

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS**

Unit B811 (Foundation Tier)

Specimen

F

B811

Candidates answer on the question paper
Additional Materials:

Geometrical instruments
Tracing paper (optional)

Time: 1 hour 30 minutes



Candidate
Name

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or 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.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- 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.
- The total number of marks for this paper is 100.



WARNING

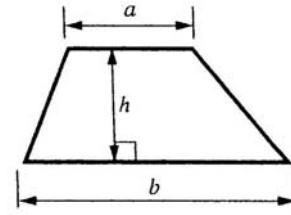
You are not allowed to use a calculator

FOR EXAMINER'S USE

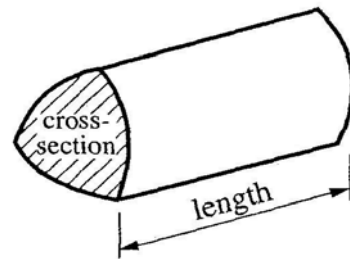
This document consists of **26** printed pages.

Formulae Sheet: Foundation Tier

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



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



1 Kofi wants to send one of each of these UK coins to his cousin in South Africa.



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(a) What is the total value of these coins?

.....
.....

(a) £ [2]

(b) Kofi sees a boxed set of the same coins in a shop.
The boxed set costs 25% more than the total value of the coins.

How much **more** does the boxed set cost?

.....
.....
.....
.....

(b) £ [2]

[Turn over

2 Shen delivers free newspapers after school.
 He delivers them over three days.
 Shen has to deliver 248 newspapers.
 He wants to deliver about the same number of newspapers each day.

(a) Here is his plan for how many newspapers to deliver each day.

Day	Number of newspapers to deliver
Tuesday	55
Wednesday	147
Thursday	66

(i) Check Shen's plan.
 Find two things wrong with his plan.

.....

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.....

.....

.....

.....

.....

.....

- 1.....
- 2..... [2]

(ii) Draw up a better plan in this table.

Day	Number of newspapers to deliver
Tuesday	
Wednesday	
Thursday	

.....

.....

..... [2]

(b) Each newspaper weighs about 200g.
Shen can carry 12 kg of newspapers.

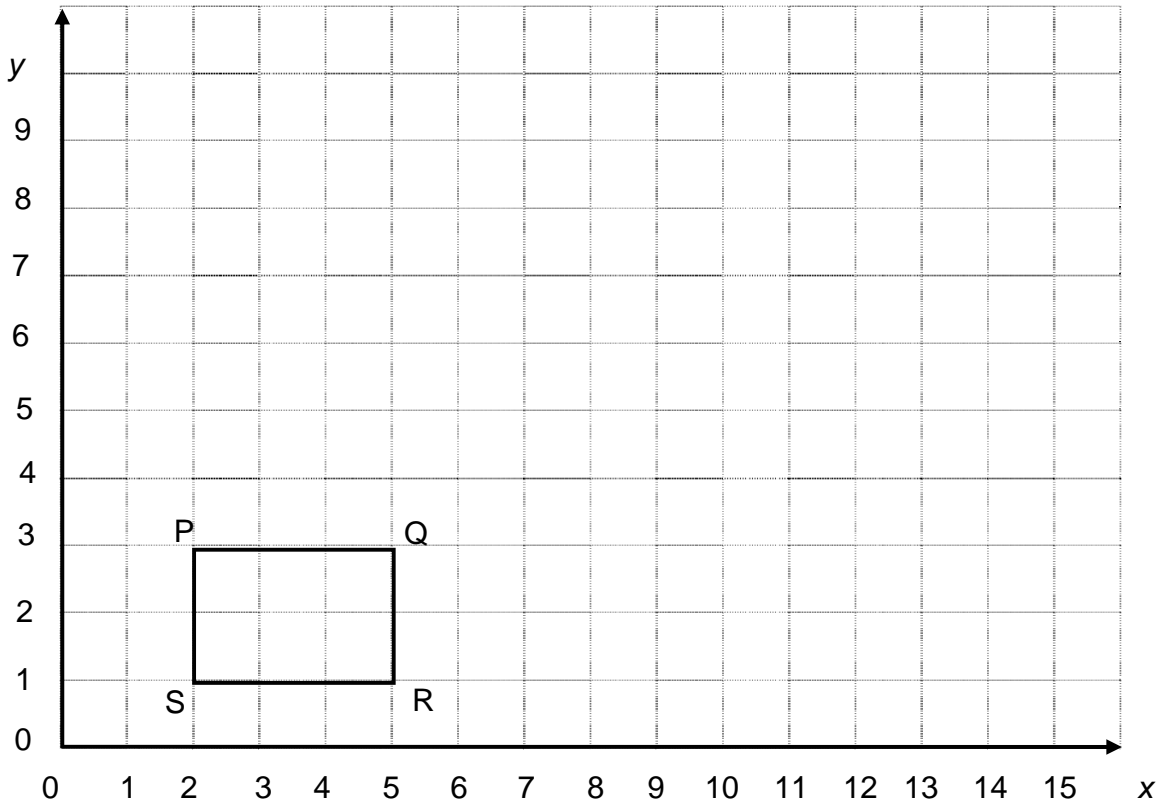
How many newspapers will Shen be able to carry?
Show clearly how you got your answer.

.....
.....
.....

(b) [3]

[Turn over

3



(a) Write down the coordinates of the point P.

(a) (..... ,) [1]

(b) On the grid above, draw an enlargement of quadrilateral PQRS, scale factor 3, centre (0, 0).

[3]

(c) How many times bigger is the area of the enlarged quadrilateral than the area of PQRS?

.....

(c) [2]

- 4 Amy is doing a multi-faith project in RE. She needs to change between the different year numberings used by some religions. For example, the year that Christians call 739, Hindus call 711.

She finds this information on the Internet.

Equivalent years of some religions		
Christian	Hindu	Islamic
739	711	117
1489	1461	867
2239	2211	1617

- (a) (i) Which Hindu year was equivalent to the Christian year 1999?

.....
 [1]

- (ii) Explain how to change a Christian year into a Hindu year.

.....

 [1]

- (b) (i) Which Hindu year will be the equivalent to the Islamic year 2017?

.....
 [1]

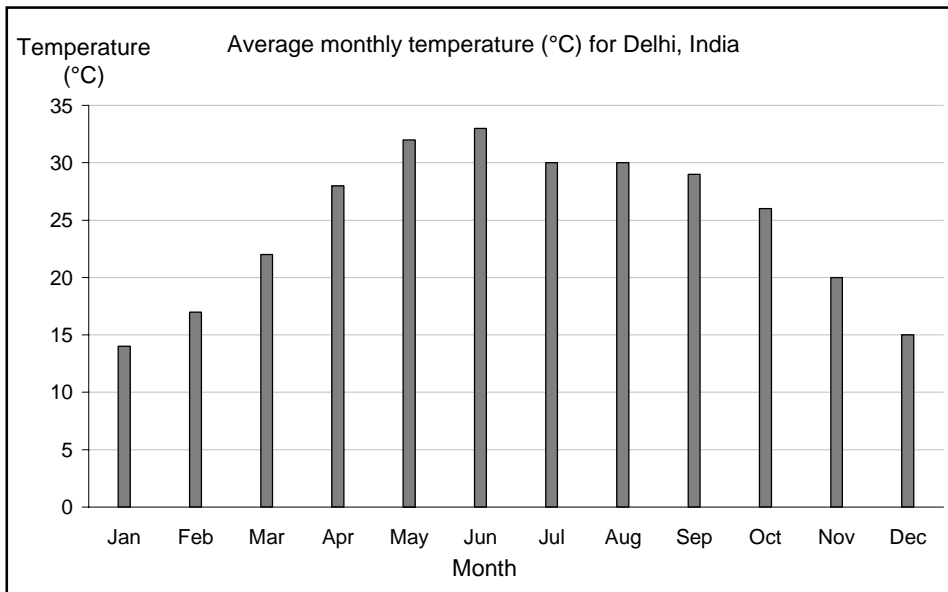
- (ii) Explain how to change an Islamic year into a Hindu year.

.....

 [1]

[Turn over

5 (a) Here is some information about the average monthly weather for Delhi, India.



(i) What is the average temperature for August?
 [1]

(ii) Which month is the coldest?
 [1]

(b)

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

Which are the wettest months?

(b) and [1]

(c) Mikal wants to visit a friend in Delhi.

He wants an average temperature above 25 °C but not above 30 °C.
 He wants there to be little rainfall.

Looking at the weather information, suggest when Mikal should visit Delhi.
 State values from the table and chart to support your answer.

.....

 [3]

[Turn over

6 A 5p coin is made of 75% copper and 25% nickel.

(a) What **fraction** of a 5p coin is nickel?

.....
(a) [2]

(b) Parveen has an **equal number** of 20p and 50p coins in a bag.
A 20p coin weighs 5 grams.
A 50p coin weighs 8 grams.
The coins weigh a total of 260 g.

What is the total value of the coins in her bag?

.....
.....
.....
.....
.....
(b) [4]

(c) People sometimes collect money by making a line or tower of coins.
The diameter of a 2p coin is 26.9 millimetres.
The thickness of a 2p coin is 2.0 millimetres.

(i) £20 worth of 2p coins are placed in a straight line.

How long is the line?



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.....
.....
.....
(c)(i) [4]

(ii) Each layer of a tower of 2p coins looks like this.



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How tall will the tower be when it contains £20 worth of 2p coins?

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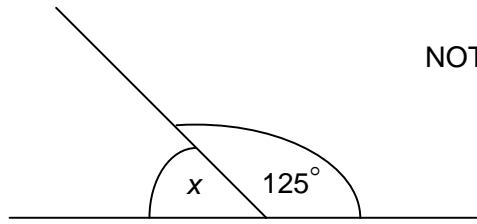
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(ii) [3]

[Turn over

7 (a) Find angle x .

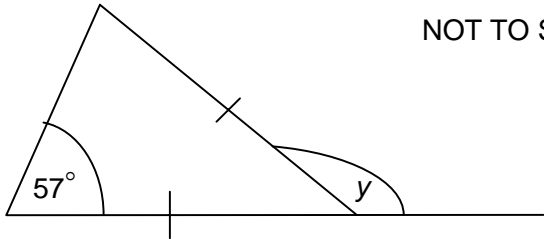


NOT TO SCALE

.....

(a) $^\circ$ [1]

(b) Find angle y .



NOT TO SCALE

.....
.....
.....

(b) $^\circ$ [3]

[Turn over

8 Amy needs a new highchair and pushchair.
She looks on the Internet for the best buy.

(a) Six highchairs are available.
The website gives stars for how easy the highchair is to:

- put up
- clean
- store
- use

Highchair				
	Put up	Clean	Store	Use
EA3	★★★	★★★★	★★	★★★★
MP2	★★★★	★★	★★★	★
EA1	★★★★	★★★	★★	★★★★
LD7	★★	★★★★★	★★★	★★
SC4	★★★	★★★★	★★★	★★★★
MP5	★★★	★★★	★★	★★★

Use the chart to choose the best highchair.
Give figures to support your choice.

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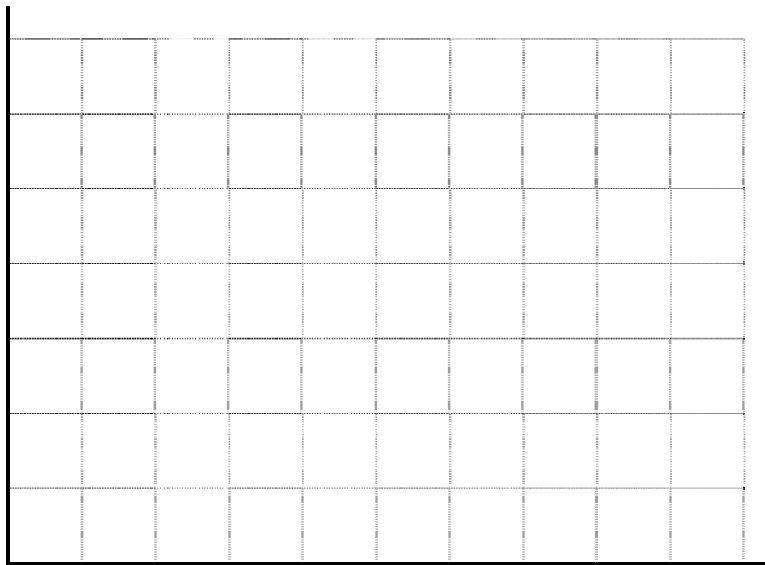
.....

..... [3]

9 The table gives the number of teachers in each of five schools in a town.

School	A	B	C	D	E
Number of teachers	48	64	55	36	27

(a) Using a suitable scale, draw a bar chart to represent the information in the table. Label your diagram clearly.



School

[4]

(b) Work out the range for the number of teachers.

.....

(b) [1]

(c) A new school is built in the town.
The range of the number of teachers in the six schools is now 44.

How many teachers are in the new school?

.....

(c) [1]

(d) There are 588 students in school D.
The students are divided into 21 tutor groups of equal size.

(i) How many students are in each tutor group?

.....

(d)(i) [1]

(ii) In one of these tutor groups there are 13 boys.
A student is chosen at random from this tutor group.

What is the probability that one of the boys is chosen?

.....

(ii) [1]

(e) There are 6 English teachers in school C.
The Headteacher chooses one of the 55 teachers in the school at random.

(i) What is the probability that an English teacher is **not** chosen?

.....

(e)(i) [1]

(ii) Explain why the probability that the teacher chosen is male may **not** be $\frac{1}{2}$.

.....

..... [1]

[Turn over

10 Josh has found a trick in a maths book.

Write down any five whole numbers.

It is always possible to add one or more of the numbers so that the answer is a multiple of 5.

This works for any five whole numbers you like.

His friend Neta says, "I bet it doesn't work for 13, 1, 6, 2 and 7."

Show that Neta is wrong.

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

11 People at a wedding sit round a large circular table which has a radius of 5 m.

Taking π as 3, work out how many people can sit round this table.
Assume each person took up a space of 60 cm.

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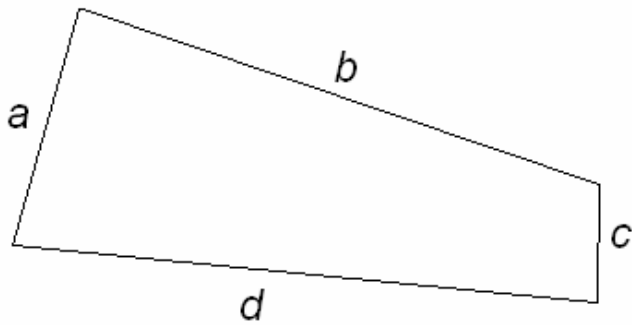
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..... [4]

[Turn over

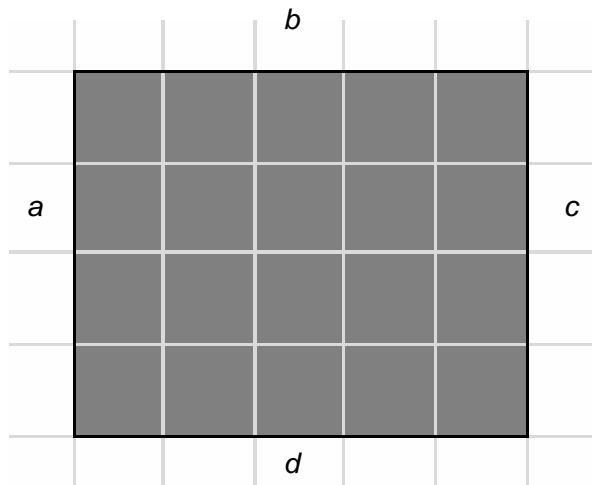
12 The Ancient Egyptians used this method to find areas of quadrilaterals.



- add the lengths a and c
- add the lengths b and d
- multiply your two answers
- divide by 4 to obtain the area

Use the Ancient Egyptian method to work out the area of this rectangle, drawn on a centimetre square grid.
Support your answers with working out.

(a)



.....

.....

.....

$a + c =$

$b + d =$

area = cm^2 [2]

(b) Does the Ancient Egyptian method work for this shape, drawn on a centimetre square grid.

Support your answers with working out.



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..... [3]

[Turn over

13 (a) In 2007, a market gardener recorded the number of strawberries produced by each of 30 plants.

The results are shown below.

32	35	12	42	36	23	24	11	48	51
40	24	25	31	38	16	37	24	42	36
17	16	21	23	26	28	19	20	53	26

(i) Draw an ordered stem and leaf diagram for these data.



Key

[3]

(ii) Find the median number of strawberries.

(a)(ii) [1]

(iii) Find the range of the number of strawberries

(iii) [1]

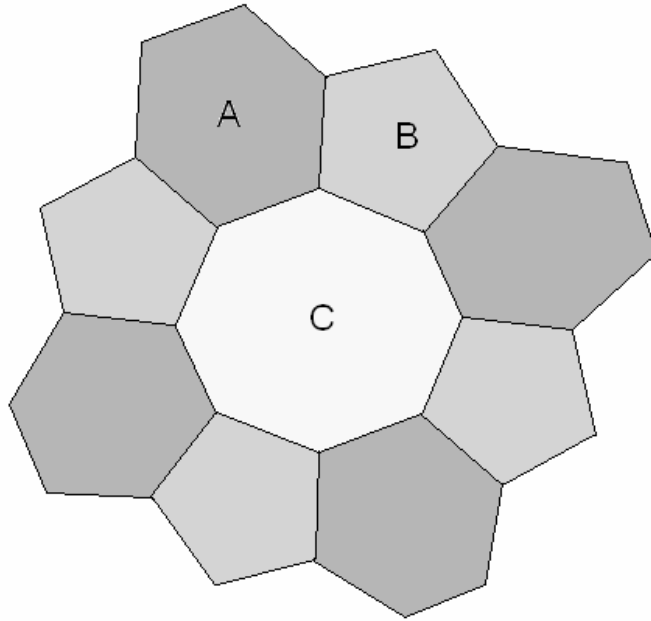
(b) In 2008 the gardener planted a different variety of strawberries.

He found that the median number of strawberries per plant was 23 and the range was 11.

Which of the two varieties of strawberries would you advise the gardener to plant in 2009?
Give your reason.

Plant the same variety as in because
..... [1]

14 Jasmine finds this tiling pattern in a book.



(a) What are the mathematical names of shapes A, B and C?

- (a) A [1]
- B [1]
- C [1]

(b) The book says:

“This tiling pattern is made from tiles of regular polygons.
All the tiles fit together perfectly with no space between them.”

Explain why the book is wrong.

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..... [4]

[Turn over

15 (a) Solve.

(i) $3x - 2 = x + 5$

.....

(a)(i) [2]

(ii) $5x > 2x + 3$

.....

(ii) [2]

(b) Multiply out and simplify.

$5(x - 3) - 2(x + 1)$

.....

(b) [2]

(c) Factorise completely.

$4x^2 - 6x$

.....

(c) [2]

16 A ball is rolled up a slope.

Its distance up the slope, d metres, after t seconds is given by this formula.

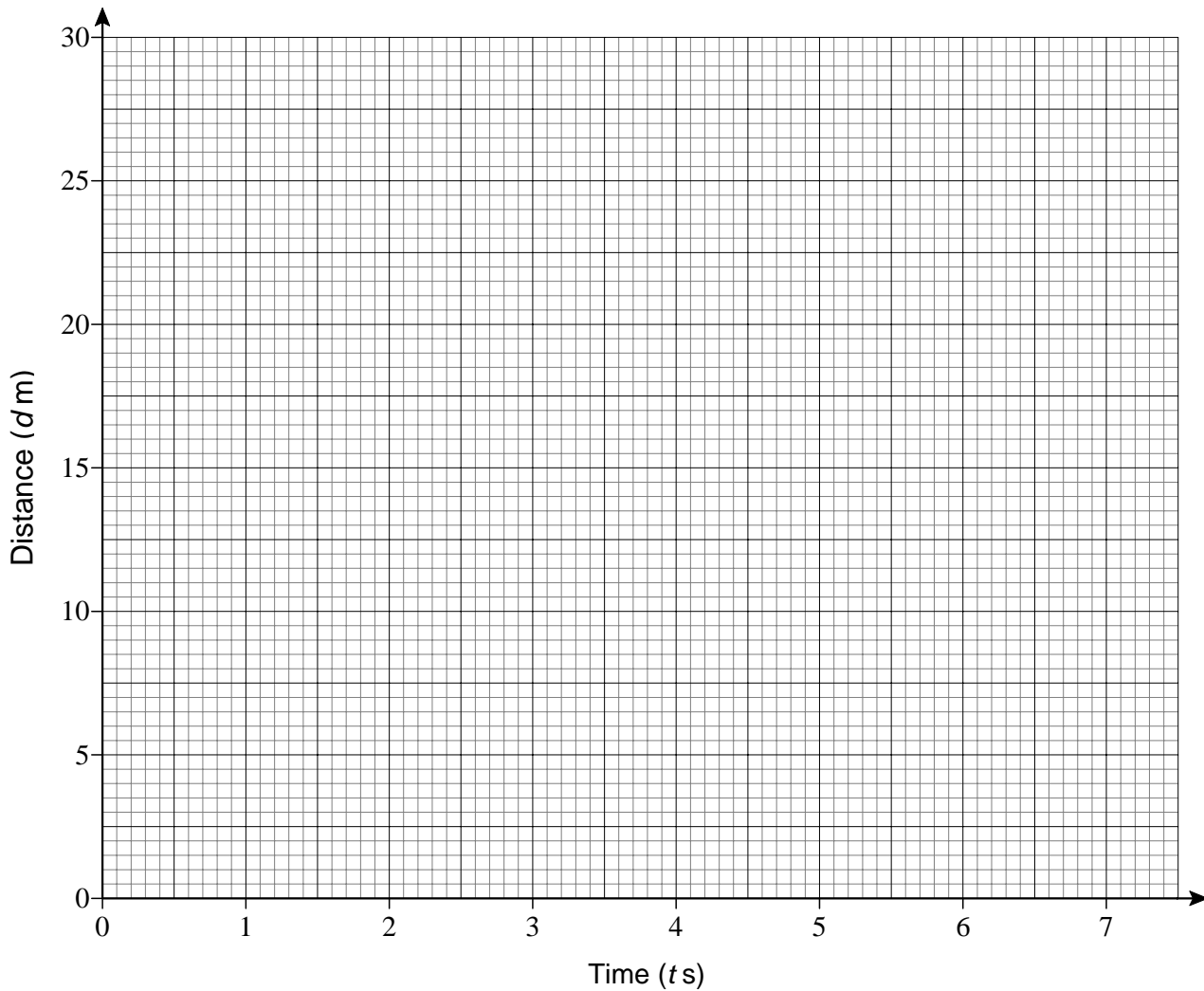
$$d = 15t - 2t^2.$$

(a) Complete the table for $d = 15t - 2t^2$.

t	0	1	2	3	4	5	6	7
d	0		22	27	28		18	7

[2]

(b) Draw the graph of $d = 15t - 2t^2$.



[3]

(c) Use the graph to find the times when the distance up the slope is 20 m.

(c) s and s [2]

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B811 Specimen Mark Scheme

1 (a)	£3.88	2	M1 for digits 288 (i.e. poor money notation)
(b)	$(a) \div 4 = 0.97$	2	M1 for $(a) \div 4$, allow full follow through SC1 result of $1.25 \times (a)$ i.e. the total price
2 (a) (i)	Uneven number per day oe total is 268 oe	1	M1 May be implied; in same units M1 A1 <i>Their</i> correct answer from <i>their</i> figures
(ii)	Correct total (248) more or less equal each day ± 10	1	
(b)	0.20 or 12 000 appropriate division = correct answer	1	
		1	
3 (b)	(2,3)	1	Accept correct freehand drawing B2 for correctly sized enlargement but incorrect centre of enlargement B1 for rectangle with one side of correct length M1 for 3×3 seen or <i>their</i> (54) $\div 6$ seen
(b)	Correct enlargement	3	
(c)	9	$\sqrt{2}$	
4 (a) (i)	1971	1	Allow equivalent
(ii)	Subtract 28	1	Allow equivalent
(b) (i)	2611	1	
(ii)	Add 594	1	
5 (a) (i)	30°C	1	
(ii)	January	1	
(b)	July and August	1	
(c)	April and/or October + ref to temp & rain	3	B2 April and/or October + ref to temp or rain B1 April and/or October
6 (a)	$\frac{1}{4}$ or $\frac{25}{100}$	2	No credit for 25% seen as answer but M1 if seen in working
(b)	$260 \div (8 + 5)$ = 20 "20" $\times 20$ + "20" $\times 50$ oe = £14	M1 A1 M1 A1	B4 www (also for T&I) Condone 1 error or omission Must have correct number and unit
(c) (i)	1000 coins <i>their</i> 1000×26.9 figs 269 seen correct units given	M1 M1 A1 A1	In (c) only penalise units once.
(ii)	20p on each layer calculating 100 layers = 200 mm oe	M1 M1 M1	Must have correct unit to fit number

7 (a)	55°	1	
(b)	114° www	B3	M1 use of isosceles triangle M1 complete method
8 (a)	eg SC4 is best as it has 14 stars (accept any justified response)	3	Must have correct answer and reason M1 for evidence of correct addition of stars M1 for attempts to rank (possibly wrong totals) or M1 for making choice based on correct totals for just one feature
(b)	Stroller is best as only 2% broke down	4	Award only 3 if no evidence of at least one other correct percentage from 4%, 5% or 6% or M1 for each instance of a correct % or equivalent fraction, decimal or equivalent (maximum 3) for each of 2%, 4%, 5% , 6%
9 (a)	Correct bar chart (must have gaps between bars)	4	B1 for correct vertical scale B1 for 4 or more bars labelled correctly B2 for 5 correct heights or B1 for any 3 correct heights
(b)	37	1	
(c)	20 and/or 71	1	
(d) (i)	28	1	
(ii)	13/28	$\sqrt{1}$	$\sqrt{13}$ / <i>their</i> d(i)
(e) (i)	49/55	1	
(ii)	The number of male and female teachers are not the same	1	Accept: 55 is an odd number Numbers of male / female not known oe
10	$13 + 7 = 20$ or $6 + 2 + 7 = 15$ 20 or 15 are multiples of 5 oe	1 1	
11	Use of $2\pi r$ Division by figs 60 = 50	M1 M1 A2	A1 for figs 5(0 ...)
12 (a)	$20 \text{ (cm}^2\text{)}$ oe	2	M1 for sight of 8 or 12
(b)	Area: -from the formula 15 or $(6 \times 10) \div 4$ seen -from calculation or their own method 12 or (3×4) seen Clear conclusion based on <i>their</i> figures	1 1 1	

Assessment Objectives Grid

Question	AO1	AO2	AO3	Total
1	4			4
2		3	4	7
3	6			6
4		4		4
5		3	3	6
6	2	7	4	13
7	4			4
8		7		7
9	7	3		10
10			2	2
11		4		4
12	3	2		5
13	5		1	6
14	3		4	7
15	8			8
16	7			7
Totals	49	33	18	100

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