

# International GCSE Maths Specification A 2022 Home Examination Feedback

4MA1-23IO6/01





# Agenda

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

# 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!



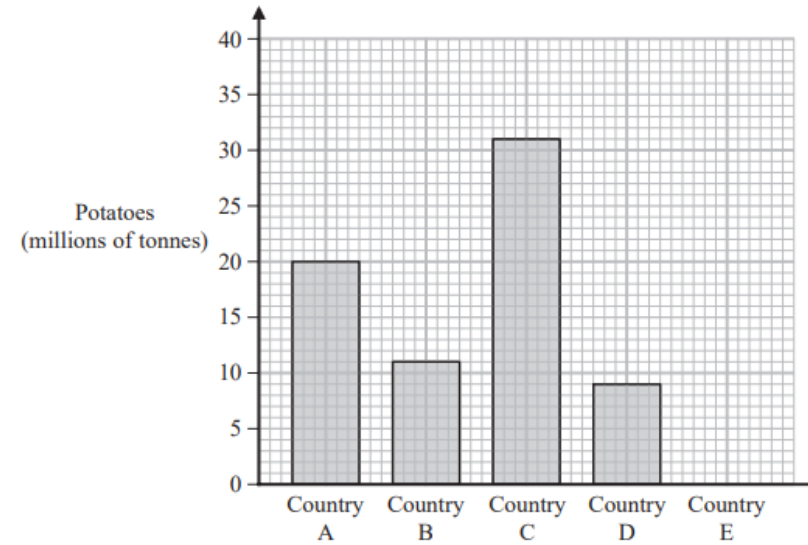


# Foundation – The Winners!

	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q04	Graphical representation of data	2.84	3	95	2.84	2.97	2.94	2.90	2.82	2.45	1.53
1F	Q01	Integers	4.27	5	85	4.27	4.59	4.49	4.31	4.01	3.54	2.69
1F	Q02	Linear equations	2.52	3	84	2.52	2.86	2.74	2.55	2.22	1.73	1.19
2F	Q03	Sequences	3.31	4	83	3.31	3.68	3.49	3.37	3.09	2.38	1.16
2F	Q08	Fractions	2.46	3	82	2.46	2.89	2.78	2.56	1.99	1.25	0.55

# 2F Qu4

- 4 The bar chart shows information about the weight, in millions of tonnes, of the potatoes produced by each of four countries in 2016



In 2016, one of these four countries produced 11 million tonnes of potatoes.

- (a) Which country?

(1)

In 2016, Country E produced 7 million tonnes of potatoes.

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

(1)

In 2016, the weight of potatoes produced by Country C was greater than the weight of potatoes produced by Country A.

- (c) How many million tonnes greater?

..... million tonnes

(1)

(Total for Question 4 is 3 marks)

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q04	Graphical representation of data	2.84	3	95	2.84	2.97	2.94	2.90	2.82	2.45	1.53



1F Qu1

1 Nav found the following table that shows the age, in years, of each of seven cities.

City	Age (years)
Cadiz	3124
Suzhou	2534
Jenin	4469
Istanbul	2704
Nanjing	2516
Gaziantep	5669
Alexandria	2351

(a) Write down the name of the city with the greatest age.

.....  
(1)

(b) Write the number 2534 in words.

.....  
(1)

(c) Write the number 2351 correct to the nearest ten.

.....  
(1)

(d) Work out the difference between the age of Cadiz and the age of Nanjing.

..... years  
(1)

A millennium is 1000 years.

(e) What is the age of Jenin in whole millennia?

..... millennia  
(1)

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q01	Integers	4.27	5	85	4.27	4.59	4.49	4.31	4.01	3.54	2.69



# 1F Qu2

2 (a) Simplify  $12a + 3a - 7a$

.....  
(1)

(b) Simplify  $8 \times 3b$

.....  
(1)

(c) Solve  $\frac{c}{3} = 9$

$c =$  .....  
(1)

**(Total for Question 2 is 3 marks)**

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q02	Linear equations	2.52	3	84	2.52	2.86	2.74	2.55	2.22	1.73	1.19

2F Qu 3

3 Here are the first five terms of a number sequence.

7      13      19      25      31

(a) (i) Write down the next term of the sequence.

(1)

(ii) Explain how you found your answer to part (a)(i)

(1)

The 30th term of the sequence is 181

(b) Work out the 28th term of the sequence.

(1)

Brian says that 96 is a number in the sequence.  
Brian is wrong.

(c) Explain why.

(1)

(Total for Question 3 is 4 marks)

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q03	Sequences	3.31	4	83	3.31	3.68	3.49	3.37	3.09	2.38	1.16

# 2F Qu 8

8 Mairi has 200 flowers.

Of these flowers

37 are white

25 are yellow

42 are pink

The rest of the flowers are red.

Express the number of red flowers as a fraction of the total number of flowers.

Give your fraction in its simplest form.

(Total for Question 8 is 3 marks)

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q08	Fractions	2.46	3	82	2.46	2.89	2.78	2.56	1.99	1.25	0.55



# 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
1F	Q19	Polygons	0.68	4	17	0.68	1.86	0.63	0.24	0.07	0.05	0.01
2F	Q28	Statistical measures	0.51	3	17	0.51	1.28	0.53	0.20	0.07	0.06	0.01
2F	Q21	Mensuration of 2D shapes	0.66	4	17	0.66	2.04	0.53	0.11	0.05	0.02	0.01
1F	Q21	Percentages	0.44	6	7	0.44	1.10	0.44	0.21	0.08	0.03	0.00
1F	Q25	Trigonometry and Pythagoras' Theorem	0.13	4	3	0.13	0.43	0.09	0.02	0.02	0.01	0.00

# 1F Qu19 - Crossover

19 The diagram shows parts of three regular polygons, **A**, **B** and **C**, meeting at a point.

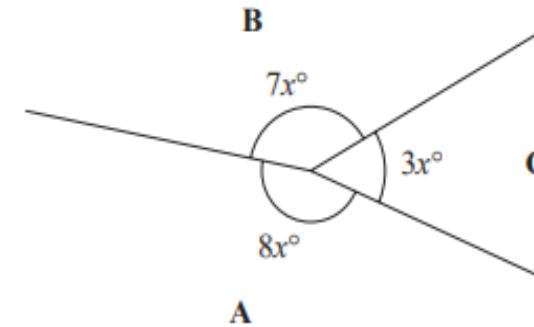


Diagram **NOT** accurately drawn

Polygon **B** has  $n$  sides.

Work out the value of  $n$ .

19	$7x + 3x + 8x = 360$ oe		4	M1	M2 for $7x = 140$
	$(x =) 360 \div 18 (= 20)$			M1	(140 can be on diagram)
	$360 \div (180 - 7 \times "20")$ oe or $360 \div (180 - "140")$ $\frac{(n-2) \times 180}{n} = 7 \times "20"$ oe or $360 \div 40$				M1 for $360 \div$ exterior angle
		9		A1	
					<b>Total 4 marks</b>

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q19	Polygons	0.68	4	17	0.68	1.86	0.63	0.24	0.07	0.05	0.01



# 2F Qu28

**28** Larry is a delivery man.

He has 7 parcels to deliver.

The mean weight of the 7 parcels is 2.7 kg

Larry delivers 3 of the parcels.

Each of these 3 parcels has a weight of  $W$  kg

The mean weight of the other 4 parcels is 3.3 kg

Work out the value of  $W$

<b>28</b>	$7 \times 2.7 (=18.9)$ or $4 \times 3.3 (= 13.2)$ or $\frac{3W + 4 \times 3.3}{7} = 2.7$ oe eg $3W + 13.2 = 18.9$		3	M1 For one correct product or for a correct equation for $W$
	$\frac{7 \times 2.7 - 4 \times 3.3}{3}$ or $\frac{18.9 - 13.2}{3}$ or $\frac{5.7}{3}$ or $3W = 5.7$			M1
	If you see 1.9 from correct working and they do further work to this value, award M2	1.9		A1
				<b>Total 3 marks</b>

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q20	Fractions	1.15	3	38	1.15	2.31	1.34	0.73	0.33	0.12	0.04
2F	Q28	Statistical measures	0.51	3	17	0.51	1.28	0.53	0.20	0.07	0.06	0.01

2F Qu21

21 The diagram shows an 8-sided shape  $ABCDEFGH$ .

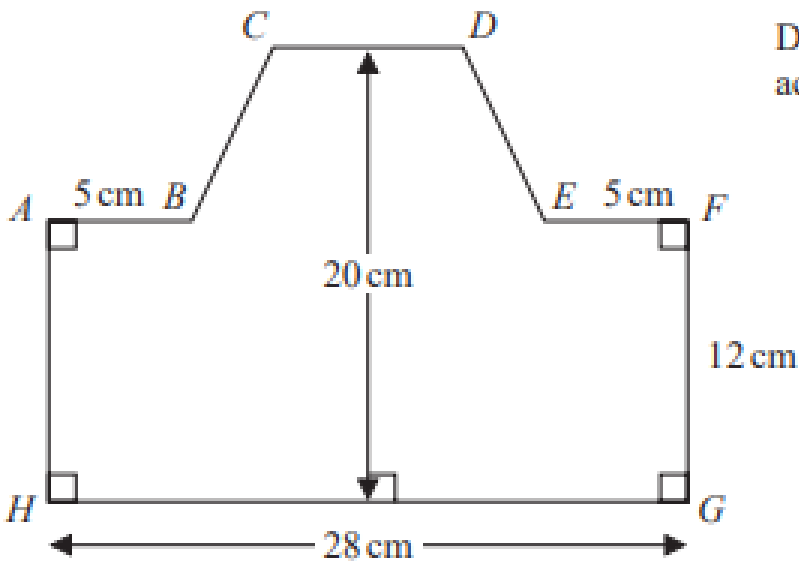


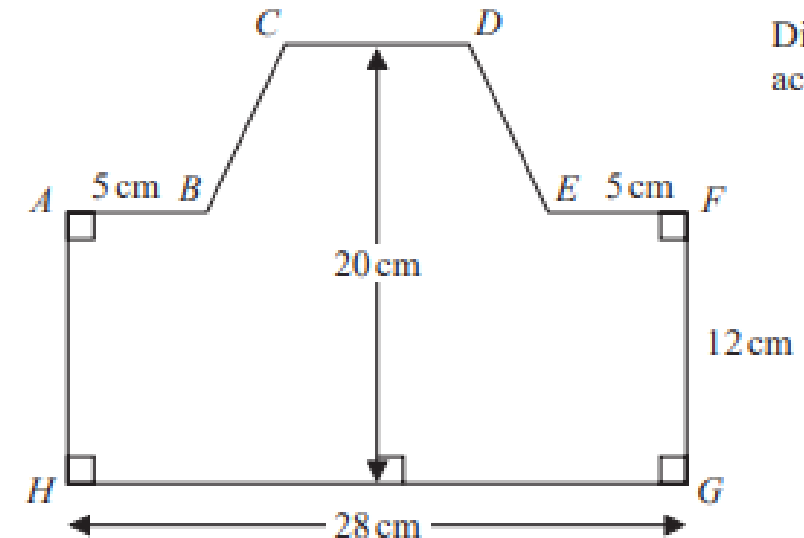
Diagram NOT accurately drawn

$HG = 28\text{ cm}$      $FG = 12\text{ cm}$      $AB = EF = 5\text{ cm}$   
The height of the shape is  $20\text{ cm}$   
 $CD$  is parallel to  $HG$

The area of shape  $ABCDEFGH$  is  $434\text{ cm}^2$   
Find the length of  $CD$ .

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q21	Mensuration of 2D shapes	0.66	4	17	0.66	2.04	0.53	0.11	0.05	0.02	0.01

# 2F Qu21



Dis  
acc

21	$28 \times 12 (=336)$ or $5 \times 12 (= 60)$ or $18 \times 12 (= 216)$ or $28 \times 20 (=560)$ or $\frac{1}{2}(CD + "18")"8"$ oe eg $72 + 4CD$ [numbers in “ ” come from correct working] <b>Check diagram for areas</b>		4	M1 For a correct method to find the area of a rectangle (may be seen as part calculation) a correct expression for the area of the trapezium with numbers substituted.  Allow for other correct method to find area linked to this shape.
	“336” + $0.5("18" + CD)"8" = 434$ oe eg $4("18" + CD) = 98$ or eg $0.5("18" + CD)"8" = "98"$ oe eg $\frac{1}{2}(18 + CD) = 12.25$ or $"560" - 2(0.5(5 + x)"8") = 434$ oe (where $x$ is horizontal from $D$ to perp with $AF$ ) [numbers in “ ” come from correct working]			M1 correct use of their values from correct working for an equation involving $CD$ ( $CD$ could be labelled with any letter)
	eg $(CD =) \frac{196 - 144}{8} (= \frac{52}{8})$ or $(CD =) \frac{98 - 72}{4} (= \frac{26}{4})$ or $(CD =) \frac{434 + 152 - 560}{4}$ or $(CD =) 2 \times 12.25 - 18$ or $98 \times 2 (= 196)$ , $"196" \div 8 (= 24.5)$ , $"24.5" - 18$			M1 a correct process to solve a correct equation <b>or</b> a correct process to find $CD$ using <b>correct values</b>
		6.5		A1 oe
Total 4 marks				

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q21	Mensuration of 2D shapes	0.66	4	17	0.66	2.04	0.53	0.11	0.05	0.02	0.01

# 1F Qu21 - Crossover

<b>21</b>	(a)	$1 + 0.04 (= 1.04)$ <b>or</b> $100(\%) + 4(\%) (= 104(\%))$ <b>or</b> $\frac{634\,400}{104} (= 6100)$ <b>oe</b>	
		$634\,400 \div "1.04"$ <b>or</b> $634\,400 \div "104" \times 100$ <b>or</b> $634\,400 \times 100 \div "104"$ <b>oe</b>	
			No and 610 000
	(b)	$"0.85" \times "0.85" (= 0.7225)$ <b>oe or</b> $"0.85" - ("0.85" \times 0.15) (= 0.7225)$ <b>or</b> $\frac{"85" \times "85"}{100} (= 72.25)$ <b>oe or</b> [0.85 and 85 must come from correct working]	
		$1 - "0.7225"$ <b>or</b> $0.2775$ <b>or</b> $100 - "72.25"$	
			27.75

21 Asha bought an apartment.

The table gives information about the value of apartments, in euros, and the annual service charge band.

Value (x euros)	Service charge band
$x \geq 700\,000$	A
$600\,000 \leq x < 700\,000$	B
$500\,000 \leq x < 600\,000$	C
$400\,000 \leq x < 500\,000$	D
$0 < x < 400\,000$	E

In 2021, the value of Asha's apartment was 634 400 euros.

The value of Asha's apartment had increased by 4% from its value in 2020

- (a) Has the annual service charge band changed for Asha's apartment?  
Show your working clearly.

(3)

Pam bought a boat.

In each year after Pam bought the boat, the value of the boat depreciated by 15%

- (b) Work out the total percentage by which the value of the boat had depreciated by the end of the second year after Pam bought the boat.

..... %  
(3)

(Total for Question 21 is 6 marks)

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q21	Percentages	0.44	6	7	0.44	1.10	0.44	0.21	0.08	0.03	0.00

# 1F Qu25 - Crossover

**25** Two circles,  $C_1$  and  $C_2$ , are drawn on a centimetre grid, with a scale of 1 cm for 1 unit on each axis.

The centre of circle  $C_1$  is at the point with coordinates  $(-1, 3)$  and the radius of  $C_1$  is 13 cm.

The centre of circle  $C_2$  is at the point with coordinates  $(7, 18)$  and the radius of  $C_2$  is 6 cm.

(a) Work out the distance between the centre of  $C_1$  and the centre of  $C_2$

..... cm  
(3)

(b) Explain why circle  $C_1$  intersects circle  $C_2$

25	(a)	$(18-3)^2 + (7-(-1))^2$ oe or $15^2 + 8^2 (= 289)$ oe		3	M1
		$\sqrt{(18-3)^2 + (7-(-1))^2} (= \sqrt{289})$			M1
			17		A1
	(b)	$13 + 6 > "17"$	correct reason	1	A1 ft dep M1 <b>Acceptable examples</b> "They overlap by 2cm" "The distance between the centres is less than the sum of the radii" "17 is less than the distance than the total of the radii" "19 is bigger than the distance between the centres" <b>Not acceptable examples</b> "19 is greater than the distance between the circles" oe "The circumference of each circle overlaps"
					<b>Total 4 marks</b>

(Total for Question 25 is 4 marks)

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q25	Trigonometry and Pythagoras' Theorem	0.13	4	3	0.13	0.43	0.09	0.02	0.02	0.01	0.00



# Foundation – Ones to watch

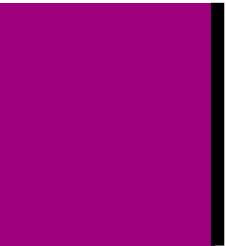


# Ones to Watch

Paper												
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q13	Graphs	1.54	3	51	1.54	2.63	<b>1.96</b>	<b>1.20</b>	<b>0.58</b>	0.17	0.04

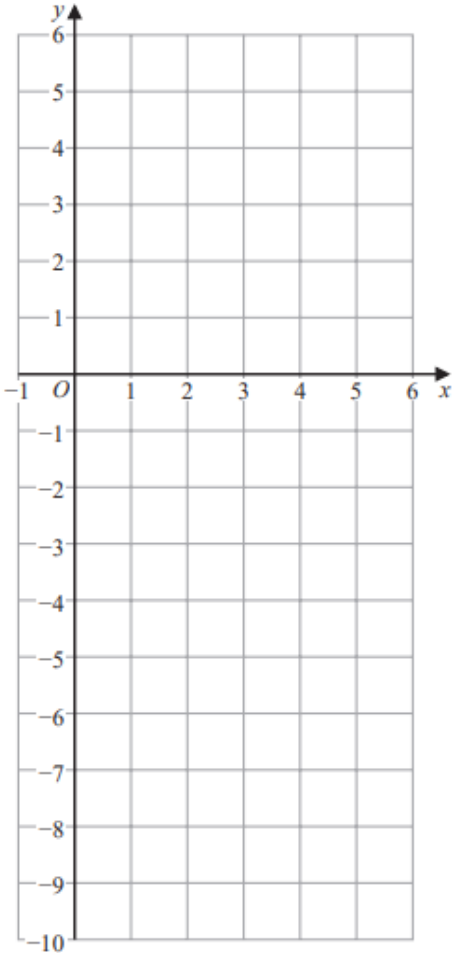
# Ones to Watch

	Paper											
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q13	Graphs	1.54	3	51	1.54	2.63	<b>1.96</b>	<b>1.20</b>	<b>0.58</b>	0.17	0.04
1F	Q14	Percentages	2.21	5	44	2.21	3.82	<b>2.85</b>	<b>1.67</b>	0.82	0.22	0.05
1F	Q15	Mensuration of 2D shapes	1.32	4	33	1.32	2.69	<b>1.65</b>	<b>0.78</b>	0.28	0.11	0.05
2F	Q07	Mensuration of 2D shapes	0.58	2	29	0.58	1.26	<b>0.69</b>	0.32	0.09	0.04	0.02
2F	Q14	Transformation geometry	1.41	4	35	1.41	2.63	<b>1.67</b>	0.94	0.52	0.21	0.01
2F	Q17	Statistical measures	1.41	3	47	1.41	2.44	<b>1.75</b>	<b>1.09</b>	<b>0.51</b>	0.16	0.06



# Ones to Watch

13 On the grid, draw the graph of  $y = -2x + 3$  for values of  $x$  from  $-1$  to  $5$



(Total for Question 13 is 3 marks)

	Paper											
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q13	Graphs	1.54	3	51	1.54	2.63	<b>1.96</b>	<b>1.20</b>	<b>0.58</b>	0.17	0.04

# Ones to Watch

14 In 2001, the total number of cars produced in the world was 39.8 million.

In 2006, the total number of cars produced in the world was 10.1 million greater than the total number produced in 2001

- (a) Express 10.1 million as a percentage of 39.8 million.  
Give your answer correct to one decimal place.

..... %  
(2)

In 2011, the total number of cars produced in the world was 59.9 million.

In 2016, the total number of cars produced in the world was 21% greater than the total number produced in 2011

In 2016, the total number of cars produced in the world was  $N$  million.

- (b) Work out the value of  $N$ .  
Give your answer correct to the nearest whole number.

	Paper											
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q14	Percentages	2.21	5	44	2.21	3.82	<b>2.85</b>	<b>1.67</b>	0.82	0.22	0.05



# Ones to Watch

15 The diagram shows a shape  $ABCDEFG$  made from a square  $ABDF$  and three identical isosceles triangles  $BCD$ ,  $DEF$  and  $FGA$ .

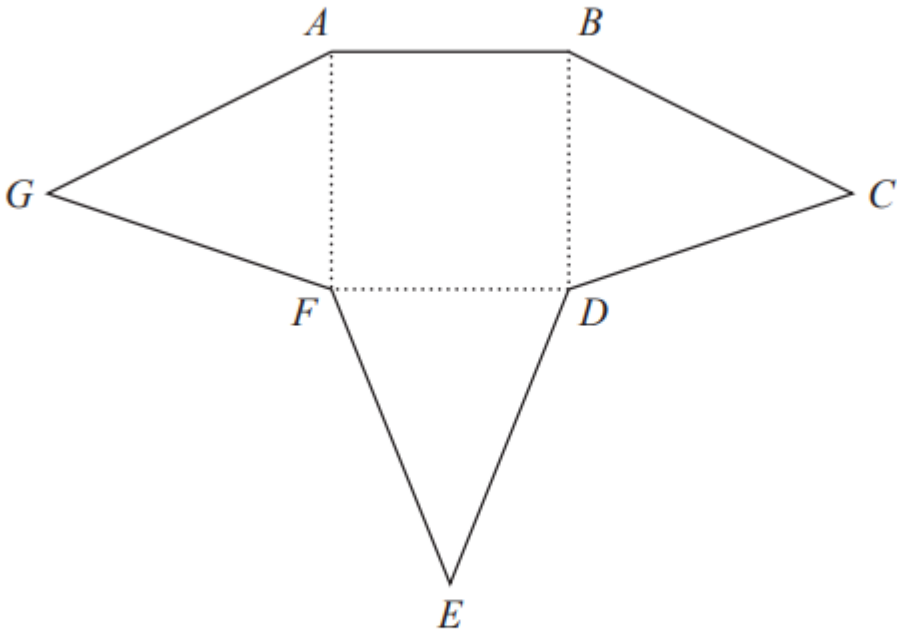


Diagram **NOT** accurately drawn

The perimeter of the square  $ABDF$  is 48 cm.  
The perimeter of each isosceles triangle is 30 cm.

Work out the perimeter of the shape  $ABCDEFG$ .

	Paper											
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
1F	Q15	Mensuration of 2D shapes	1.32	4	33	1.32	2.69	<b>1.65</b>	<b>0.78</b>	0.28	0.11	0.05

# Ones to Watch

7 A circle has radius 6.5 cm.

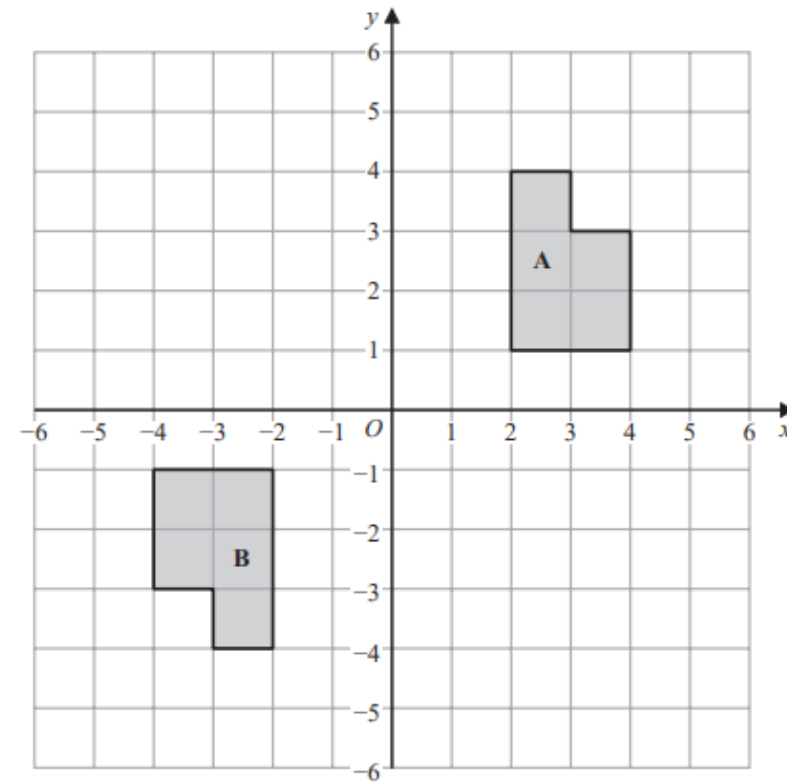
Calculate the circumference of the circle.  
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 7 is 2 marks)

	Paper											
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q07	Mensuration of 2D shapes	0.58	2	29	0.58	1.26	<b>0.69</b>	0.32	0.09	0.04	0.02

# Ones to Watch



(a) Describe fully the single transformation that maps shape A onto shape B.

(2)

(b) On the grid, reflect shape A in the line with equation  $x = -1$

(2)

(Total for Question 14 is 4 marks)

Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q14	Transformation geometry	1.41	4	35	1.41	2.63	<b>1.67</b>	0.94	0.52	0.21	0.01



# Ones to Watch?

17 Here are some integers where  $a < b < c < d$

$a$        $b$        $c$        $d$        $d$        $d$

The mode of the integers is 9

The median of the integers is 8

The range of the integers is 4

Work out the value of  $a$ , the value of  $b$ , the value of  $c$  and the value of  $d$

	Paper											
Paper	Question	Skill tested	Mean score	Max score	Mean %	ALL	5	4	3	2	1	U
2F	Q17	Statistical measures	1.41	3	47	1.41	2.44	<b>1.75</b>	<b>1.09</b>	<b>0.51</b>	0.16	0.06

Higher –  
The Winners!





# Higher– The Winners!

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q08	Standard form	1.82	2	91	1.82	1.95	1.93	1.87	1.81	1.68	1.50	1.20
1H	Q05	Linear equations	4.38	5	88	4.38	4.96	4.88	4.71	4.30	3.59	2.65	1.56
2H	Q04	Fractions	2.61	3	87	2.61	2.90	2.84	2.74	2.57	2.25	1.80	1.21
1H	Q12	Probability	3.46	4	87	3.46	3.96	3.91	3.76	3.40	2.76	1.87	1.01
2H	Q11	Quadratic equations	2.58	3	86	2.58	2.98	2.93	2.80	2.49	2.05	1.31	0.51



# 1H Qu8 - Crossover

8 (a) Write 0.000089 in standard form.

(1)

(b) Write  $8.34 \times 10^4$  as an ordinary number.

(1)

(Total for Question 8 is 2 marks)

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q08	Standard form	1.82	2	91	1.82	1.95	1.93	1.87	1.81	1.68	1.50	1.20

## 1H Qu5 - Crossover

(2)

(b) Solve  $2x - 3 = \frac{3x - 5}{4}$

Show clear algebraic working.

5	(a)	$n^2 - 6n + 4n - 24$		2	M1 for any 3 correct terms <b>or</b> for 4 out of 4 correct terms ignoring signs <b>or</b> for $n^2 - 2n \dots$ <b>or</b> for $\dots - 2n - 24$
			$n^2 - 2n - 24$		A1 oe
	(b)	$8x - 12$ <b>or</b> $\frac{3}{4}x - \frac{5}{4}$ oe or $0.75x - 1.25$ oe		3	M1 for correct multiplication by 4 <b>or</b> separate fractions on the RHS
		$8x - 3x = -5 + 12$ oe or $5x = 7$ oe <b>or</b> $2x - \frac{3}{4}x = -\frac{5}{4} + 3$ or $2x - 0.75x = -1.25 + 3$ oe			M1 ft (dep on 4 terms) for terms in $x$ on one side of equation and number terms on the other
			$\frac{7}{5}$		A1 oe dep on M1 1.4 or $1\frac{2}{5}$ oe
					<b>Total 5 marks</b>

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q05	Linear equations	4.38	5	88	4.38	4.96	4.88	4.71	4.30	3.59	2.65	1.56

# 2H Qu4 - Crossover

4 Show that  $5\frac{1}{3} - 2\frac{6}{7} = 2\frac{10}{21}$

4	$\frac{16}{3}(-)\frac{20}{7}$ or $(5)\frac{7}{21}(-)(2)\frac{18}{21}$		3	M1 for correct improper fractions or fractional part of numbers written correctly over a common denominator (no need for minus sign)
	$\frac{112}{21} - \frac{60}{21}$ or $5\frac{7}{21} - 2\frac{18}{21} = 3 - \frac{11}{21}$ oe or $5\frac{7}{21} - 2\frac{18}{21} = 4\frac{28}{21} - 2\frac{18}{21}$			M1 for correct fractions with a common denominator with minus sign or mixed numbers to the stage shown
	$\frac{112}{21} - \frac{60}{21} = \frac{52}{21} = 2\frac{10}{21}$ oe or $3 - \frac{11}{21} = 2\frac{10}{21}$ or $5\frac{7}{21} - 2\frac{18}{21} = 4\frac{28}{21} - 2\frac{18}{21} = 2\frac{10}{21}$	Shown		A1 Dep on M2 for a correct answer from fully correct working  If all 3 fractions turned into improper fractions on the first line $\frac{16}{3} - \frac{20}{7} = \frac{52}{21}$ then the student <b>clearly</b> needs to show that the LHS $= \frac{52}{21}$
				<b>Total 3 marks</b>

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q04	Fractions	2.61	3	87	2.61	2.90	2.84	2.74	2.57	2.25	1.80	1.21

# 1H Qu12

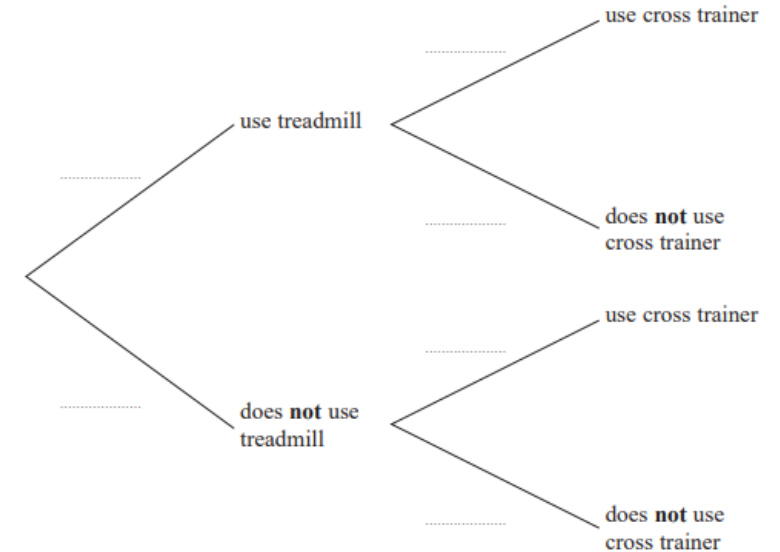
12 Rudolf goes to the gym.

The probability that he will use the treadmill is 0.8

When he uses the treadmill, the probability that he will use the cross trainer is 0.3

When he does **not** use the treadmill, the probability that he will use the cross trainer is 0.6

(a) Complete the probability tree diagram for this information.



(2)

(b) Work out the probability that Rudolf uses both the treadmill and the cross trainer.

12	(a)		0.8 and 0.2 0.3 and 0.7 0.6 and 0.4	2	B2 for all 3 correct pairs of probabilities on the correct branches (B1 for 2 correct pairs of probabilities on the correct branches) Allow equivalent fractions
	(b)	"0.8" × "0.3"		2	M1ft (Both probabilities must be less than 1)
			0.24		A1ft oe
					<b>Total 4 marks</b>

(2)

s 4 marks)

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q12	Probability	3.46	4	87	3.46	3.96	3.91	3.76	3.40	2.76	1.87	1.01



# 2H Qu11 – Crossover

(2)

(ii) Hence, solve  $x^2 + 5x - 24 = 0$

(1)

(Total for Question 11 is 3 marks)

11	(i)	<div>(x ± 3)(x ± 8)</div>		2	M1 or (x + a)(x + b) where $ab = -24$ <b>or</b> $a + b = 5$
			$(x - 3)(x + 8)$		A1
	(ii)		3, -8	1	<div>B1ft Must fit from their answer to (i) ft from their incorrect factors in the form (x + a)(x + b)</div>
					Total 3 marks

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q11	Quadratic equations	2.58	3	86	2.58	2.98	2.93	2.80	2.49	2.05	1.31	0.51



# Examiners Comments

- It was good to see several students attempting the grade 4 and 5 questions and gaining a couple of marks for these, even if they could not see the question all the way through.
- Although some struggled with questions of a problem-solving nature, there was ample opportunity to score well with the significant number of familiar looking questions.
- Students should be aware of the word 'hence' in questions.
- Students should be encouraged to look at the reality of their answers. For example, some candidates wrote that after investing 50 000 dollars for 4 years at 1.3% compound interest they would receive over a million dollars interest.
- Students were less successful in using set theory, polygons and working with prime factors.
- A significant number of students struggled with solving problems with perimeters, finding HCF and LCM using indices, applying Pythagoras theorem and working out the number of sides of a polygon.

Higher –  
The not so  
winners!



# Higher – The not so winners

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q16	Powers and roots	0.57	3	19	0.57	1.55	0.50	0.17	0.06	0.02	0.00	0.00
1H	Q23	Sequences	1.06	6	18	1.06	2.48	0.82	0.55	0.41	0.34	0.27	0.21
2H	Q24	Powers and roots	0.39	3	13	0.39	1.21	0.21	0.06	0.02	0.01	0.00	0.00
2H	Q22	Graphs	0.83	7	12	0.83	2.14	0.72	0.32	0.15	0.10	0.08	0.05
1H	Q24	Algebraic manipulation	0.36	4	9	0.36	1.11	0.18	0.07	0.03	0.02	0.02	0.02

# 1H Qu16

**16** Without using a calculator, show that  $\frac{12}{\sqrt{2}-1} - (\sqrt{2})^5 = 2\sqrt{32} + 12$   
Show your working clearly.

<b>16</b>	$\frac{12}{\sqrt{2}-1} \times \frac{\sqrt{2}+1}{\sqrt{2}+1}$ or $\frac{12}{\sqrt{2}-1} \times \frac{-\sqrt{2}-1}{-\sqrt{2}-1}$ <b>and</b> $4\sqrt{2}$ or $2\sqrt{8}$ or $\sqrt{32}$ oe		3	M1 for showing a correct method for rationalising the denominator <b>and</b> dealing with $(\sqrt{2})^5$
	E.g. $12\sqrt{2} + 12 - 4\sqrt{2}$ or $8\sqrt{2} + 12$ $12\sqrt{2} + 12 - 2\sqrt{8}$ or $12\sqrt{2} + 12 - \sqrt{32}$ oe			M1 dep expression must be in surd form
	E.g. $12\sqrt{2}(+12) - 4\sqrt{2} = 8\sqrt{2}(+12) = 2\sqrt{4^2 \times 2}(+12) = 2\sqrt{32}(+12)$ or $12\sqrt{2}(+12) - 2\sqrt{8} = 6\sqrt{8}(+12) - 2\sqrt{8} = 4\sqrt{8}(+12) = 2\sqrt{4 \times 8}(+12) = 2\sqrt{32}(+12)$ or $12\sqrt{2}(+12) - \sqrt{32} = 3\sqrt{4^2 \times 2}(+12) - \sqrt{32} = 2\sqrt{32}(+12)$ oe Note $8\sqrt{2} = 2\sqrt{4^2 \times 2}$ or $2\sqrt{16 \times 2}$ or $\sqrt{32 \times 4}$ or $\sqrt{64 \times 2}$ $12\sqrt{2} = 3\sqrt{4^2 \times 2}$ or $3\sqrt{16 \times 2}$ or $\sqrt{32 \times 9}$	Shown		A1 dep on M2 for showing working to given answer (they may dismiss the +12 and just deal with the surd part for this stage)
				<b>Total 3 marks</b>

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q16	Powers and roots	0.57	3	19	0.57	1.55	0.50	0.17	0.06	0.02	0.00	0.00



# 1H Qu23

23 A polygon has  $n$  sides, where  $n > 5$

When arranged in order of size, starting with the largest number, the sizes of the interior angles of the polygon, in degrees, are the terms of an arithmetic sequence.

Here are the first five terms of this sequence.

177    175    173    171    169

Find the value of  $n$   
Show clear algebraic working.

23	$d = -2$	6	M1 for common difference
	$(S_n =) \frac{n}{2} [2(177) + (n-1)(-2)]$ or $(S_n =) \frac{n}{2} [354 - 2n + 2]$ or $(S_n =) \frac{n}{2} [356 - 2n]$ oe		M1 for correctly substituting 177 and $-2$ into $(S_n =) \frac{n}{2} [2a + (n-1)d]$
	$\frac{n}{2} [2(177) + (n-1)(-2)] = (n-2) \times 180$		M1 dep on M2 for equating $S_n$ with $(n-2) \times 180$
	E.g. $2n^2 + 4n - 720 = 0$ or $n^2 + 2n - 360 = 0$ oe  Allow $n^2 + 2n = 360$		A1 (dep on M3) writing a correct 3-term quadratic expression in form $ax^2 + bx + c (= 0)$  allow $ax^2 + bx = c$
	E.g. $(x-18)(x+20) (= 0)$  $x = \frac{-2 \pm \sqrt{2^2 - 4 \times 1 \times -360}}{2}$  e.g. $(x+1)^2 - (1)^2 = 360$		M1 (dep on M2) for a complete method to solve their 3-term quadratic equation  Allow one sign error and some simplification – allow as far as $\frac{-2 \pm \sqrt{4+1440}}{2}$
	18		A1 dep on M3 for 18 only
Total 6 marks			

## International GCSE Mathematics Formulae sheet – Higher Tier

### Arithmetic series

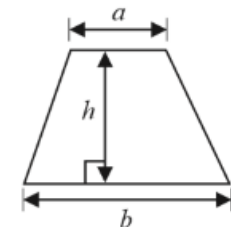
Sum to  $n$  terms,  $S_n = \frac{n}{2} [2a + (n-1)d]$

### The quadratic equation

The solutions of  $ax^2 + bx + c = 0$  where  $a \neq 0$  are given by:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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



	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q23	Sequences	1.06	6	18	1.06	2.48	0.82	0.55	0.41	0.34	0.27	0.21



# 2H Q24

24

$$\frac{18 \times (\sqrt{27})^{4n+6}}{6 \times 9^{2n+8}} = 3^x$$

Express  $x$  in terms of  $n$

Show your working clearly and simplify your expression.

24	eg $\frac{2 \times 3 \times 3 \times (3^{\frac{3}{2}})^{4n+6}}{2 \times 3 \times 3^{2(2n+8)}}$ or $\frac{3 \times 3^{\frac{3}{2}(4n+6)}}{3^{2(2n+8)}}$  $\sqrt{27}$ to be changed to a power of 3 and not $3\sqrt{3}$ unless recovered		3	M1 For 2 of: <ul style="list-style-type: none"> <li>writing 18 as <math>2 \times 3^2</math> oe <b>and</b> 6 as <math>2 \times 3</math> <b>OR</b> cancelling 6 &amp; 18 fully</li> <li>writing <math>\sqrt{27}</math> as <math>3^{\frac{3}{2}}</math> or <math>3 \times 3^{\frac{1}{2}}</math> <b>OR</b> <math>(\sqrt{27})^{4n+6}</math> as <math>(3^3)^{2n+3}</math> or <math>3^{6n+9}</math></li> <li>writing 9 as <math>3^2</math> <b>OR</b> <math>9^{2n+8}</math> as <math>3^{2(2n+8)}</math> or <math>3^{4n+16}</math></li> </ul>
	eg $\frac{3 \times 3^{6n+9}}{3^{4n+16}}$ or $\frac{3^{6n+10}}{3^{4n+16}}$ or $\frac{3 \times 3^{1.5(4n+6)}}{3^{2(2n+8)}}$ or  $\frac{3^2 \times 3^{6n+9}}{3 \times 3^{4n+16}}$ or $\frac{3^{6n+11}}{3^{4n+17}}$ oe or eg $3^{6n+11} = 3^x \times 3^{4n+17}$ oe			M1 For a correct expression or equation using only powers of 3 (powers of 3 but not necessarily a single power)
		$2n - 6$		A1 oe eg $2(n - 3)$ dep on M1
				<b>Total 3 marks</b>

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q24	Powers and roots	0.39	3	13	0.39	1.21	0.21	0.06	0.02	0.01	0.00	0.00

## 2H Qu22

**22**  $ABCD$  is a kite, with diagonals  $AC$  and  $BD$ , drawn on a centimetre square grid, with a scale of 1 cm for 1 unit on each axis.

$A$  is the point with coordinates  $(-3, 4)$

The diagonals of the kite intersect at the point  $M$  with coordinates  $(0, 2)$

Given that  $AB = AD = 6.5$  cm and the  $x$  coordinate of  $B$  is positive,

find the coordinates of the points  $B$  and  $D$ .

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q22	Graphs	0.83	7	12	0.83	2.14	0.72	0.32	0.15	0.10	0.08	0.05

# 1H Qu24

24 Express each of  $a$ ,  $b$  and  $c$  in terms of  $q$  so that

$$q + 12x - qx^2$$

can be written as  $a - b(x - c)^2$

24	$-q\left(x^2 - \frac{12}{q}x\right) + q$ or $-q\left(x^2 - \frac{12}{q}x - \frac{q}{q}\right)$ oe		4	M1 for a correct factorisation of the expression or $b = q$ (must be stated)
	$-q\left[\left(x - \frac{12}{2q}\right)^2 \dots\right]$ oe or $-q\left[\left(x - \frac{6}{q}\right)^2 \dots\right]$ oe			M1 for starting the correct process to complete the square
	E.g. $-q\left(x - \frac{6}{q}\right)^2 + \frac{36}{q} + q$ oe or $-q\left(x - \frac{12}{2q}\right)^2 + \frac{144q}{4q^2} + q$ oe			M1 for a complete process of completing the square. (Does not need to be simplified)
		$a = \frac{36}{q} + q$ $b = q$ $c = \frac{6}{q}$		A1 oe $a$ and $c$ must come from a correct process of completing the square. (Does not need to be simplified)
				<b>Total 4 marks</b>

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q24	Algebraic manipulation	0.36	4	9	0.36	1.11	0.18	0.07	0.03	0.02	0.02	0.02

# 1H Qu24

24 Express each of  $a$ ,  $b$  and  $c$  in terms of  $q$  so that

$$q + 12x - qx^2$$

can be written as  $a - b(x - c)^2$

24 ALT	$a - bx^2 + 2bcx - bc^2$ oe or $-bx^2 + 2bcx - bc^2 + a$ oe or $b = q$		4	M1 for correctly multiplying out $a - b(x - c)^2$
	$2bc = 12$ or $a - bc^2 = q$ oe			M1 for correctly equating coefficients
	$c = \frac{12}{2q}$ or $a = q\left(\frac{12}{2q}\right)^2 + q$ or $c = \frac{6}{q}$ or $a = q\left(\frac{6}{q}\right)^2 + q$			M1 for correctly finding $a$ or $c$ (Does not need to be simplified)
		$a = \frac{36}{q} + q$ $b = q$ $c = \frac{6}{q}$		A1 oe (Does not need to be simplified)
				<b>Total 4 marks</b>

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q24	Algebraic manipulation	0.36	4	9	0.36	1.11	0.18	0.07	0.03	0.02	0.02	0.02

# Higher – Ones to watch



# Ones to Watch - Grade 8

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q10	Trigonometry and Pythagoras' Theorem	1.51	4	38	1.51	3.14	<b>1.83</b>	<b>1.00</b>	0.48	0.19	0.07	0.01
1H	Q16	Powers and roots	0.57	3	19	0.57	1.55	<b>0.50</b>	0.17	0.06	0.02	0.00	0.00
1H	Q17	Calculus	1.11	5	22	1.11	2.65	<b>1.03</b>	0.60	0.31	0.16	0.08	0.02
<del>1H</del>	<del>Q19</del>	<del>Mensuration of 2D shapes</del>	<del>1.40</del>	<del>5</del>	<del>28</del>	<del>1.40</del>	<del>3.23</del>	<del><b>1.47</b></del>	<del>0.80</del>	<del>0.35</del>	<del>0.15</del>	<del>0.05</del>	<del>0.01</del>
2H	Q20	Mensuration of 2D shapes	0.77	4	19	0.77	2.38	<b>0.48</b>	0.10	0.02	0.01	0.00	0.00
2H	Q23	Graphs	0.53	2	27	0.53	1.30	<b>0.59</b>	0.23	0.06	0.03	0.01	0.00
2H	Q24	Powers and roots	0.39	3	13	0.39	1.21	<b>0.21</b>	0.06	0.02	0.01	0.00	0.00



# Ones to Watch - Grade 8

**10** Two circles,  $C_1$  and  $C_2$ , are drawn on a centimetre grid, with a scale of 1 cm for 1 unit on each axis.

The centre of circle  $C_1$  is at the point with coordinates  $(-1, 3)$  and the radius of  $C_1$  is 13 cm.

The centre of circle  $C_2$  is at the point with coordinates  $(7, 18)$  and the radius of  $C_2$  is 6 cm.

(a) Work out the distance between the centre of  $C_1$  and the centre of  $C_2$

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q10	Trigonometry and Pythagoras' Theorem	1.51	4	38	1.51	3.14	<b>1.83</b>	<b>1.00</b>	0.48	0.19	0.07	0.01

# Ones to Watch - Grade 8

**16** Without using a calculator, show that  $\frac{12}{\sqrt{2}-1} - (\sqrt{2})^5 = 2\sqrt{32} + 12$   
Show your working clearly.

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q16	Powers and roots	0.57	3	19	0.57	1.55	<b>0.50</b>	0.17	0.06	0.02	0.00	0.00

# Ones to Watch - Grade 8

**17** A particle  $P$  moves along a straight line.  
The fixed point  $O$  lies on this line.

The displacement of  $P$  from  $O$  at time  $t$  seconds,  $t \geq 1$ , is  $s$  metres where

$$s = 4t^2 + \frac{125}{t}$$

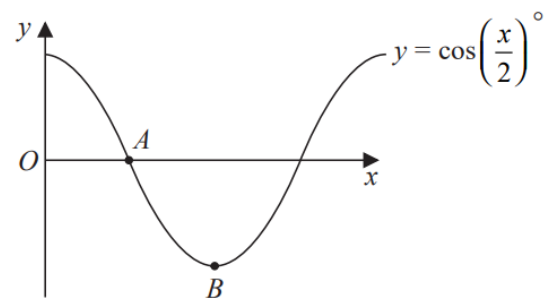
The velocity of  $P$  at time  $t$  seconds,  $t \geq 1$ , is  $v$  m/s

Work out the distance of  $P$  from  $O$  at the instant when  $v = 0$

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q17	Calculus	1.11	5	22	1.11	2.65	<b>1.03</b>	0.60	0.31	0.16	0.08	0.02

# Ones to Watch - Grade 8

23 The diagram shows a sketch of the graph of  $y = \cos\left(\frac{x}{2}\right)^\circ$



(i) Find the coordinates of the point A

( ..... , ..... )  
(1)

(ii) Find the coordinates of the point B

( ..... , ..... )  
(1)

(Total for Question 23 is 2 marks)

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q23	Graphs	0.53	2	27	0.53	1.30	0.59	0.23	0.06	0.03	0.01	0.00

# Ones to Watch - Grade 8

24

$$\frac{18 \times (\sqrt{27})^{4n+6}}{6 \times 9^{2n+8}} = 3^x$$

Express  $x$  in terms of  $n$

Show your working clearly and simplify your expression.

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q24	Powers and roots	0.39	3	13	0.39	1.21	<b>0.21</b>	0.06	0.02	0.01	0.00	0.00

# Ones to Watch - Grade 7

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q14	Function notation	2.17	4	54	2.17	3.70	<b>2.72</b>	<b>1.79</b>	1.13	0.76	0.52	0.28
<del>1H</del>	<del>Q18</del>	<del>Trigonometry and Pythagoras' Theorem</del>	<del>2.76</del>	5	55	<del>2.76</del>	<del>4.66</del>	<del>3.81</del>	<b>2.50</b>	<b>1.27</b>	<del>0.54</del>	<del>0.25</del>	<del>0.06</del>
1H	Q20	Transformation geometry	0.92	2	46	0.92	1.77	<b>1.24</b>	<b>0.68</b>	0.30	0.11	0.04	0.00
<del>1H</del>	<del>Q22</del>	<del>3D shapes and volume</del>	<del>2.19</del>	5	44	<del>2.19</del>	<del>4.12</del>	<b>2.86</b>	<b>1.70</b>	<del>0.86</del>	<del>0.37</del>	<del>0.14</del>	<del>0.09</del>
2H	Q05	Mensuration of 2D shapes	2.93	4	73	2.93	3.85	3.65	3.27	<b>2.47</b>	<b>1.42</b>	<b>0.52</b>	0.17
2H	Q06	Trigonometry and Pythagoras' Theorem	2.46	3	82	2.46	2.94	2.85	2.68	2.35	1.80	<b>1.02</b>	<b>0.31</b>
2H	Q08	Ratio and proportion	4.04	5	81	4.04	4.84	4.68	4.38	3.86	2.98	<b>1.62</b>	<b>0.56</b>
2H	Q11	Quadratic equations	2.58	3	86	2.58	2.98	2.93	2.80	2.49	2.05	<b>1.31</b>	<b>0.51</b>
2H	Q17	Proportion	2.12	4	53	2.12	3.60	2.90	<b>1.89</b>	<b>0.97</b>	0.44	0.16	0.05



# Ones to Watch

14 The function  $f$  is defined as

$$f: x \mapsto \frac{2x}{x-6} \quad x \neq 6$$

(a) Find  $f(10)$

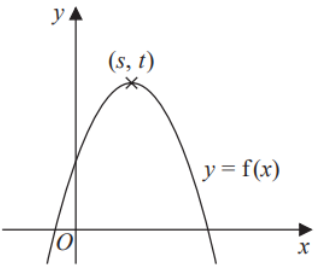
(1)

(b) Express the inverse function  $f^{-1}$  in the form  $f^{-1}: x \mapsto \dots$

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q14	Function notation	2.17	4	54	2.17	3.70	<b>2.72</b>	<b>1.79</b>	1.13	0.76	0.52	0.28

# Ones to Watch

20 The diagram shows a sketch of part of the curve with equation  $y = f(x)$



There is one maximum point on this curve.  
The coordinates of this maximum point are  $(s, t)$

Find, in terms of  $s$  and  $t$ , the coordinates of the maximum point on the curve with equation

(i)  $y = f(x - 2)$

( ..... , ..... )  
(1)

(ii)  $y = 3f(x)$

( ..... , ..... )  
(1)

(Total for Question 20 is 2 marks)

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
1H	Q20	Transformation geometry	0.92	2	46	0.92	1.77	<b>1.24</b>	<b>0.68</b>	0.30	0.11	0.04	0.00

# Ones to Watch

5 The diagram shows an 8-sided shape  $ABCDEFGH$ .

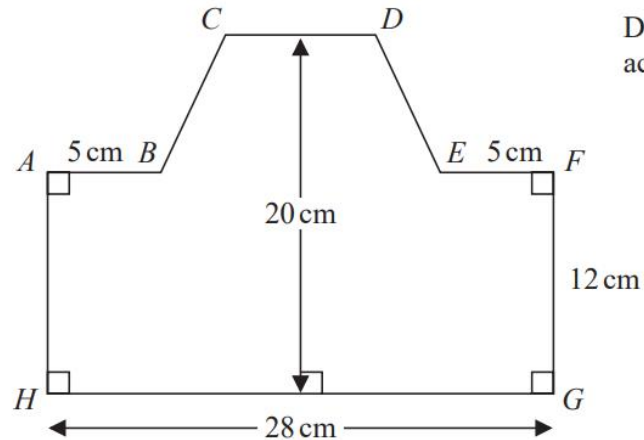


Diagram **NOT**  
accurately drawn

$HG = 28 \text{ cm}$      $FG = 12 \text{ cm}$      $AB = EF = 5 \text{ cm}$

The height of the shape is  $20 \text{ cm}$

$CD$  is parallel to  $HG$

The area of shape  $ABCDEFGH$  is  $434 \text{ cm}^2$

Find the length of  $CD$ .

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q05	Mensuration of 2D shapes	2.93	4	73	2.93	3.85	3.65	3.27	<b>2.47</b>	<b>1.42</b>	<b>0.52</b>	0.17

# Ones to Watch

6 The diagram shows triangle  $PQR$ .

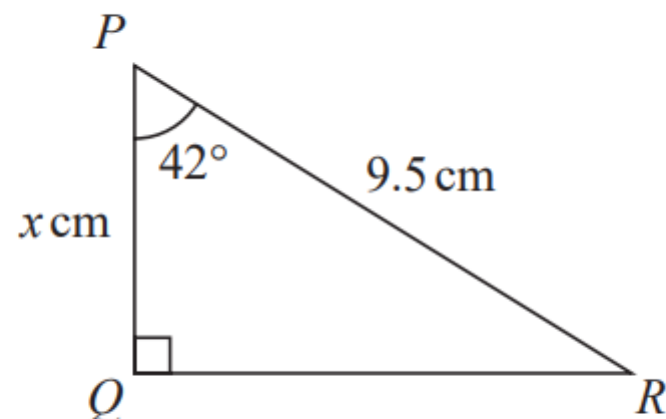


Diagram **NOT**  
accurately drawn

Work out the value of  $x$   
Give your answer correct to one decimal place.

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q06	Trigonometry and Pythagoras' Theorem	2.46	3	82	2.46	2.94	2.85	2.68	2.35	1.80	<b>1.02</b>	<b>0.31</b>

# Ones to Watch

8 Behnaz makes 300 celebration cards so that

number of birthday cards : number of anniversary cards : number of congratulations cards = 7:5:3

$\frac{2}{5}$  of the birthday cards have numbers on them.

36% of the anniversary cards have numbers on them.

None of the congratulations cards have numbers on them.

Work out what fraction of the 300 cards have numbers on them.

Give your answer in its simplest form.

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q08	Ratio and proportion	4.04	5	81	4.04	4.84	4.68	4.38	3.86	2.98	<b>1.62</b>	<b>0.56</b>

# Ones to Watch

11 (i) Factorise  $x^2 + 5x - 24$

(ii) Hence, solve  $x^2 + 5x - 24 = 0$

(2)

(1)

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q11	Quadratic equations	2.58	3	86	2.58	2.98	2.93	2.80	2.49	2.05	<b>1.31</b>	<b>0.51</b>



# Ones to Watch

**17**  $M$  varies directly as the cube of  $h$   
 $M = 4$  when  $h = 0.5$

Find the value of  $h$  when  $M = 500$

	Question	Skill tested	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3
2H	Q17	Proportion	2.12	4	53	2.12	3.60	2.90	<b>1.89</b>	<b>0.97</b>	0.44	0.16	0.05

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

21

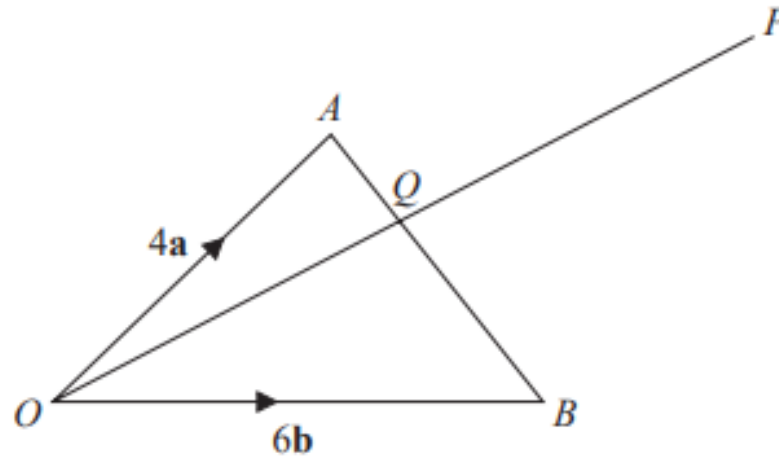


Diagram **NOT**  
accurately drawn

$OAB$  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](#)
[Save](#)

**Total :** 2 questions 10 minutes 10 marks

[Remove all](#)
[Export](#)

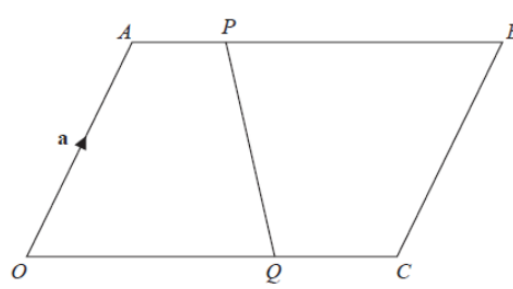
Find expression for a vector

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

- Students who were well prepared for this paper were able to make a good attempt at a majority of questions.
- Students were less successful in producing a full treatment for surds (Q16), differentiating functions in context (Q17) and completing the square, particularly for negative quadratics (Q24).
- Finding probabilities in a context, transformations of functions, gaining answers from histograms and manipulation of algebra in later questions, proved to be challenging for many. Reverse percentage in a context, (Q6a) also caused difficulty for less able students.
- Generally, problem solving, and questions assessing mathematical reasoning (Q2, Q4, Q7, Q10, and Q13), were tackled well.

# Tiering Guidance - Crossover

	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

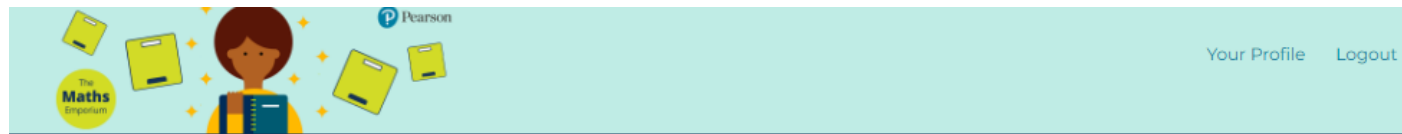
FT 1 Qu 16-25

FT 2 Qu 17-28

HT 1 Qu 1-10

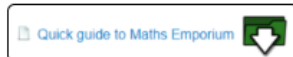
HT 2 Qu 1-12

# 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

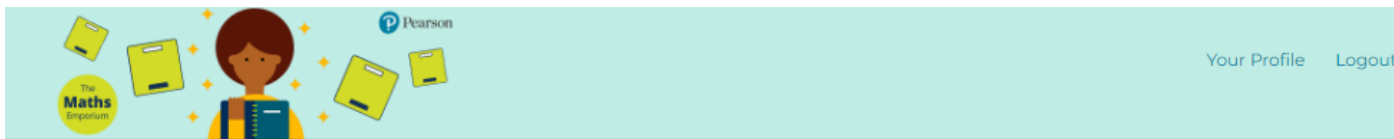
- FEB All day  
**3** A Level Statistics 9ST0 June 2022 exemplars release date
- FEB All day  
**10** Updated A Level Maths Year 2 scheme of work with technology links
- FEB All day  
**21** June 2023 Exam Series Entry Deadline Day
- MAR 4:00 pm - 5:30 pm  
**8** A level Maths: Deep dive into teaching 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

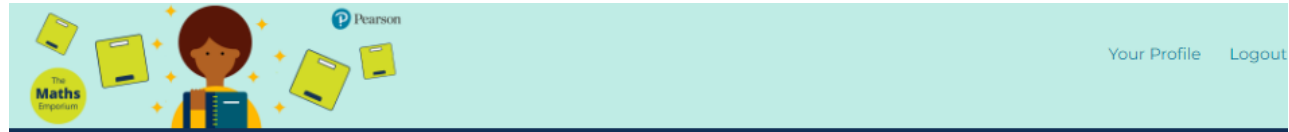
February 21

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

March 2023

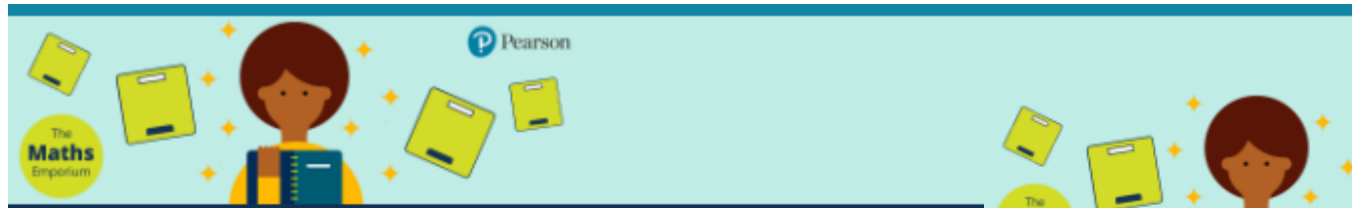


# Emporium Resources



<input type="text" value="Search for events"/>							<a href="#">FIND EVENTS</a>	<a href="#">List</a>	<a href="#">Month</a>	<a href="#">Day</a>
<a href="#">&lt;</a> <a href="#">This Month</a> <b>FEBRUARY 2023</b> <a href="#">v</a>										
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				

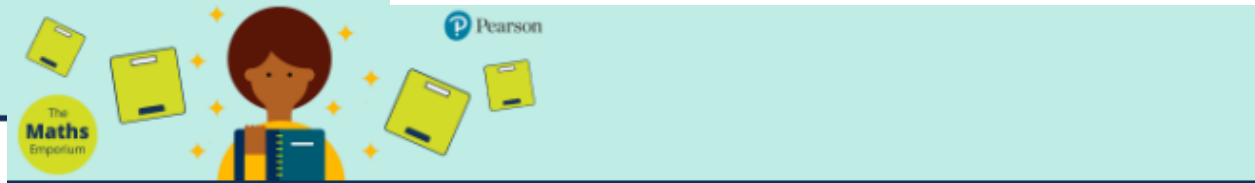
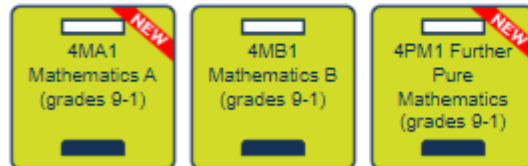
# Emporium Resources



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

## Category: International GCSE Mathematics

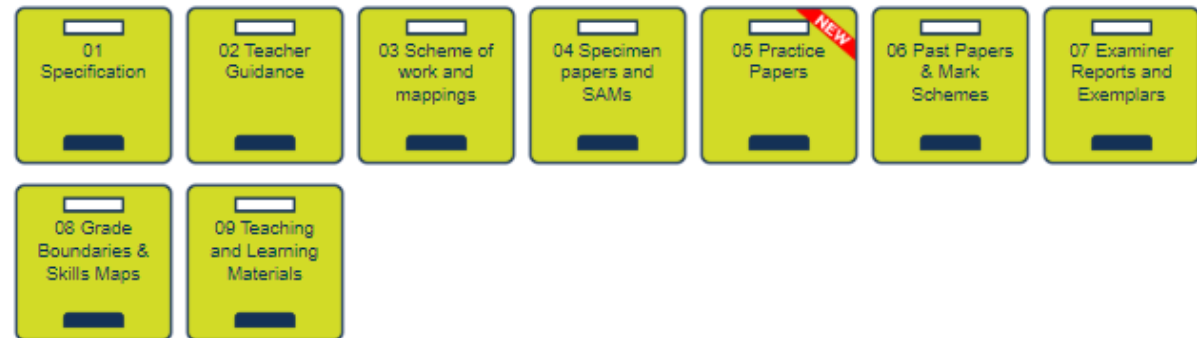
International GCSE Mathematics documents for current and past International GCSE specifications. Document Certificate in Mathematics (IGCSE for state schools), which ran from 2012 to 2017.



[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

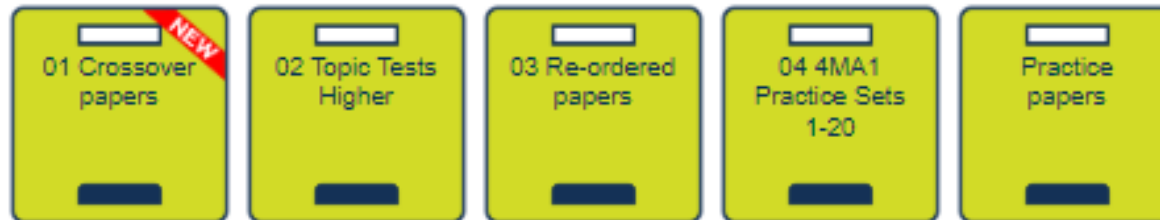


[Maths Emporium](#) > [International GCSE Mathematics](#) > [4MA1 Mathematics A \(grades 9-1\)](#) > [05 Practice Papers](#)

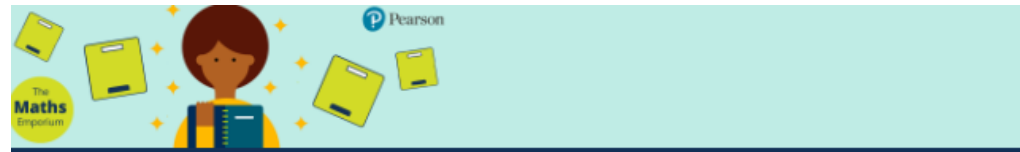
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## Category: 05 Practice Papers

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

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

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

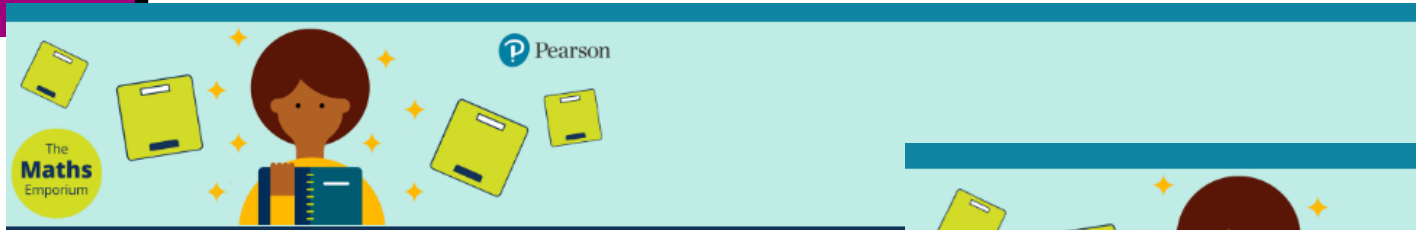
$$\text{Change} = 140$$

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

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

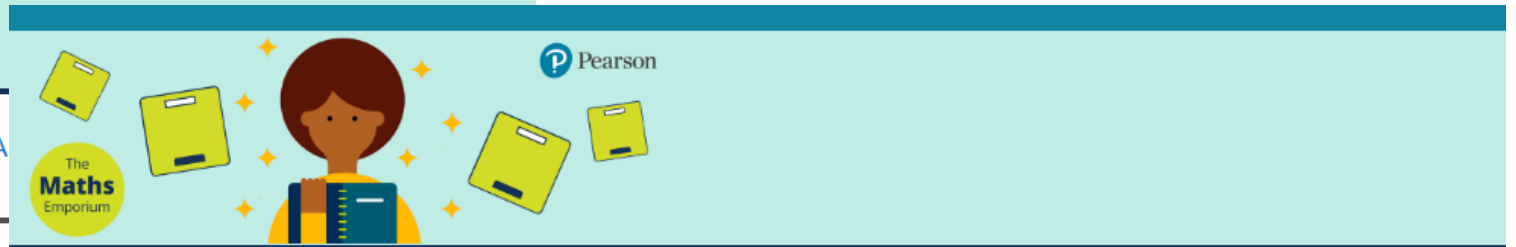
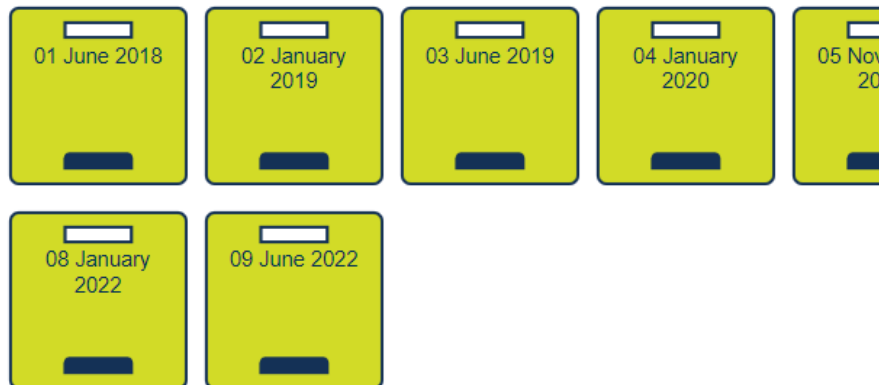
$$3540 \div 295 \\ = 12$$

# 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

# Emporium Resources - [Link](#)

	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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By Qn



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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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