MATHEMATICS - MARKING SCHEME

Notes for Marking of Scripts

Types of Marks

<u>Method marks</u> are awarded for knowing a correct method of solution and attempting to apply it. Method marks cannot be lost for arithmetic mistakes. They can only be awarded if the method used would have led to the correct answer had not an arithmetic mistake been made. Unless otherwise stated, any valid method not specified in the marking scheme is to be accepted and marked accordingly.

There are two types of <u>Method</u> marks: **M** marks and **(M)** marks.

- **M marks** are <u>only</u> awarded if method is seen.

- **(M) marks** are awarded even when a correct answer is given and no work is shown.

There are two types of <u>Accuracy</u> marks: **A** marks and **B** marks.
- **A** marks are accuracy marks given for correct answer only (c.a.o.).
    - ✳ Incorrect answers, even though nearly correct, score no marks.
    - ✳ Accuracy marks are also awarded for incorrect answers which are correctly followed through (f.t.) from an incorrect previous answer, **provided that f.t. is indicated in the marking scheme**.
    - ✳ No Method marks **M/(M)** or Accuracy marks **A** are awarded when a wrong method leads to a correct answer.
    - ✳ When a question is assigned **M** and **A** marks and students present a correct answer without any working, only **A** marks are awarded.

- **B** marks are accuracy marks awarded for specific results or statements independent of the method used.

Misreading
Method marks can still be earned (unless that part of the question is trivialised) but the final Accuracy marks are lost.

Crossed out working
An answer or working that is crossed out and not replaced is marked as if it were not crossed out. If the answer or working is replaced, then the crossed out answer or working is ignored and should not be considered for marking.

Units
In general, missing or inaccurate units are not penalised unless otherwise indicated in the marking scheme.

Other
- Incorrect working or statement following a correct answer is ignored.
- Marks are not sub-divisible; no half marks may be awarded.
- Other abbreviations used:
    - ✳ o.e. (or equivalent)
    - ✳ e.e.o.o. (each error or omission)
- Markers are advised to indicate the M, (M), A or B marks awarded in the body of the script and then write their total in the margin. The total mark for each question should be written in the table included at the top of page 1 of the main paper. This measure facilitates the moderation of papers.

Marking Scheme (Total 100 marks)

Que.		Requirements	Mark		Additional Guidance
1	a)	i) 0.4	B1		
		ii) 23 or 29	B1		
		iii) C or even number	B1	**6**	
	b)	a^7	B1		
	c)	$805.1, 80.51, 8.51, 0.851$	B2		Award 1 mark if only first answer is correct
2	a)	$72 + 55 + 55 + 64 + 72 + 51 + 72 = 441$ $441 \div 7 = 63$	M1 A1		
	b)	51, 55, 55, 64, 72, 72, 72 64	M1 A1	**6**	
	c)	72	B1		
	d)	72-51 =21	B1		
3		$360º \div 60 = 6º$ $20 \times 6º = 120º$ $25 \times 6º = 150º$ $15 \times 6º = 90º$ Correct angles Correct labelling	M1 M2 A1 A1	**5**	Accept alternative methods 1 mark for 2 correct angles Correct angle ∓ 2
4	a)	$1200 \div 6 = 200g$ $200 \times 2 = 400g$	M1 M1 A1	**5**	
	b)	$800 \div 2 = 400; \ 400 \times 3 = 1200g$	M1 A1		
5	a)	27, 24, 21, **18**, 15, **12**	B2	**5**	1 mark each
	b)	5, 10, 15, 20, **25**, … **40**, **5n**	B3		
6	a)	€45 + €75 = €120 $\dfrac{20}{100} \times €120 = €24$ €120 − €24 = €96	M1 M1 A1 A1	**7**	Accept alternative methods
	b)	€45 + €75 + €35 + €45 = €200 $\dfrac{30}{100} \times €200 = €60$	M1 M1 A1		
7	(a)	$3 \times 6 + 5 \times 2 = 28$	(M)1 A1		
	(b)	$10c + 2d + 7c + 7d$ $17c + 9d$	M1 A1	**7**	
	(c)	$2x - 8 = 3 + x$ $2x - x = 3 + 8$ $x = 11$	M1 (M)1 A1		

8	(a)	$3x(2x + y - 3)$	B2	**8**	B1 for each correct factor
	(b)	(i) $f(2) = 15 - 14$	M1		
		$\quad = 1$	A1		
		(ii) $8 = 15 - 7x$			
		$\quad 7x = 7$	M1		
		$\quad x = 1$	A1		
	(c)	$r^2 = \dfrac{A}{4\pi}$	M1		
		$r = \sqrt{\dfrac{A}{4\pi}}$	A1		
9	(a)	$x + y = 71$	B1	**6**	
		$2x + 4y = 180$	B1		
	(b)	$2x + 4y = 180$			
		$\underline{2x + 2y = 142}$			
		$\quad 2y = 38$	M1		Eliminating one variable
		$\quad y = 19$	M1		Finding one variable
		$x + 19 = 71$	(M)1		Correct substitution
		$x = 52$	A1		Finding the 2nd variable
10	(a)	White	B1	**5**	
	(b)	(i) $\dfrac{3}{16}$	B1		
		(ii) $\dfrac{1}{4}$ o.e.	B1		
		(iii) 7 black and grey squares	(M)1		
		$\quad \dfrac{7}{16}$	A1		
11	(a)		B1	**8**	Correct values of $3x$
			B1		Correct values of $-x^2$
			A1		Correct values of y.

x	0	0.5	1	1.5	2	2.5	3
$3x$	**0**	1.5	**3**	**4.5**	6	**7.5**	**9**
$-x^2$	**0**	-0.25	**-1**	**-2.25**	-4	**-6.25**	**-9**
y	**0**	1.25	**2**	**2.25**	2	**1.25**	**0**

	(b) (c)		M1 A1 B1		Plotting of points Smooth parabola Correct line
	(d)	Any value from 0.6 up to and including 0.7 Any value from 2.3 up to and including 2.4	A1 (f.t.) A1 (f.t.)		f.t. for incorrect curve f.t. for incorrect curve
12	a)	A	B1		
	b)	C	B1		
	c)	i) C or 360°	B1	5	
		ii) $x + 320° = 360°$ $x = 40°$	M1 A1		
13	i)	$\angle$ADC = 70° Angle at centre is twice angle at circumference	A1 M1		Accept 140 ÷ 2 = 70
	ii)	$\angle$ABC = 110° Opposite angles in a cyclic quadrilateral are supplementary	A1 M1	6	Accept 180 − 70 = 110
	iii)	$\angle$OAC = 20° Angles in isosceles triangle	A1 M1		Accept $\frac{180-140}{2}$
14	a)	A of //ogram = 15.2 × 6 = 91.2 A of triangle = $\frac{15.2 \times 12.6}{2}$ = 95.76 Total Area = 91.2 + 95.76 = 186.96 cm²	M1 M1 M1 A1	6	
	b)	V = 186.96 × 12.5 V = 2337 cm³	M1 A1 ft		
15	a)	180 − 60 = 120° 360 − 150 − 120 = 90° Bearing = 150° + 90° = 240°	(M)1 M1 A1	9	Bearing = 180 + 60 = 240
	b)	i) 180-150+60 =90	M1A1		

		ii) tan C = $\frac{7.5}{5}$ C = 56.3°	M1 A1		
		iii) AC = $\sqrt{7.5^2 + 5^2}$ AC = 9.01 km	M1 A1		
16				**6**	
		Correct AB 8 cm long and AC 6 cm long Correct angle BAC 60° Correct perpendicular bisector CX = 5.3 cm	B1 M1 A1 M1 A1 B1		Arcs seen Arcs seen ± 0.2 cm