

# International GCSE Maths Specification A 2022 Regional (R) Examination Feedback

4MA1-23IO7





# Agenda

- Marking tips
- Grade Boundaries
- Foundation and Higher
  - Winners
  - Not so winners
  - Ones to watch
- Resources

# Grade Boundaries

<b>Foundation Tier</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Paper 1</b>					58	43	32	21	10
<b>Paper 2</b>					59	44	33	22	11
<b>Total</b>					<b>122</b>	<b>87</b>	<b>65</b>	<b>43</b>	<b>21</b>

<b>Higher Tier</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Paper 1</b>	71	57	44	33	22	11	5		
<b>Paper 2</b>	65	52	40	30	20	10	5		
<b>Total</b>	<b>143</b>	<b>113</b>	<b>84</b>	<b>63</b>	<b>42</b>	<b>21</b>	<b>10</b>		

(‘R’ papers are taken by those candidates in regions five or more hours ahead of GMT.  
Total boundaries are given out of 200)

# Marking Guidance

## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.





# Marking Guidance

## **Types of mark**

- M marks: method marks
- A marks: accuracy marks
- B marks: unconditional accuracy marks (independent of M marks)

## **Abbreviations**

- cao – correct answer only
- ft – follow through
- isw – ignore subsequent working
- SC - special case
- oe – or equivalent (and appropriate)
- dep – dependent
- indep – independent
- awrt – answer which rounds to
- eeoo – each error or omission

# Marking Guidance

## **No working**

- If no working is shown then correct answers normally score full marks
- If no working is shown then incorrect (even though nearly correct) answers score no marks.

## **With working**

- If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
- If it is clear from the working that the “correct” answer has been obtained from incorrect working, award 0 marks.
- If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified.
- Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.
- If there is no answer on the answer line then check the working for an obvious answer.

# Marking Guidance

## **Ignoring subsequent work**

- It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.
- It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
- Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

## **Parts of questions**

- Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

# Marking Guidance

International GCSE Maths				
Apart from Questions 3, 5b, 6a, 16, 19 and 23 (where the mark scheme states otherwise), the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.				
Q	Working	Answer	Mark	Notes
1 (a)			2	M1 for $4n + k$ ( $k \neq -3$ ) or $4 \times n + k$ ( $k \neq -3$ ) or $n \times 4 + k$ ( $k \neq -3$ ) ( $k$ may be zero or absent)
		$4n - 3$		A1 oe e.g. $1 + (n - 1)4$ oe or $4 \times n - 3$ oe or $n \times 4 - 3$ oe NB: award full marks for eg $x = 4n - 3$ oe or $x = 4 \times n - 3$ oe or $x = n \times 4 - 3$ oe or $n$ th term = $4n - 3$ oe or $n$ th term = $4 \times n - 3$ oe or $n$ th term = $n \times 4 - 3$ oe but only M1 for $n = 4n - 3$ oe
(b)		$6m + 5$	1	B1 for $3(2m) + 5$ oe or $6m + 5$ or $3 \times 2m + 5$ oe or $6 \times m + 5$ Allow $3(2n) + 5$ or $6n + 5$ oe
				<b>Total 3 marks</b>



# Foundation – The Winners!

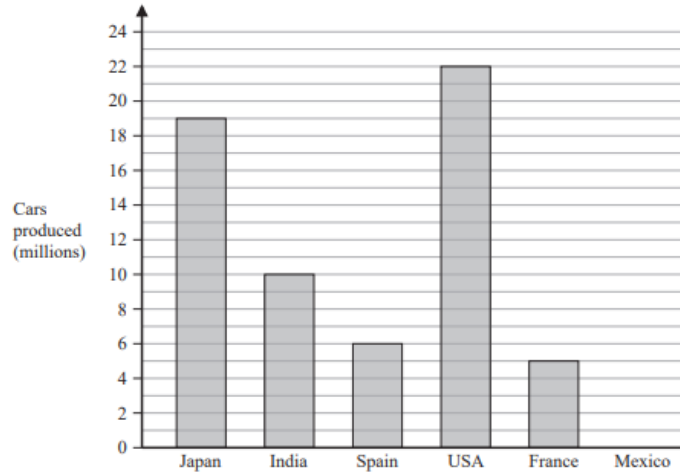


# Foundation Papers – The Winners!

	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2FR	Q02	Graphical representation of data	3.64	4	91	3.64	3.83	3.79	3.71	3.56	0.00	0.00
1FR	Q03	Graphical representation of data	3.50	4	88	3.50	3.83	3.72	3.61	3.12	2.76	1.26
1FR	Q04	Fractions	3.34	4	84	3.34	3.91	3.69	3.37	2.67	1.92	0.88
2FR	Q06	Integers	3.29	4	82	3.29	3.55	3.37	3.37	3.12	0.00	0.00
2FR	Q08	Applying number	2.46	3	82	2.46	2.92	2.73	2.46	2.07	1.19	0.19

# Foundation – The Winners!

- 2 The bar chart gives information about the total number, in millions, of cars produced in 2017 and 2018 for each of five countries.



The total number of cars produced in 2017 and 2018 in Mexico was 8 million.

(a) Draw a bar on the bar chart to show this information.

(b) Which of these six countries produced the greatest total number of cars?

(c) Which country produced half as many cars as India?

(d) Work out the difference between the total number of cars produced in Japan and the total number of cars produced in Spain.

- 3 The pictogram shows information about the number of loaves of bread sold in a bakery each day from Tuesday to Friday last week.

Monday	
Tuesday	○ ○ ◐
Wednesday	○ ◐
Thursday	◐
Friday	○ ○ ○

Key: ○ represents 6 loaves of bread

(a) How many loaves of bread were sold on Friday?

	Question	Skill tested	Mean score	Max score	Mean %	ALL
2FR	Q02	Graphical representation of data	3.64	4	91	3.64
1FR	Q03	Graphical representation of data	3.50	4	88	3.50
1FR	Q04	Fractions	3.34	4	84	3.34
2FR	Q06	Integers	3.29	4	82	3.29
2FR	Q08	Applying number	2.46	3	82	2.46

The total number of loaves sold in the bakery from Monday to Friday last week was 66

(b) (i) Work out the number of loaves sold on Monday last week.

(ii) Show this information for Monday on the pictogram.

# Foundation – The Winners!

4 (a) Write 0.7 as a fraction.

(b) Write a number in the box so that the following statement is correct.

$\frac{3}{4}$  and  $\frac{\boxed{\phantom{000}}}{20}$  are equivalent fractions.

(c) Work out  $\frac{3}{5}$  of 35

(1)

(1)

6 (a) Find the value of

(i)  $\sqrt{31.36}$

(ii)  $14^3$

(b) Write a number on each dotted line to make the calculation correct.

(i)  $10 - \dots \times 2 = 4$

(ii)  $(5 + \dots) \times 3 = 36$

(1)

(1)

	Question	Skill tested	Mean score	Max score	Mean %	ALL
2FR	Q02	Graphical representation of data	3.64	4	91	3.64
1FR	Q03	Graphical representation of data	3.50	4	88	3.50
1FR	Q04	Fractions	3.34	4	84	3.34
2FR	Q06	Integers	3.29	4	82	3.29
2FR	Q08	Applying number	2.46	3	82	2.46

(1)

# Foundation – The Winners!

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2FR	Q06	Integers	3.29	4	82	3.29
2FR	Q08	Applying number	2.46	3	82	2.46

8 Jordan buys 256 notebooks.

He buys the notebooks in packs of 8 notebooks.

Each pack of 8 notebooks costs £2.48

Work out how much the 256 notebooks cost Jordan.



# Foundation – The not so winners!



# Foundation

- The “not so winners”

	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2FR	Q24	Powers and roots	0.07	2	4	0.07	0.23	0.02	0.00	0.00	0.00	0.00
2FR	Q21	Set language and notation	0.69	5	14	0.69	1.45	0.68	0.33	0.16	0.00	0.00
2FR	Q27	Trigonometry and Pythagoras' Theorem	0.69	5	14	0.69	2.06	0.37	0.15	0.05	0.05	0.00
1FR	Q26	Graphs	0.48	3	16	0.48	1.38	0.28	0.12	0.06	0.03	0.00
1FR	Q27	Trigonometry and Pythagoras' Theorem	0.98	6	16	0.98	2.90	0.52	0.21	0.07	0.21	0.00

24  $\frac{2^k}{4^n} = 2^x$

Find an expression for  $x$  in terms of  $k$  and  $n$

	Paper											
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2FR	Q24	Powers and roots	0.07	2	4	0.07	0.23	0.02	0.00	0.00	0.00	0.00

21  $\mathcal{E} = \{9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$   
 $A = \{\text{multiples of } 3\}$   
 $B = \{\text{odd numbers}\}$

(a) List the members of the set

(i)  $A \cap B$

(1)

(ii)  $A \cup B$

(1)

(b) Is it true that  $24 \in A$ ?

Tick one of the boxes below.

Yes

No

☐☐

Give a reason for your answer.

(1)

Set  $C$  has 4 members such that  $C \cap B' = \{10, 18\}$

(c) List the members of one possible set  $C$

	Paper											
			Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
Paper	Question	Skill tested										
2FR	Q21	Set language and notation	0.69	5	14	0.69	1.45	0.68	0.33	0.16	0.00	0.00

27 The diagram shows triangle  $ABP$  inside the regular hexagon  $ABCDEF$

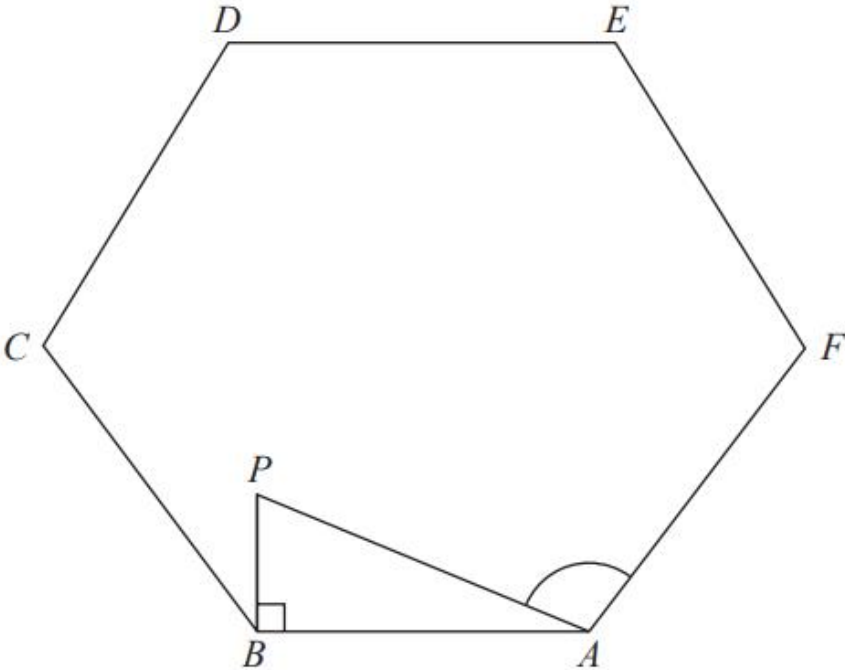


Diagram **NOT**  
accurately drawn

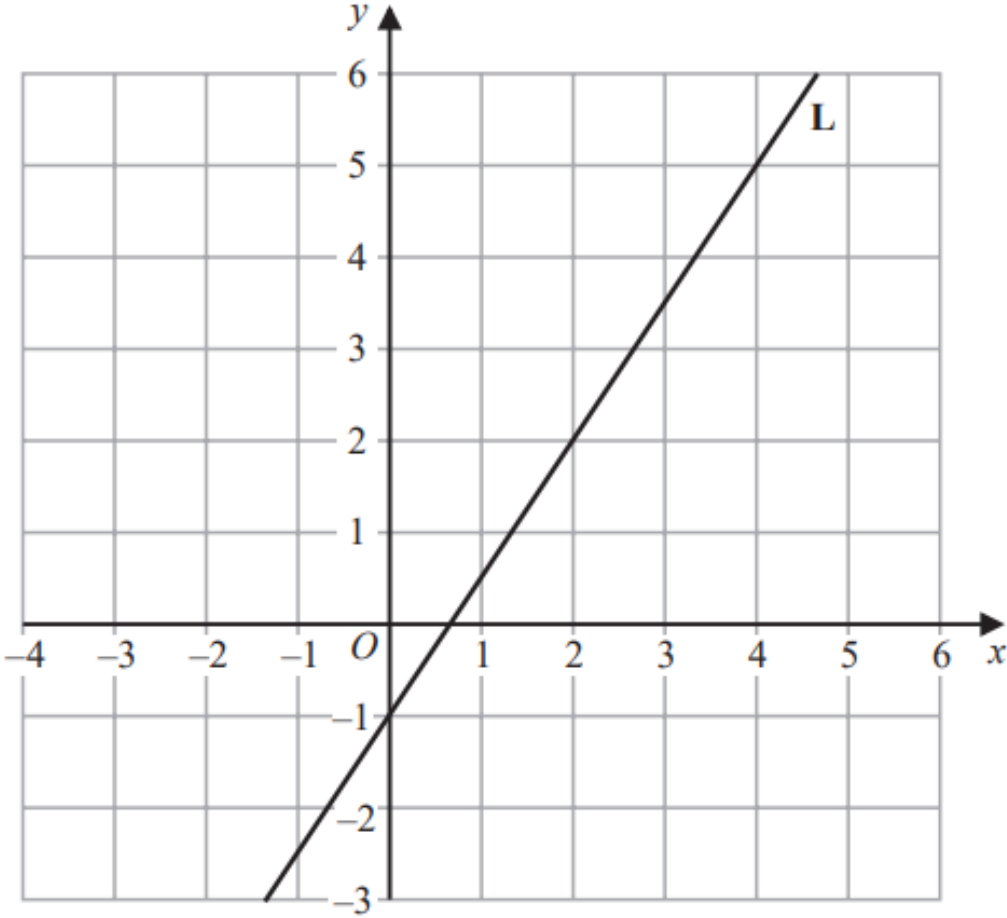
$AB = 5\text{ cm}$        $BP = 2\text{ cm}$       Angle  $ABP = 90^\circ$

Work out the size of angle  $PAF$   
Give your answer correct to 3 significant figures.

v	Paper											
			Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
Paper	Question	Skill tested										
2FR	Q27	Trigonometry and Pythagoras' Theorem	0.69	5	14	0.69	2.06	0.37	0.15	0.05	0.05	0.00



26 Line **L** is drawn on the grid.



Find an equation for **L**  
Give your answer in the form  $y = mx + c$

	Paper											
			Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
Paper	Question	Skill tested										
1FR	Q26	Graphs	0.48	3	16	0.48	1.38	0.28	0.12	0.06	0.03	0.00

27 The diagram shows a quadrilateral  $ABCD$

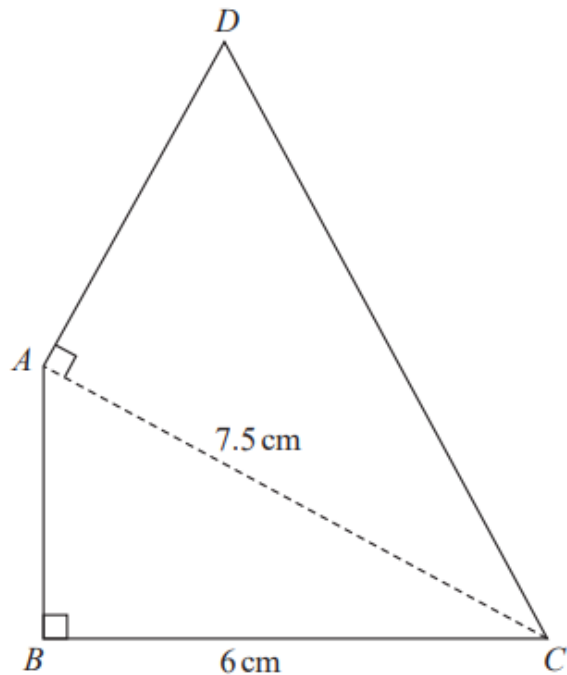


Diagram **NOT**  
accurately drawn

In the diagram,  $ABC$  and  $DAC$  are right-angled triangles.

$BC = 6\text{ cm}$        $AC = 7.5\text{ cm}$

The area of quadrilateral  $ABCD$  is  $31.5\text{ cm}^2$

Work out the length of  $AD$

	Paper											
			Mean score	Max score	Mean %							
Paper	Question	Skill tested				ALL	5	4	3	2	1	U
1FR	Q27	Trigonometry and Pythagoras' Theorem	0.98	6	16	0.98	2.90	0.52	0.21	0.07	0.21	0.00

# Foundation – Ones to watch



# Ones to Watch – Grade 4

Paper												
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2FR	Q22	Mensuration of 2D shapes	0.97	4	24	0.97	2.44	<b>0.84</b>	0.25	0.06	0.08	0.00
1FR	Q27	Trigonometry and Pythagoras' Theorem	0.98	6	16	0.98	2.90	<b>0.52</b>	0.21	0.07	0.21	0.00
1FR	Q26	Graphs	0.48	3	16	0.48	1.38	<b>0.28</b>	0.12	0.06	0.03	0.00
1FR	Q12	Polygons	0.63	3	21	0.63	1.64	<b>0.56</b>	0.12	0.02	0.00	0.00
2FR	Q16	Statistical measures	1.26	4	32	1.26	2.65	<b>1.29</b>	<b>0.51</b>	0.36	0.00	0.00

# Ones to Watch

12 The diagram below shows the trapezium  $PQRS$

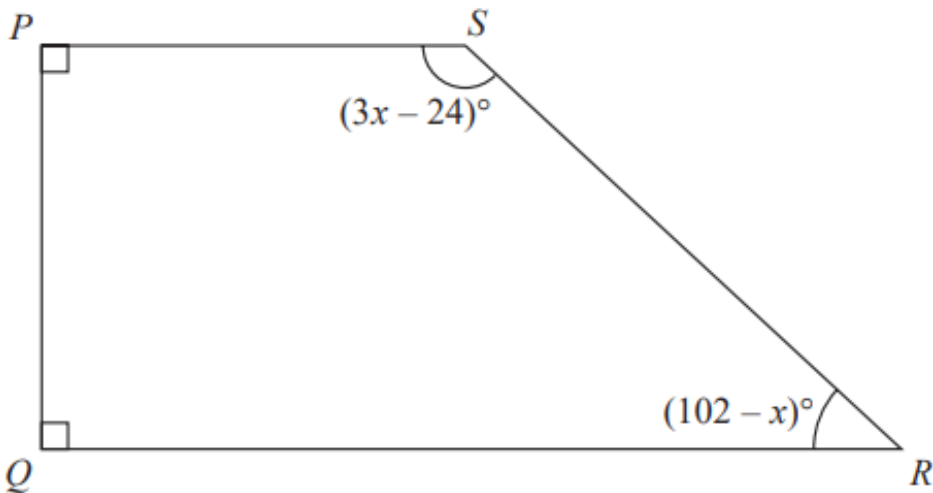


Diagram **NOT** accurately drawn

Angle  $PQR$  and angle  $QPS$  are right angles.

Find the value of  $x$

	Paper											
			Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
Paper	Question	Skill tested										
1FR	Q12	Polygons	0.63	3	21	0.63	1.64	<b>0.56</b>	0.12	0.02	0.00	0.00



16 The table shows information about the number of mobile phones owned by each of 40 families.

Number of mobile phones	Frequency
0	1
1	5
2	12
3	9
4	11
5	2

For the information in the table,

(a) write down the mode,

(1)

(b) work out the mean.

	Paper											
			Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
Paper	Question	Skill tested										
2FR	Q16	Statistical measures	1.26	4	32	1.26	2.65	<b>1.29</b>	<b>0.51</b>	0.36	0.00	0.00

# Higher – The Winners!



# Higher– The Winners!

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2HR	Q09	Standard form	3.63	4	91	3.63	3.91	3.80	3.69	3.57	3.47	3.11	2.30
1HR	Q03	Statistical measures	2.64	3	88	2.64	2.98	2.92	2.84	2.67	2.30	1.72	0.62
1HR	Q06	Fractions	2.63	3	88	2.63	2.92	2.86	2.81	2.63	2.42	1.76	0.99
1HR	Q01	Probability	3.43	4	86	3.43	3.86	3.74	3.63	3.39	3.14	2.40	1.29
2HR	Q02	Powers and roots	2.54	3	85	2.54	2.87	2.76	2.67	2.44	2.29	1.77	0.98

# Higher– The Winners!

- 9 The table gives information about the population, correct to 2 significant figures, of each of five cities in 2018

City	Population (2018)
Ahmedabad	$7.7 \times 10^6$
Barcelona	$5.5 \times 10^6$
Chicago	$8.8 \times 10^6$
Lagos	$1.3 \times 10^7$
Tokyo	$3.7 \times 10^7$

- (a) Write  $8.8 \times 10^6$  as an ordinary number.

.....  
(1)

- (b) Which of these cities had the least population in 2018?

.....  
(1)

- (c) Work out the difference between the population of Tokyo and the population of Ahmedabad in 2018  
Give your answer in standard form correct to 2 significant figures.

	Qu	Skill tested	Mean score	Max score	Mean %	ALL
2HR	Q09	Standard form	3.63	4	91	3.63
1HR	Q03	Statistical measures	2.64	3	88	2.64
1HR	Q06	Fractions	2.63	3	88	2.63
1HR	Q01	Probability	3.43	4	86	3.43
2HR	Q02	Powers and roots	2.54	3	85	2.54

- 3 Here are five cards.

Each card has a number written on it.



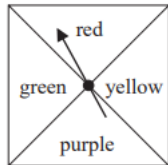
The mean of the five numbers is 12

Work out the value of  $x$

6 Show that  $2\frac{2}{3} + 3\frac{3}{4} = 6\frac{5}{12}$

# Higher– The Winners!

1 Here is a biased spinner.



When the spinner is spun once, the probabilities that it lands on red or on yellow or on green are given in the table.

Colour	red	yellow	purple	green
Probability	0.25	0.2		0.2

(a) Work out the probability that the spinner lands on red or on yellow.

Yang is going to spin the spinner 300 times.

(b) Work out an estimate for the number of times the spinner will land on purple.

	Qu	Skill tested	Mean score	Max score	Mean %	ALL
2HR	Q09	Standard form	3.63	4	91	3.63
1HR	Q03	Statistical measures	2.64	3	88	2.64
1HR	Q06	Fractions	2.63	3	88	2.63
1HR	Q01	Probability	3.43	4	86	3.43
2HR	Q02	Powers and roots	2.54	3	85	2.54

2 Write 1200 as a product of powers of its prime factors.  
Show your working clearly.

eg  $2 \times 2 \times 300$   
 $2 \times 5 \times 120$   
 $2 \times 3 \times 200$   
 $3 \times 5 \times 80$  or

eg

```

1200
 /  \
2    600
     /  \
    3    200
         /  \
        2    100
            /  \
           2    50
              /  \
             2    25
                /  \
               5    5
    
```

or

2	1200
3	600
	200

2, 2, 2, 2, 3, 5, 5  
or

```

1200
 /  \
2    600
     /  \
    3    200
         /  \
        2    100
            /  \
           2    50
              /  \
             2    25
                /  \
               5    5
    
```

oe

2	1200
3	600
2	200
5	100
2	20
5	10
2	2
	(1)



# Examiners Comments

- The majority of the questions on this paper were well-attempted by this cohort. As is often the case with this paper, there were plenty of blank responses in the latter stages. Students are now well-accustomed to being asked to show their working and it was pleasing to see the majority of answers supported with full workings out.
- Students were less successful in using set theory, indices and working with prime factors
- On the whole, working was shown and was easy to follow through. Some students could not recall the conversion that there are 1000m in 1km as in Q5.
- A striking weakness in students was solving problems with areas, writing a number as a product of prime factors in index form, applying trigonometry and using median, mode and range in context. Overall, students struggled with problem solving questions and questions assessing mathematical reasoning. This was particularly apparent in questions 15, 20 and 27

Higher –  
The not so  
winners!



# Higher – The not so winners

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1HR	Q24	Probability	0.51	5	10	0.51	1.71	0.18	0.03	0.00	0.00	0.00	0.00
2HR	Q25	Vectors	0.64	5	13	0.64	1.90	0.47	0.12	0.03	0.00	0.00	0.01
1HR	Q22	Calculus	1.22	7	17	1.22	3.71	0.80	0.17	0.08	0.01	0.00	0.00
1HR	Q20	Similarity	0.79	4	20	0.79	2.27	0.67	0.13	0.05	0.00	0.00	0.00
2HR	Q24	3D shapes and volume	1.35	6	23	1.35	3.52	1.37	0.47	0.13	0.03	0.00	0.00

24 Elliot has  $x$  counters.

Each counter has one red face and one green face.

Elliot spreads all the counters out on a table and sees that the number of counters showing a red face is 5

Elliot then picks at random one of the counters and turns the counter over.  
He then picks at random a second counter and turns the counter over.

The probability that there are still 5 counters showing a red face is  $\frac{19}{32}$

Work out the value of  $x$   
Show clear algebraic working.

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1HR	Q24	Probability	0.51	5	10	0.51	1.71	0.18	0.03	0.00	0.00	0.00	0.00



25  $ABCD$  is a parallelogram and  $ADM$  is a straight line.

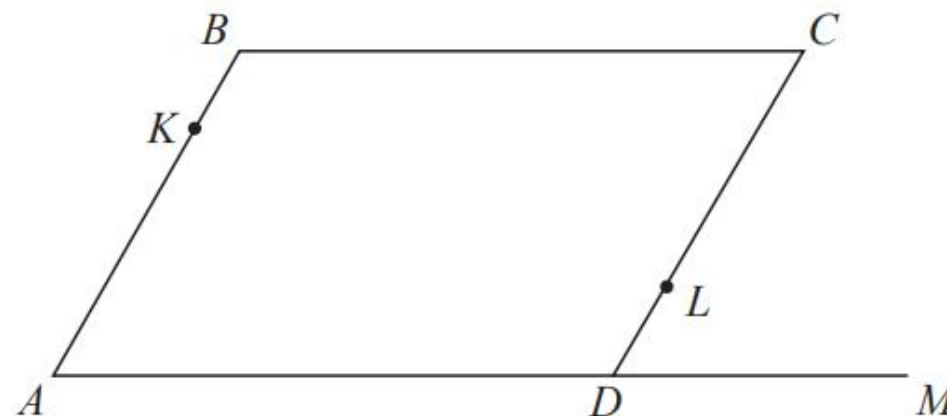


Diagram **NOT**  
accurately drawn

$$\vec{AB} = \mathbf{a} \quad \vec{BC} = \mathbf{b} \quad \vec{DM} = \frac{1}{2} \mathbf{b}$$

$K$  is the point on  $AB$  such that  $AK:AB = \lambda:1$

$L$  is the point on  $CD$  such that  $CL:CD = \mu:1$

$KLM$  is a straight line.

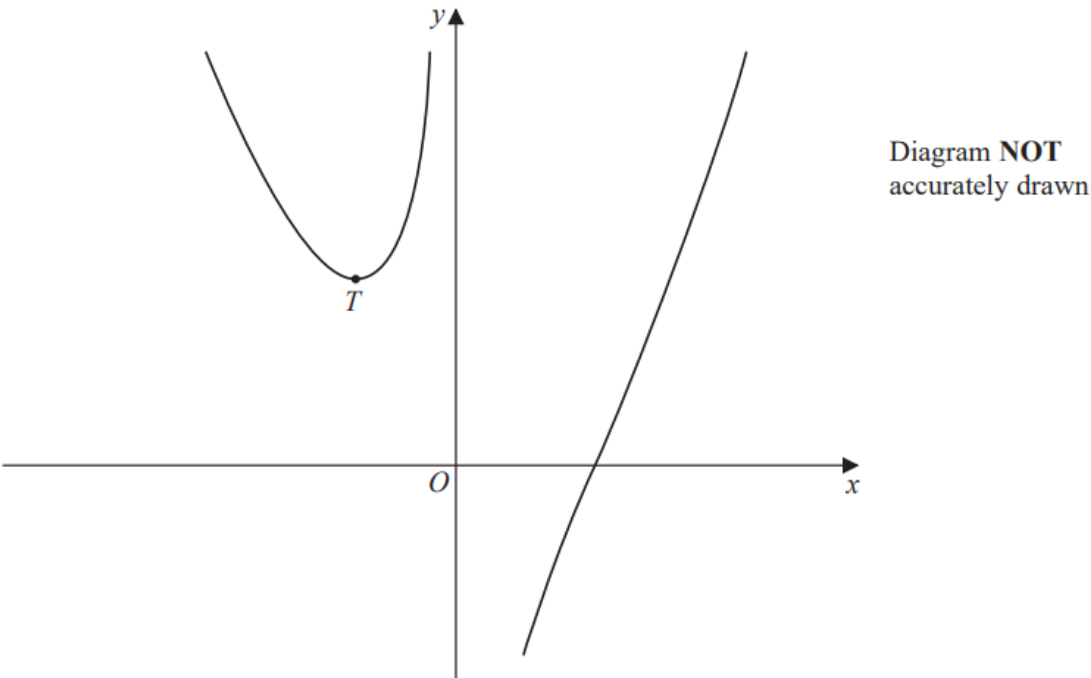
Given that  $\lambda:\mu = 1:2$

use a vector method to find the value of  $\lambda$  and the value of  $\mu$

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2HR	Q25	Vectors	0.64	5	13	0.64	1.90	0.47	0.12	0.03	0.00	0.00	0.01



22 The diagram shows a sketch of part of the curve with equation  $y = x^2 - \frac{p}{x}$  where  $p$  is a positive constant.



For all values of  $p$ , the curve has exactly one turning point and this turning point is a minimum shown as the point  $T$  in the sketch.

For the curve where the  $x$  coordinate of  $T$  is  $-3$

(a) find the value of  $p$

The line with equation  $y = k$  is a tangent to the curve with equation  $y = x^2 - \frac{16}{x}$

(b) Find the value of  $k$

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1HR	Q22	Calculus	1.22	7	17	1.22	3.71	0.80	0.17	0.08	0.01	0.00	0.00

20 The diagram shows two similar metal statues.



A



B

Diagram **NOT**  
accurately drawn

The volume of statue **B** is 20% less than the volume of statue **A**

The surface area of statue **B** is  $k\%$  less than the surface area of statue **A**

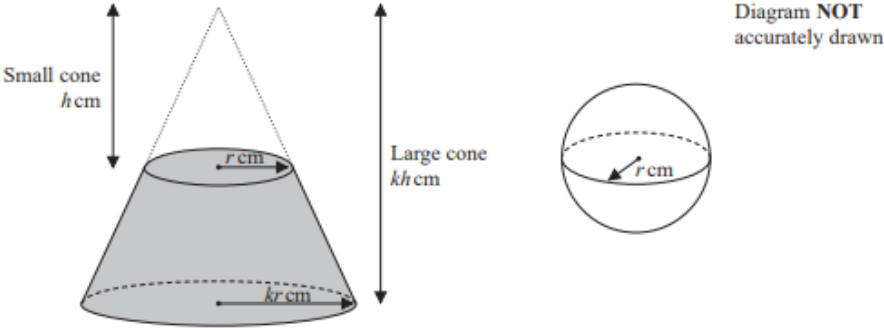
Work out the value of  $k$

Give your answer correct to 3 significant figures.

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1HR	Q20	Similarity	0.79	4	20	0.79	2.27	0.67	0.13	0.05	0.00	0.00	0.00

24 The diagram shows a frustum of a cone, and a sphere.

The frustum, shown shaded in the diagram, is made by removing the small cone from the large cone.  
The small cone and the large cone are similar.

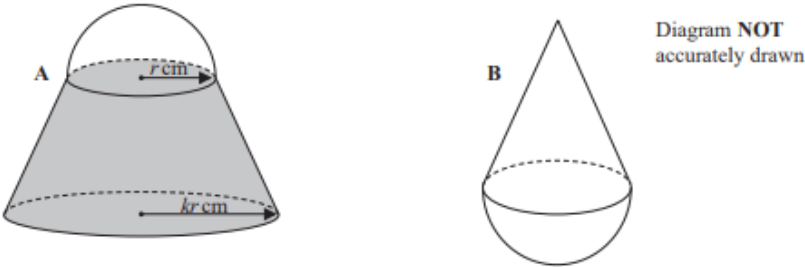


The height of the small cone is  $h$  cm and the radius of the base of the small cone is  $r$  cm.  
The height of the large cone is  $kh$  cm and the radius of the base of the large cone is  $kr$  cm.  
The radius of the sphere is  $r$  cm.

The sphere is divided into two hemispheres, each of radius  $r$  cm.

Solid A is formed by joining one of the hemispheres to the frustum.  
The plane face of the hemisphere coincides with the upper plane face of the frustum, as shown in the diagram below.

Solid B is formed by joining the other hemisphere to the small cone that was removed from the large cone.  
The plane face of the hemisphere coincides with the plane face of the base of the small cone, as shown in the diagram below.



The volume of solid A is 6 times the volume of solid B.

Given that  $k > \sqrt[3]{7}$

find an expression for  $h$  in terms of  $k$  and  $r$

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2HR	Q24	3D shapes and volume	1.35	6	23	1.35	3.52	1.37	0.47	0.13	0.03	0.00	0.00

# Higher – Ones to watch





# Ones to Watch - Grade 8

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1HR	Q25	Sequences	1.57	5	31	1.57	3.97	<b>1.76</b>	<b>0.54</b>	0.17	0.05	0.01	0.00
1HR	Q22	Calculus	<del>1.22</del>	<del>7</del>	<del>17</del>	<del>1.22</del>	<del>3.71</del>	<b>0.80</b>	0.17	0.08	0.01	0.00	0.00
2HR	Q20	Graphs	1.36	4	34	1.36	3.19	<b>1.55</b>	<b>0.64</b>	0.27	0.13	0.05	0.00
1HR	Q20	Similarity	<del>0.79</del>	4	20	<del>0.79</del>	<del>2.27</del>	<b>0.67</b>	0.13	0.05	0.00	0.00	0.00
2HR	Q14	Probability	0.86	3	29	0.86	2.01	<b>0.87</b>	0.46	0.20	0.11	0.03	0.02



# Ones to Watch

**25** The sum of the first 10 terms of an arithmetic series is 4 times the sum of the first 5 terms of the same series.

The 8th term of this series is 45

Find the first term of this series.  
Show clear algebraic working.

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1HR	Q25	Sequences	1.57	5	31	1.57	3.97	<b>1.76</b>	<b>0.54</b>	0.17	0.05	0.01	0.00

# Ones to Watch

**20** The centre  $O$  of a circle has coordinates  $(4, 7)$

The point  $A$ , on the circle, has coordinates  $(6, 11)$  and  $AOP$  is a diameter of the circle.

Find an equation of the tangent to the circle at the point  $P$

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2HR	Q20	Graphs	1.36	4	34	1.36	3.19	<b>1.55</b>	<b>0.64</b>	0.27	0.13	0.05	0.00

# Ones to Watch

**14** Ciara throws **four** fair six-sided dice.

The faces of each dice are labelled with the numbers 1, 2, 3, 4, 5, 6

Work out the probability that at least one of the dice lands on an even number.

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2HR	Q14	Probability	0.86	3	29	0.86	2.01	<b>0.87</b>	0.46	0.20	0.11	0.03	0.02

# Ones to Watch - Grade 7

	Qu	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2HR	Q21	Quadratic equations	2.45	5	49	2.45	4.52	<b>3.47</b>	<b>1.87</b>	<b>0.87</b>	0.33	0.11	0.02
2HR	Q07	Powers and roots	0.85	2	43	0.85	1.79	<b>1.12</b>	<b>0.51</b>	0.19	0.05	0.03	0.00
1HR	Q17	Mensuration of 2D shapes	2.11	5	42	2.11	4.37	<b>2.82</b>	<b>1.36</b>	0.53	0.15	0.05	0.01
2HR	Q15	Trigonometry and Pythagoras' Theorem	1.49	3	50	1.49	2.71	<b>2.03</b>	<b>1.23</b>	0.56	0.23	0.11	0.04
1HR	Q23	Graphs	2.17	5	43	2.17	4.27	<b>2.79</b>	<b>1.49</b>	0.78	0.40	0.21	0.13

$$7 \quad \frac{2^k}{4^n} = 2^x$$

Find an expression for  $x$  in terms of  $k$  and  $n$

	Paper											
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2FR	Q24	Powers and roots	0.07	2	4	0.07	0.23	0.02	0.00	0.00	0.00	0.00

	Paper											
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2HR	Q07	Powers and roots	0.85	2	43	0.85	1.79	<b>1.12</b>	<b>0.51</b>	0.19	0.05	0.03



# An Extra 2H Qu21 – 7<sup>th</sup> Lowest Score

21

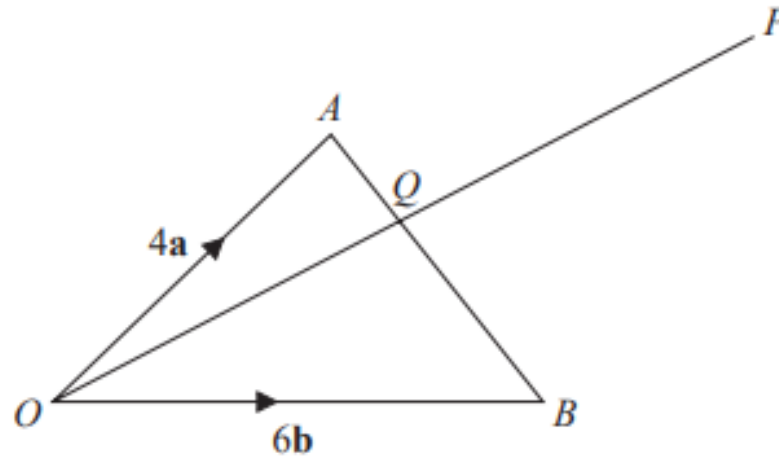


Diagram **NOT**  
accurately drawn

$OAB$  is a triangle.

$Q$  is the point on  $AB$  such that  $OQP$  is a straight line.

$$\vec{OA} = 4\mathbf{a} \quad \vec{OB} = 6\mathbf{b} \quad \vec{AP} = 2\mathbf{a} + 8\mathbf{b}$$

Using a vector method, find the ratio  $AQ:QB$

Edit Search

Search Results		Showing 31 out of 31
Add vectors	2 mins 2 marks Q17 4MA0/4H, June 2015	<a href="#">View</a> <a href="#">Add</a>
Column vectors	5 mins 5 marks Q17 4MA1/1H, June 2018	<a href="#">View</a> <a href="#">Add</a>
Cone	6 mins 6 marks Q22 4MA1/2H, Jan 2019	<a href="#">View</a> <a href="#">Add</a>
Find expression for a vector	3 mins 3 marks Q21 4MA0/3HR, June 2014	<a href="#">Viewing</a> <a href="#">Add</a>
Find expressions for vectors	4 mins 4 marks Q24 4MA0/3H, June 2015	<a href="#">View</a> <a href="#">Add</a>
Find magnitude of vector, use vectors and geometric information	8 mins 8 marks Q15 4MA0/4HR, Jan 2015	<a href="#">View</a> <a href="#">Add</a>
Find resultant vector, solve geometric vector problem	6 mins 6 marks Q23 4MA0/3HR, Jan 2017	<a href="#">View</a>

[View/Edit](#)
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**Total :** 2 questions 10 minutes 10 marks

[Remove all](#)
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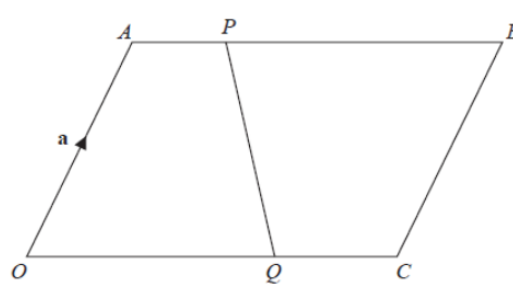
Find expression for a vector

Question

Mark Scheme

Examiner's Report

Resources



**Diagram NOT accurately drawn**

OACB is a parallelogram.

$\overrightarrow{OA} = \mathbf{a}$  and  $\overrightarrow{OC} = \mathbf{c}$

P is the point on AB such that  $AP = \frac{1}{4} AB$ .

Q is the point on OC such that  $OQ = \frac{2}{3} OC$ .



# Examiners Comments

- The first time this paper has been sat during the summer in 3 years saw students well prepared and all questions were well-attempted. The majority of questions saw full methods shown although certain methods still saw calculators being used when the instructions in the question asked for otherwise such as the linear simultaneous equations in Question 14 and the surds in Question 21.
- Although this paper contained many questions in a familiar style, testing familiar topics, there were questions, targeted at the top grades, which were especially challenging. It was therefore pleasing to see a significant number of students who displayed commendable prowess in dealing with these questions in the final third of the paper.

# Tiering Guidance – Crossover Home

	Marks	9	8	7	6	5	4	3
FT 1	40					18.5	10.8	6.7
FT 2	40					25.0	13.7	6.6
Total	80					43.5	24.5	13.2
HT 1	40	36.8	31.9	27.3	22.6	17.7	12.4	7.9
HT 2	40	38.7	36.9	33.9	29.0	22.3	14.0	6.8
Total	80	75.5	68.8	61.2	51.6	39.9	26.3	14.7

	Marks	9	8	7	6	5	4	3
FT	80					43.5	24.5	13.2
HT	80	75.5	68.8	61.2	51.6	39.9	26.3	14.7

FT 1 Qu 16-25

FT 2 Qu 17-28

HT 1 Qu 1-10

HT 2 Qu 1-12

# Tiering Guidance – Crossover Regional

FT 1 Qu 17-27

FT 2 Qu 18-27

HT 1 Qu 1-11

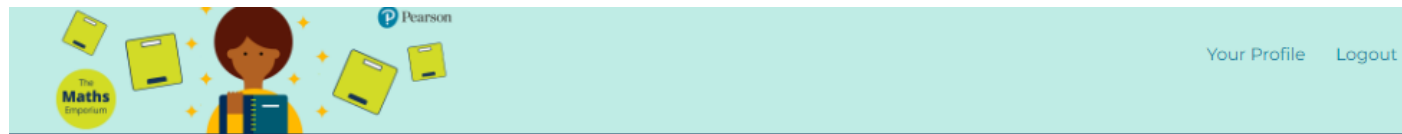
HT 2 Qu 1-10

	Marks	9	8	7	6	5	4	3
FT 1	40					23.6	12.7	7.0
FT 2	41					21.0	10.4	6.1
Total	81					44.6	23.1	13.0
HT 1	40	37.7	34.7	31.2	26.5	21.0	13.5	6.7
HT 2	41	37.5	33.1	28.5	23.1	17.8	11.4	5.7
Total	81	75.2	67.8	59.7	49.6	38.8	24.9	12.4

	Marks	9	8	7	6	5	4	3
FT	80					44.6	23.1	13.0
HT	80	75.2	67.8	59.7	49.6	38.8	24.9	12.4

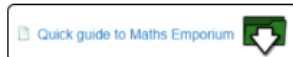


# Emporium Resources



## Our Qualifications

Welcome to the newly re-organised Maths Emporium. We are hoping the changes we have made will make it easier for you to find the resources you need. Please download [this Quick Guide to Maths Emporium pdf](#) or see the video below for a quick guide.



As always, find us on [@EmporiumMaths](#) to get in touch.



## UPCOMING EVENTS

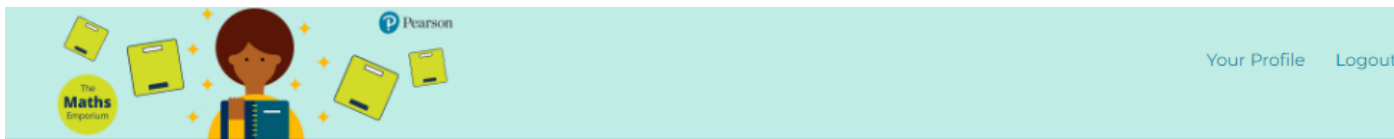
- FEB All day  
**3** A Level Statistics 9ST0 June 2022 exemplars release date
- FEB All day  
**10** Updated A Level Maths Year 2 scheme of work with technology links
- FEB All day  
**21** June 2023 Exam Series Entry Deadline Day
- MAR 4:00 pm - 5:30 pm  
**8** A level Maths: Deep dive into teaching and revising ladder problems for mechanics (Free online event)
- MAY 12:00 pm - 5:00 pm  
**15** AS Further Maths 8FM0-01 Exam Day

[View Calendar](#)

## CONTACT US

If you have any questions or issues about the emporium, please contact us via our [support portal](#). Please select the following so that your query reaches us. Customer type: Teacher & Department Heads - Issue Type: Systems, Tools and Services - Category: Maths Emporium.

# Emporium Resources



Search for events  [FIND EVENTS](#) [List](#) [Month](#) [Day](#)

< > Today **UPCOMING** ▾

February 2023

FRI  
3

February 3

## **A Level Statistics 9ST0 June 2022 exemplars release date**

Exemplar candidate responses with examiner commentary on the June 2022 A Level Statistics exams will be available on the Emporium and on our website

FRI  
10

February 10

## **Updated A Level Maths Year 2 scheme of work with technology links**

An updated version of the A Level Maths Year 2 scheme of work is to be release to include links to technology resources. This will be available on the Emporium and on our website.

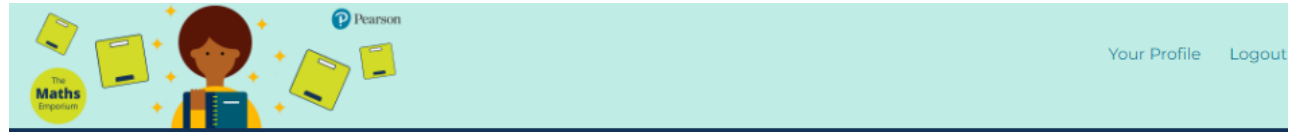
TUE  
21

February 21

## **June 2023 Exam Series Entry Deadline Day**

March 2023

# Emporium Resources

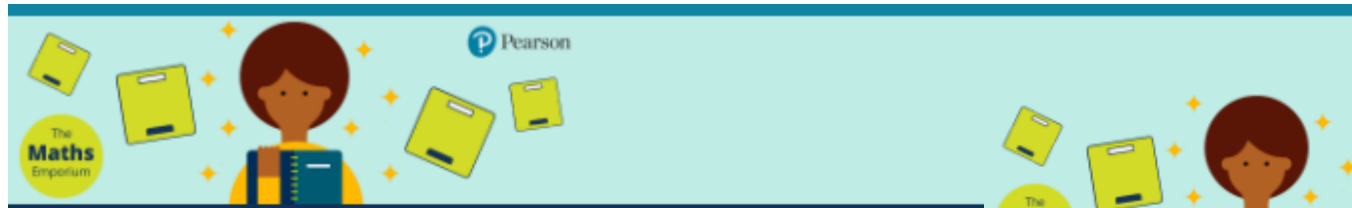


Search for events [FIND EVENTS](#) [List](#) [Month](#) [Day](#)

< > This Month FEBRUARY 2023 ▾

MON	TUE	WED	THU	FRI	SAT	SUN
30	31 Re-ordered papers f...	1	2	3 A Level Statistics QS...	4	5
6	7	8	9	10 Updated A Level Mat...	11	12
13	14	15	16	17	18	19
20	21 June 2023 Exam Ser...	22	23	24	25	26

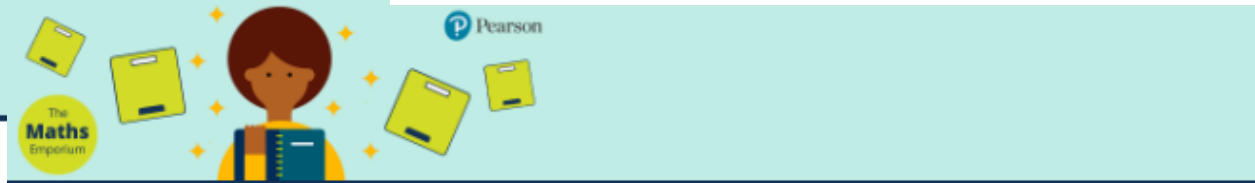
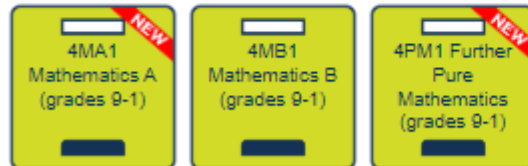
# Emporium Resources



[Maths Emporium](#) > [International GCSE Mathematics](#)

## Category: International GCSE Mathematics

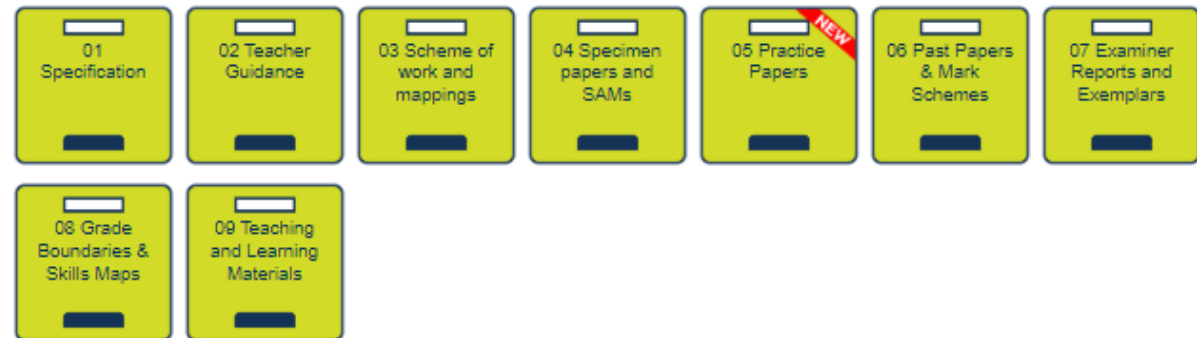
International GCSE Mathematics documents for current and past International GCSE specifications. Document Certificate in Mathematics (IGCSE for state schools), which ran from 2012 to 2017.



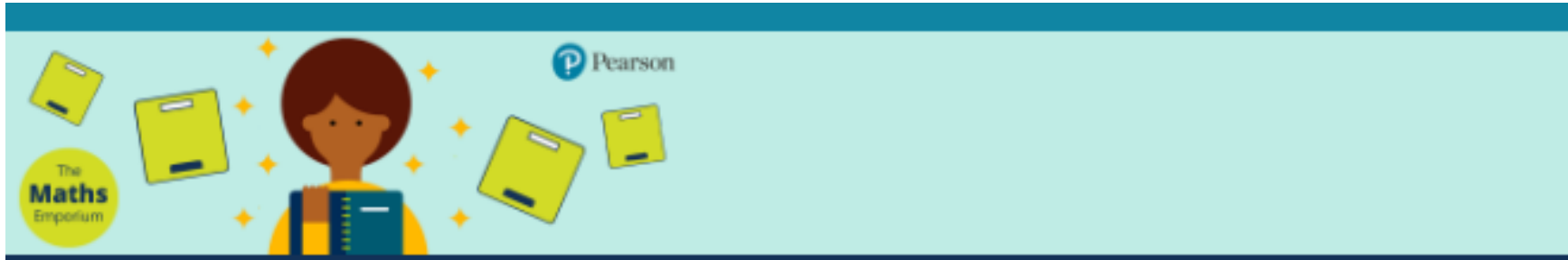
[Maths Emporium](#) > [International GCSE Mathematics](#) > [4MA1 Mathematics A \(grades 9-1\)](#)

## Category: 4MA1 Mathematics A (grades 9-1)

The new International GCSE Spec A (9-1), for first teaching September 2016 and first assessment summer 2018.



# Emporium Resources



[Maths Emporium](#) > [International GCSE Mathematics](#) > [4MA1 Mathematics A \(grades 9-1\)](#) > [05 Practice Papers](#)

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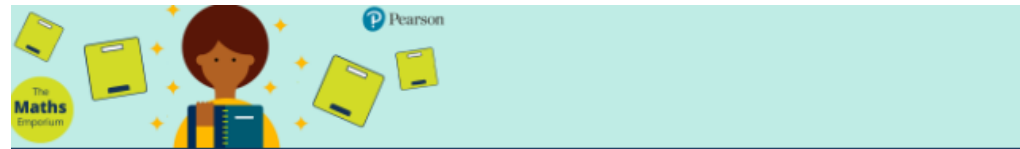
## Category: 05 Practice Papers

Topic Tests will be released daily (March 2022)






















# Emporium Resources - [Link](#)



[Maths Emporium](#) > [International GCSE Mathematics](#) > [4MA1 Mathematics A \(grades 9-1\)](#) > [05 Practice Papers](#) > [01 Crossover papers](#) > [Summer 2022](#)

## Category: Summer 2022

 <a href="#">01a 4MA1 Paper 1 F and H Summer 2022 Crossover (word)</a> <i>New!</i>	 
 <a href="#">01b 4MA1 Paper 1 F and H Summer 2022 Crossover (pdf)</a> <i>New!</i>	 
 <a href="#">01c 4MA1 Paper 1 F and H Summer 2022 Crossover MS (word)</a> <i>New!</i>	 
 <a href="#">01d 4MA1 Paper 1 F and H Summer 2022 Crossover Solutions (pdf)</a> <i>New!</i>	 
 <a href="#">02a 4MA1 Paper 2 F and H Summer 2022 Crossover (word)</a> <i>New!</i>	 
 <a href="#">02b 4MA1 Paper 2 F and H Summer 2022 Crossover (pdf)</a> <i>New!</i>	 
 <a href="#">02c 4MA1 Paper 2 F and H Summer 2022 Crossover MS (word)</a> <i>New!</i>	 
 <a href="#">02d 4MA1 Paper 2 F and H Summer 2022 Crossover Solutions (pdf)</a> <i>New!</i>	 

# Emporium Resources - [Link](#)



Maths Emporium > International GCSE Mathematics > 4MA1 Mathematics A (grades 9-1) > 06 Past Papers & Mark Schemes > 17 4MA1 June 2022

## Category: 17 4MA1 June 2022

00 IGCSE Maths 4MA1 May 2022 QLA	
01a IGCSE Maths 4MA1 1F – May 2022 examination paper (pdf)	
01b IGCSE Maths 4MA1 1F May 2022 examination paper (word)	
01c IGCSE Maths 4MA1 1F – May 2022 mark scheme (pdf)	
01d IGCSE Maths 4MA1 1F – May 2022 Solutions	
02a IGCSE Maths 4MA1 2F – June 2022 examination paper (pdf)	
02b IGCSE Maths 4MA1 2F June 2022 examination paper (word)	
02c IGCSE Maths 4MA1 2F – June 2022 mark scheme (pdf)	

- 7 Sandeep buys some flowers.  
He has 5000 rupees to spend.

He buys 6 carnations at 220 rupees each.  
He also buys some roses at 295 rupees each.

Sandeep should receive 140 rupees in change from his 5000 rupees.

Work out how many roses Sandeep buys.

$$6 \text{ carnations} = 6 \times 220 = 1320$$

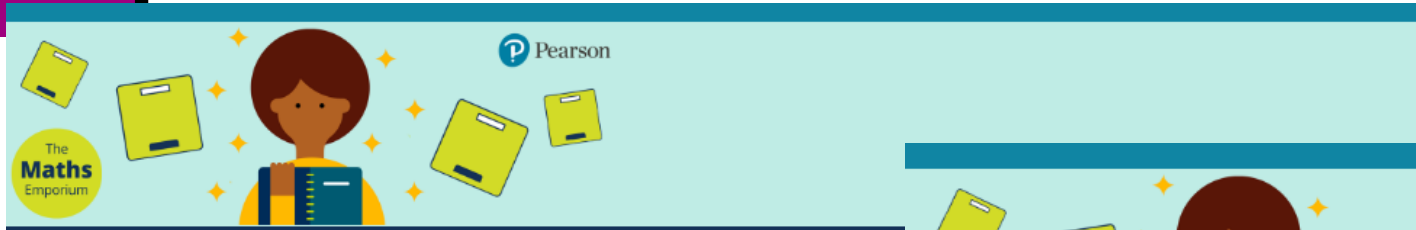
$$\text{Change} = 140$$

$$\text{so spends } 5000 - 140 = 4860$$

$$\text{Roses} \Rightarrow 4860 - 1320 = 3540$$

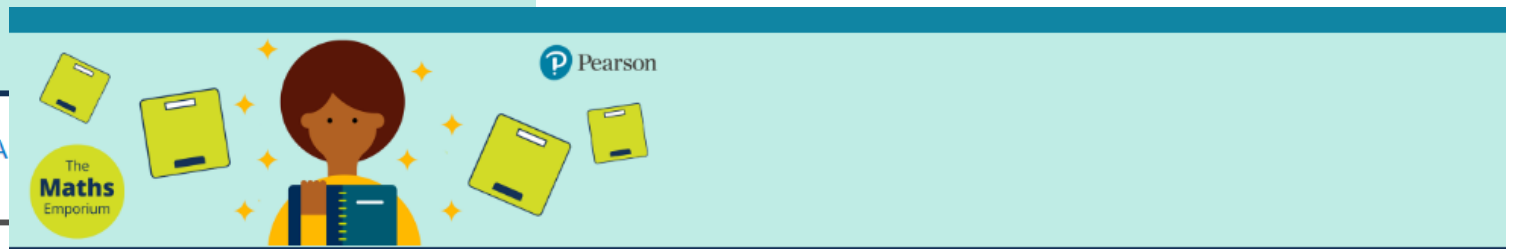
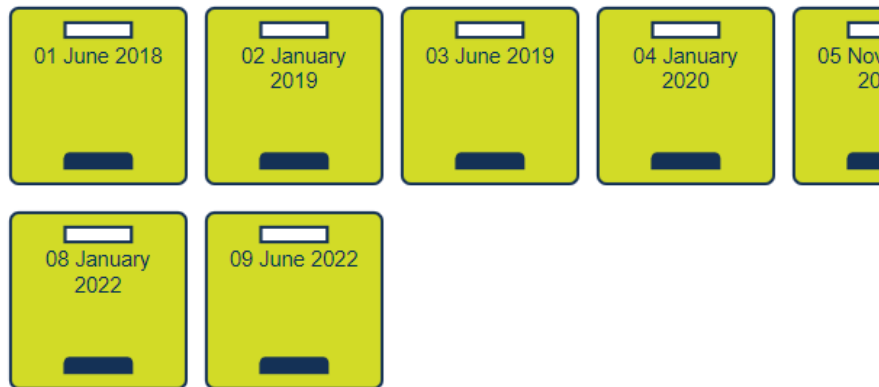
$$\begin{aligned} 3540 \div 295 \\ = 12 \end{aligned}$$

# Emporium Resources - [Link](#)



[Maths Emporium](#) > [International GCSE Mathematics](#) > [4MA1 Mathematics A](#)  
[Skills Maps](#)

## Category: 08 Grade Boundaries & Skills Maps



[Maths Emporium](#) > [International GCSE Mathematics](#) > [4MA1 Mathematics A \(grades 9-1\)](#) > [08 Grade Boundaries & Skills Maps](#) > [09 June 2022](#)


## Category: 09 June 2022

 [09 IGCSE 4MA1 Grade Boundaries June 2022](#)



 [2206 4MA1 June 2022](#)



 [2206 4MA1\(R\) June 2022](#)



# Emporium Resources - [Link](#)

A	B	C	D	E	G	H	I	J	K	L	M	N	O	P	Q	R
<b>1MA1 - June 2022</b>				Edexcel averages: mean scores of students who achieved grade												
Topic	Spec Ref	AO	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3	2
<b>Paper</b>																
<b>1F NON CALCULATOR (F)</b>																
Ratio	R1	1	Q01	Change between standard units and compound units	0.67	1	67	0.67	-	-	-	-	0.87	0.77	0.67	0.59
Algebra	A4	1	Q02	Simplify and manipulate expressions using laws of indices	0.73	1	73	0.73	-	-	-	-	0.90	0.81	0.73	0.66
Geometry	G7	1	Q03	Transformations	0.92	1	92	0.92	-	-	-	-	0.99	0.98	0.95	0.90
Number	N2	1	Q04	Apply four operations	0.88	1	88	0.88	-	-	-	-	0.97	0.96	0.92	0.86
Number	N1	1	Q05	Order numbers	0.76	1	76	0.76	-	-	-	-	0.98	0.94	0.85	0.66
Statistics	S2	2	Q06	Pictograms	0.92	1	92	0.92	-	-	-	-	0.95	0.94	0.93	0.92
Number	N13, N2	3	Q07	Apply four operations	2.70	3	90	2.70	-	-	-	-	2.97	2.93	2.84	2.64
Statistics	S2	2	Q08	Bar charts	2.48	3	83	2.48	-	-	-	-	2.80	2.68	2.54	2.37
Statistics	S2	2	Q09	Linear and non-linear sequences of diagrams and numbers	1.89	2	95	1.89	-	-	-	-	1.99	1.97	1.94	1.89
Algebra	A23	2	Q10	Apply four operations	1.53	2	77	1.53	-	-	-	-	1.91	1.81	1.64	1.38
Algebra	A23	3	Q11	Apply four operations	1.41	4	35	1.41	-	-	-	-	2.48	1.88	1.41	0.96
Number	N2	3	Q12	Calculate exactly with fractions	2.28	4	57	2.28	-	-	-	-	3.65	3.13	2.33	1.52
Ratio	R11, N13	3	Q13	Probabilities of an exhaustive set of outcomes	1.46	2	73	1.46	-	-	-	-	1.96	1.86	1.64	1.22
Number	N2	1	Q14	Substitute values into formulae and expressions	1.53	2	77	1.53	-	-	-	-	1.97	1.91	1.75	1.35
Number	N2	1	Q15	Apply four operations	1.54	3	51	1.54	-	-	-	-	2.58	2.24	1.68	0.90
Probability	P3	1	Q16	Use standard units of measure and related concepts	1.67	4	42	1.67	-	-	-	-	2.93	2.21	1.63	1.12
Probability	P4	1	Q17	Theoretical probability; appropriate language; 0-1 probability	3.83	5	77	3.83	-	-	-	-	4.54	4.37	4.12	3.66

# Emporium Resources - [Link](#)

A	B	D	E	F	G	H	I	J	K	L	M	N
International GCSE Mathematics 4MA1 - June 2022					Edexcel averages: scores of candidates who achieved grade:							
Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
<b>Paper</b>												
<b>1F CALCULATOR (F)</b>												
Q01a	Integers	0.97	1	97	0.97	-	-	-	-	0.98	0.98	0.98
Q01b	Integers	0.95	1	95	0.95	-	-	-	-	0.98	0.97	0.96
Q01c	Degree of accuracy	0.85	1	85	0.85	-	-	-	-	0.97	0.94	0.86
Q01d	Integers	0.95	1	95	0.95	-	-	-	-	0.99	0.98	0.96
Q01e	Integers	0.55	1	55	0.55	-	-	-	-	0.67	0.62	0.55
Q02a	Expressions and formulae	0.84	1	84	0.84	-	-	-	-	0.94	0.91	0.82
Q02b	Expressions and formulae	0.90	1	90	0.90	-	-	-	-	0.97	0.93	0.91
Q02c	Linear equations	0.78	1	78	0.78	-	-	-	-	0.95	0.90	0.82
Q03ai	Probability	0.85	1	85	0.85	-	-	-	-	0.97	0.93	0.86
Q03aii	Probability	0.86	1	86	0.86	-	-	-	-	0.97	0.94	0.88
Q03b	Probability	0.40	1	40	0.40	-	-	-	-	0.70	0.47	0.33
Q04a	Polygons	0.63	1	63	0.63	-	-	-	-	0.83	0.73	0.62
Q04b	Integers	0.92	1	92	0.92	-	-	-	-	0.98	0.97	0.93
Q04c	Measures	0.79	1	79	0.79	-	-	-	-	0.92	0.86	0.78
Q04d	Measures	0.90	1	90	0.90	-	-	-	-	0.96	0.95	0.92
Q05ai	Integers	0.94	1	94	0.94	-	-	-	-	0.99	0.97	0.96
Q05aii	Integers	0.83	1	83	0.83	-	-	-	-	0.92	0.87	0.83
Q05aiii	Integers	0.68	1	68	0.68	-	-	-	-	0.92	0.81	0.65
Q05aiv	Integers	0.90	1	90	0.90	-	-	-	-	0.98	0.95	0.92
Q05b	Integers	0.62	1	62	0.62	-	-	-	-	0.80	0.69	0.61
Q06ai	Angles, lines and triangles	0.88	1	88	0.88	-	-	-	-	0.99	0.98	0.95
Q06aii	Geometrical reasoning	0.73	1	73	0.73	-	-	-	-	0.93	0.86	0.78
Q06b	Geometrical reasoning	1.27	3	42	1.27	-	-	-	-	2.38	1.69	0.84
Q07	Applying number	3.27	4	82	3.27	-	-	-	-	3.88	3.68	3.32
Q08a	Expressions and formulae	1.39	2	70	1.39	-	-	-	-	1.84	1.62	1.32



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	A	B	D	E	F	G	H	I	J	K	L	M	N	
1	International GCSE Mathematics 4MA1 - June 2022					Edexcel averages: scores of candidates who achieved grade:								
2	Question	Skill tested	Mean sco	Max score	Mean %	ALL	9	8	7	6	5	4	3	
3	Paper													
4	1F CALCULATOR (F)													
5	Q01	Integers	4.27	5	85	4.27					4.59	4.49	4.31	
6	Q02	Linear equations	2.52	3	84	2.52					2.86	2.74	2.55	
7	Q03	Probability	2.11	3	70	2.11					2.64	2.34	2.07	
8	Q04	Measures	3.24	4	81	3.24					3.69	3.51	3.25	
9	Q05	Integers	3.97	5	79	3.97					4.61	4.29	3.97	
10	Q06	Geometrical reasoning	2.88	5	58	2.88					4.30	3.53	2.57	
11	Q07	Applying number	3.27	4	82	3.27	-	-	-	-	3.88	3.68	3.32	
12	Q08	Linear equations	4.45	6	74	4.45					5.76	5.36	4.45	
13	Q09	Construction	0.77	2	39	0.77	-	-	-	-	1.32	0.93	0.61	
14	Q10	Probability	2.22	3	74	2.22					2.88	2.67	2.31	
15	Q11	Applying number	2.67	4	67	2.67	-	-	-	-	3.81	3.30	2.58	
16	Q12	Probability	1.65	4	41	1.65					2.87	2.04	1.30	
17	Q13	Graphs	1.54	3	51	1.54	-	-	-	-	2.63	1.96	1.20	
18	Q14	Percentages	2.21	5	44	2.21					3.82	2.85	1.67	
19	Q15	Mensuration of 2D shapes	1.32	4	33	1.32	-	-	-	-	2.69	1.65	0.78	
20	Q16	Sequences	0.81	3	27	0.81					1.46	0.98	0.60	
21	Q17	Probability	1.37	4	34	1.37	-	-	-	-	2.75	1.64	0.86	
22	Q18	Powers and roots	1.89	4	47	1.89					2.91	2.28	1.68	
23	Q19	Polygons	0.68	4	17	0.68	-	-	-	-	1.86	0.63	0.24	
24	Q20	Linear equations	1.25	5	25	1.25					2.74	1.41	0.72	
25	Q21	Percentages	0.44	6	7	0.44					1.10	0.44	0.21	
26	Q22	3D shapes and volume	0.86	4	22	0.86	-	-	-	-	1.71	0.88	0.58	
27	Q23	Standard form	1.23	2	62	1.23					1.66	1.40	1.14	
28	Q24	Use of symbols	0.95	4	24	0.95					1.88	1.07	0.60	
29	Q25	Trigonometry and Pythagoras' Theorem	0.13	4	3	0.13					0.43	0.09	0.02	

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## Edexcel IGCSE Mathematics (4MA1) Grade Boundaries – June 2022

Foundation Tier	9	8	7	6	5	4	3	2	1
Paper 1					66	49	36	23	11
Paper 2					69	51	38	25	12
Total					130	100	74	48	23

Higher Tier	9	8	7	6	5	4	3	2	1
Paper 1	73	59	45	34	23	12	6		
Paper 2	76	61	47	35	24	13	7		
Total	142	117	92	69	47	25	14		

(Total boundaries are given out of 200)

## Edexcel IGCSE Mathematics (4MA1(R)) Grade Boundaries – June 2022

Foundation Tier	9	8	7	6	5	4	3	2	1
Paper 1					58	43	32	21	10
Paper 2					59	44	33	22	11
Total					122	87	65	43	21

Higher Tier	9	8	7	6	5	4	3	2	1
Paper 1	71	57	44	33	22	11	5		
Paper 2	65	52	40	30	20	10	5		
Total	143	113	84	63	42	21	10		

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