correct to the nearest 10 kg.
Circle the **least** possible value of this mass. [1]

420 kg 425 kg 429·5 kg 426 kg 424·9 kg

(ii) A time period is written as 22 seconds, correct to the nearest second.
Circle the **least** possible value of this time period. [1]

22 s 20 s 21 s 21·5 s 21·4 s

(iii) A population is written as 85 people, correct to the nearest five people.
Circle the **least** possible value of this population. [1]

83 people 81 people 84 people 82 people 80 people

(b) Calculate $(3{\cdot}4 \times 10^{-5}) \times 700$.
Give your answer in standard form. [2]

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Examiner only

17. Arthur, Sian and Kezia are all given some £1 coins.

Arthur receives £n.
Sian is given five times as much money as Arthur.
Kezia receives three times as much money as Arthur, plus an extra £7.

Sian was given less money than Kezia.

(a) Write down an inequality in terms of n that illustrates the fact that Sian received less money than Kezia. [2]

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(b) What was the greatest amount of money that Arthur could have been given? [2]

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Examiner only

18. Leah is visiting Cardiff.
The probability that she will go on a tour bus is 0·3.
The probability of Leah seeing a show at the Millennium Centre is independent of her going on a tour bus.

The probability that she goes on a tour bus and sees a show at the Millennium Centre is 0·24.

(a) Complete the following tree diagram. [4]

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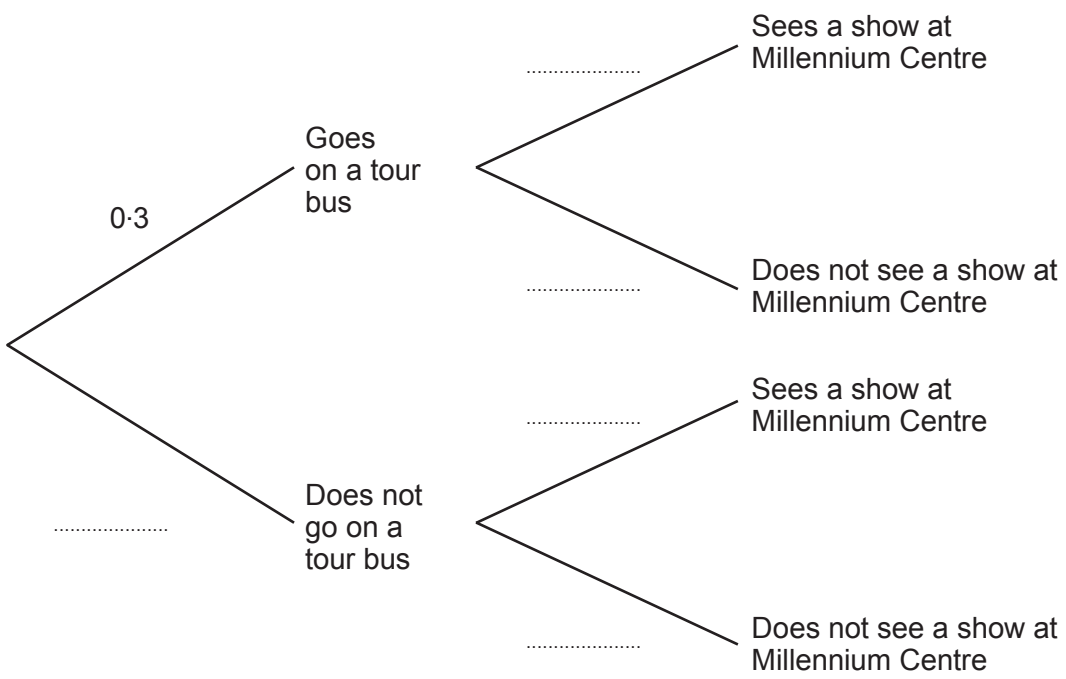

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(b) Calculate the probability that Leah does not go on a tour bus and does not see a show at the Millennium Centre. [2]

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Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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