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Mark Scheme (Results)

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GCSE Mathematics (1380)
Paper 4H

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NOTES ON MARKING PRINCIPLES

1   **Types of mark**
M marks: method marks   A marks: accuracy marks
B marks: unconditional accuracy marks (independent of M marks)

2   **Abbreviations**
cao – correct answer only   ft – follow through   isw – ignore subsequent working
SC: special case   dep – dependent   oe – or equivalent (and appropriate)
indep - independent

3   **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.

4   **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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
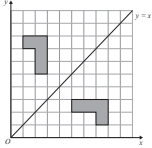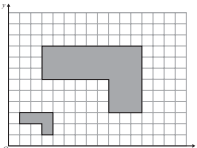If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

5   **Follow through marks**
Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

6   **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: e.g. incorrect canceling 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 e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

7   **Probability**
Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

8   **Linear equations**
Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

9   **Parts of questions**
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

10   **Range of answers**
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

1380/4H				
Question	Working	Answer	Mark	Notes
1	$5 \times 8 \div 2$	20	2	M1 for $5 \times 8 \div 2$ oe A1 cao
2	$1 - 0.58 - 0.3$ $= 1 - 0.88$	0.12	2	M1 for $1 - 0.58 - 0.3$ oe A1 for 0.12 oe
3	B = 20×2 $= 40$ C = $3 \div 4 \times 20$ $= 15$ D = $10 \div 100 \times 20 + 20$ = 22 20 + 40 + 15 + 22	97	4	M1 for 20×2 or 40 seen M1 for $3 \div 4 \times 20$ or 15 seen M1 for $10 \div 100 \times 20 + 20$ oe or 22 seen or 1.1×20 A1 cao
4 (a)	3×100	300	2	M1 for 3×100 or $100 \div 6 \times 18$ oe A1 cao
(b)	$2 \div \frac{1}{2} \times 6$	24	2	M1 for $2 \div \frac{1}{2} \times 6$ oe A1 cao

1380/4H				
Question	Working	Answer	Mark	Notes
5 (a)			2	B2 cao (B1 for shape in the correct orientation above the line y = x or for shape elongated or shortened by one square but with either top or bottom in the correct position and in the correct orientation)
(b)			3	B3 for correct enlargement in correct position (B2 for enlargement SF 3 in incorrect position or enlargement, centre O, but different scale factor) (B1 for 4 lines enlarged by SF 3 or enlargement, not from O, different scale factor)
6 (a)		$6x + 5y$	2	B2 (B1 for either $6x$ or $5y$ seen)
(b)	$2x = 10 - 3 = 7$ $x = 7 \div 2$	3.5	2	M1 for $2x = 10 - 3$ or $2x = 7$ or $(10 - 3) \div 2$ A1 for 3.5 oe
(c)(i)		c^{11}	2	B1 accept $c^{5 + 6}$
(ii)		e^{8}		B1 accept $e^{12 - 4}$

1380/4H				
Question	Working	Answer	Mark	Notes
7	$8 \div 20 \times 100$	40	2	M1 for $8 \div 20 \times 100$ or $\dfrac{8}{20} = \dfrac{8 \times 5}{20 \times 5}$ oe or $\dfrac{40}{100}$ A1 cao
8 (a)		10 to 19	1	B1 cao
(b)		20 to 29	1	B1 for acceptable reason eg correct answer is 20 to 29 eg 30$^{\text{th}}$/31$^{\text{st}}$ person not in this interval
(c)			2	B2 for complete polygon (ignore histograms and any lines below an age of 4.5 or above an age of 65, but award B1 if there is a line joining the first to the last point.) (B1 for one vertical or horizontal error OR incorrect but consistent error in placing the midpoints horizontally OR correct plotting but not joined. In this case ignore a line joining the first to the last.) Plotting tolerance: ± 1 square Points to be joined by lines (ruled or handdrawn, but not curves.)

1380/4H				
Question	Working	Answer	Mark	Notes
9		2.42927(0474)	2	B2 for 2.42927 or better (B1 for 19.56 or 8.0518 seen or 2.43 or 2.429 or 2.4292 or 2.4293 or digits 242927... or $\dfrac{97800}{40259}$ seen)
10 (a)		−2, −1, 0, 1, 2	2	B2 for −2, −1, 0, 1, 2 (B1 for one extra or one missing)
(b)	2x < 30	x < 15	2	M1 for 2x < 30 or $\dfrac{x}{3}$ < 5 or x = 15 or x > 15 A1 cao
11		A and 3 B and 2 C and 4 D and 1	2	B2 for all 4 correct (B1 for 2 correct)
12		$T = 7x + 5y$	3	B3 for $T = 7x + 5y$ oe (B2 for $7x + 5y$ oe or $T = 7x + ...$ or $T = ... + 5y$) (B1 for T = an expression in x and y or $7x$ or $5y$ seen)
13	$7120 \div 8$	890	2	M1 for 7120 ÷ 8 or 7120 ÷ 480 A1 cao

1380/4H				
Question	Working	Answer	Mark	Notes
14 (a)			2	B2 for correct front elevation (B1 for the correct diagram with extra row or extra column) Internal lines need not be drawn
(b)			2	B2 for correct plan - it can be rotated (B1 for any rectangle that is not a square) Internal lines need not be drawn
15 (a)		Reason	1	B1 for valid reason eg only best students, biased, sample is too small
(b)		Wrong	1	B1 for valid thing wrong eg the choices are all positive, question does not reference liking
(c)		Question	2	B1 for one question which includes a time frame or reference to 'normal' homework B1 for at least 3 valid non-overlapping boxes, need not be inclusive NB response boxes must be intervals but allow 0 on its own
16 (a)		(0, 3, 2)	1	B1 cao
(b)		(5, 3, 0)	1	B1 cao
17 (a)	8.25×10^7	8.25×10^7	1	B1 cao
(b)	$= 14.56 \times 10^{-16}$	1.456×10^{-15}	2	M1 for digits 1456×10^n or $A \times 10^{-15}$, $1 < A < 2$ A1 for 1.456×10^{-15}

1380/4H				
Question	Working	Answer	Mark	Notes
18	19.5 × 1000 ÷ 210 = 19500 ÷ 210 = 92.8(5714…) or 92 × 210 = 19320 = 19.32 *l* 93 × 210 = 19530 = 19.53 *l* or 19500 ÷ 92 = 211.95 19500 ÷ 93 = 209.67	Explanation	3	M1 for converting between m*l* and *l* correctly or for 0.21 or 19500 seen M1 for "19500" ÷ "210" or 92 × "210" or 93 × "210" or "19500" ÷ 92 A1 for a worded explanation with correct calculations
19 (a) (b)		61, 82, 94, 100 Points plotted and joined	1 2	B1 cao B2 ft (dep on sensible table - condone 1 addition error) for 5 points plotted correctly, ± 1 square, at ends of interval and joined by curve or line segments provided no gradient is negative – ignore any part of graph outside range of their points (B1 ft for 4 points plotted correctly and joined or for 5 points plotted correctly) (SC B1 if 5 points plotted not at end but consistent within each interval and joined)

1380/4H				
Question	Working	Answer	Mark	Notes
19 (c)		36 − 38	1	B1 for answer in range 36 − 38 or ft (± 1square) from cf graph using cf = 50 or 50.5
(d)		9 − 11	2	B2 for answer in range 9 − 11 OR M1 ft from cf graph for valid reading (± 1square) from 56 or 57 or vertical line drawn from age = 56 or 57 and horizontal line drawn to 'y'-axis A1 ft (± 1square) for 100 − "reading from 56 or 57"
20 (a)	2) 56 2) 28 2) 14 7	$2 \times 2 \times 2 \times 7$	2	M1 for a systematic method of at least 2 correct divisions by a prime number oe factor tree, can be implied by digits 2, 2, 2, 7 on answer line A1 for $2 \times 2 \times 2 \times 7$ or $2^3 \times 7$
(b)	$42 = 2 \times 3 \times 7$	14	2	M1 for attempt to find the common factor (by 2 lists or otherwise) or for answer of 7 A1 cao

1380/4H				
Question	Working	Answer	Mark	Notes
21	AB = 8 cos 37° = 8 (0.7986…) = 6.389…	6.39	3	M1 for $\cos 37 = \dfrac{AB}{8}$ M1 for AB = 8 cos 37° or 6.4 seen (dep on 1st M1) A1 for 6.38 - 6.39 OR M1 for $\dfrac{AB}{Sin53} = \dfrac{8}{Sin90}$ M1 for $AB = \dfrac{8 Sin53}{Sin90} AB$ or 6.4 seen (dep on 1st M1) A1 for for 6.38 - 6.39 SC M2A0 for 6.12 (radians) or 6.69 (grad)
22 (a) (b)		−15, (−8), −7, −6, 1, (20)	2 2	B2 for all 4 correct (B1 for 2 or 3 correct) B2 for fully correct graph OR B1 ft for 6 'points' plotted correctly ± 1square B1 for smooth curve through all their 5 or 6 plotted points provided B1 awarded in (a)

1380/4H				
Question	Working	Answer	Mark	Notes
23	Angle $ADC = 180 - 128$ $= 52°$ $x = 2 \times 52°$ or Reflex angle $AOC = 256°$ $x = 360 - 256$	104	2	M1 for valid method to get angle ADC or $128 \times$ 2 or $256°$ seen ... can be on the diagram A1 cao
24	35.5×26.5	940.75	3	B1 for sight of 35.5 or 26.5 or 35.4999(...) or 26.4999(...) M1 for UB length × UB width where $35.49 \le$ UB length ≤ 35.5 $26.49 \le$ UB width ≤ 26.5 A1 for 940.74 - 940.75 (or $\dfrac{3763}{4}$)
25 (a)	$(2x + 4y)(4x - 5y)$ $= 8x^2 - 10xy + 16xy - 20y^2$	$8x^2 + 6xy - 20y^2$	2	B2 cao (B1 for 3 out of 4 terms correct or all 4 correct ignoring signs)
(b)		$x + 10$	1	B1 for $x + 10$ or $(x + 10)$ or $(x + 10)^1$
(c)	$= \dfrac{(x+5)(x-5)}{(x+5)(x+2)}$	$\dfrac{x-5}{x+2}$	3	M1 for $(x+5)(x-5)$ M1 (indep) for $(x+5)(x+2)$ A1 cao
(d)	$x^2 + 6x - 2 = (x+3)^2 - 9 - 2$	$p = 3$ $q = -11$	2	M1 for $(x+3)^2 \pm k$ or $x^2 + 2px + p^2 + q$ oe or $p = 3$ or $q = -11$ A1 cao

1380/4H				
Question	Working	Answer	Mark	Notes
26	$\dfrac{7}{11} \times \dfrac{4}{10} + \dfrac{4}{11} \times \dfrac{7}{10}$ $= \dfrac{28}{55} + \dfrac{28}{55}$	$\dfrac{28}{55}$	3	M1 for $\dfrac{4}{10}$ and $\dfrac{7}{10}$ as second probabilities, may be seen on a tree diagram, or for $\dfrac{7}{11} \times \dfrac{4}{10}$ or $\dfrac{4}{11} \times \dfrac{7}{10}$ M1 (dep) for $\dfrac{7}{11} \times \dfrac{"4"}{10} + \dfrac{4}{11} \times \dfrac{"7"}{10}$ A1 for $\dfrac{28}{55}$ oe SC B2 for an answer of $\dfrac{56}{121}$ oe
27 (a)	Graph translated 3 units to the right through points (1, 6), (7, 6), (2, 0), (6, 0), (4, −2.5)	sketch	2	M1 for a horizontal translation with at least three of the points (−1, 0), (3, 0), (1, −2.5) translated by the same amount A1 for a curve through the points (1, 6), (7, 6), (2, 0), (6, 0), (4, −2.5) ± ½ square
(b)	Graph reflected in the *x*-axis through points (−1, 0), (3, 0), (1, 2.5), (−2, −6), (4, −6)	sketch	2	M1 for a reflection in *x*-axis through (−1, 0), (3, 0) or in *y*-axis through (0, −2) A1 for a curve through the points (−1, 0), (3, 0), (1, 2.5), (−2, −6), (4, −6) ± ½ square

1380/4H					
Question		Working	Answer	Mark	Notes

28	(a)	Area = ½ (8.3 × 10.5) sin 62°
		    = 43.575 × 0.88294…
		    = 38.47444136
			38.5	2	M1 for ½ (8.3 × 10.5) sin 62°
					A1 for 38.4 – 38.5
					
					SC M1A0 for ±32.2 (radians) or 36.0 (grad)

	(b)	$QR^2 = 8.3^2 + 10.5^2$
		    $- 2(8.3)(10.5) \cos 62$
		    = 68.89 + 110.25
		    − 174.3 × 0.46947…
		    = 179.14 − 81.828…
		$QR = \sqrt{97.3111…}$
		    = 9.86463920
			9.86		M1 for correct substitution into cosine rule
					M1 (dep) for correct order of evaluation
					      (excluding square root)
					A1 for 9.86 – 9.865
					
					SC M2A0 for 7.86 (radians) or 9.01 (grad)

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