Version 1.0

General Certificate Secondary of Education
Practice Paper 1

Methods in Mathematics (Pilot) 9365

Unit 2 Higher Tier 93652

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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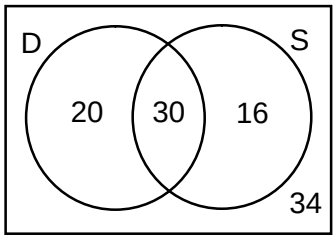
Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
Q	Marks awarded for quality of written communication. (QWC)
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$

M2 Higher Tier

Q	Answer	Mark	Comments
1(a)	$5y - 2y = 8 + 4$	M1	Allow one sign or rearrangement error
	$3y = 12$	M1	
	4	A1 ft	ft On one error only
1(b)	$5x - 7 = 3x + 15$	M1	
	$2x = 22$	M1 Dep	Allow one sign or rearrangement error
	11	A1	
2	$\pi \times 12$ or $2 \times \pi \times 6$	M1	
	37.68 to 37.704	A1	12π
*__3__	$32 \div 8$	M1	oe
	Side of rectangle = 12 or 4	A1	
	12×12	M1	
	144	Q1	Strand (iii) - Finds sides from 32, multiples largest sides together
4	(94 – any multiple of 4) ÷ 5.25	M1	(94 – any multiple of 5.25) ÷ 4
	(94 – any other multiple of 4) ÷ 5.25	M1Dep	(94 – any other multiple of 5.25) ÷ 4
	8 adults 13 children	A1	
4 Alt 1	5.25 × any value + 4 × any value	M1	
	5.25 × any refined value + 4 × any refined value	M1 Dep	One of second values must be closer to answer
	8 adults 13 children	A1	
4 Alt 2	Realising that adults is a multiple of 4 (4, 8 or 12)	M1 Dep	$n = 1$, 2 or 3
	$(94 - 4n \times 5.25) \div 4$	A1	
	8 adults 13 children	A1	

Q	Answer	Mark	Comments
5(a)	$5x + 15 - 2x + 2$	M1	Allow one sign or arithmetic error
	$3x + 17$	A1	
5(b)	$x^2 + 3x - x - 3$	M1	Allow one sign or arithmetic error
	$x^2 + 2x - 3$	A1	
*__6__	$x + x + 10 + x + 20$ (= 180)	M1	Marking angles on diagram such that all three are on straight line or in triangle
	Their $3x + 30 = 180$	M1 Dep	oe
	50	A1	
	All steps above carried out with both Ms awarded	Q1	Strand (ii) ft Their equation for final answer
7		B3	
	16	B1	ft Their Venn diagram
7 Alt	100 – 34 (= 66)	B1	
	46 + 50 = 96	B1	
	96 – 66 = 30	B1	
	16	A1	
8(a)	$\pi \times 12 \times 5^2$	M1	
	942 to 942.6	A1	
	cm^3	B1	
8(b)	$30 \times 40 \times 24$	M1	$15 \times 20 \times 24$
	Area any face 960 or 720 or 1200	M1	
	All areas correct	A1	
	5760	A1	SC3 2880

Q	Answer	Mark	Comments
9(a)	$7^2 + 10^2$	M1	
	$\sqrt{149}$	M1 Dep	
	12.2 …	A1	
9(b)	Sight of sine	M1	
	$(x =)\ \sin^{-1}(10 \div 22)$	M1 Dep	
	27	A1	
10(a)	6.03023 ….	B1	
10(b)	6, 6.0 or 6.03	B1 ft	ft Their answer in (a)
11	$x \div (10 - x) = 5 \div 7$	M1	
	$7x = 50 - 5x$	M1	
	$\frac{50}{12} = 4\frac{1}{6} = 4.17$	A1	
11 Alt	$x \div 10 = 5 \div 12$	M1	oe
	$x = 50 \div 12$	M1	
	$\frac{50}{12} = 4\frac{1}{6} = 4.17$	A1	

Q	Answer	Mark	Comments
12	Area on right = $\frac{1}{2} \times 5 \times (3 + 2)$	M1	
	= 12.5	A1	
	$5 \times x = 37.5$	M1	
	y – their x – 2 or their x – 3	M1	oe
	$(-4\frac{1}{2}, 2)$ $(-5\frac{1}{2}, -3)$	A1	
12 Alt	Area on right = $\frac{1}{2} \times 5 \times (3 + 2)$	M1	
	= 12.5	A1	
	$25 = \frac{1}{2} \times 5 \times (x + x + 1)$	M1	oe
	$2x + 1 = 10$	M1	
	$(-4\frac{1}{2}, 2)$ $(-5\frac{1}{2}, -3)$	A1	
13(a)	$2 \times 3 \times 5$	M1	
	30	A1	
13(b)	$2^2 \times 3^3 \times 5 \times 7$	M1	
	3780	A1	
14(a)	–1, 0, 3	B2	B1 For 2 correct
14(b)	Second difference 1	M1	
	$\frac{1}{2} - 5$, $2 - 6$, $4\frac{1}{2} - 8$, ….	M1	± 4.5, ± 4, ± 3.5, ± 3, ± 2.5
	$\frac{1}{2}n - 5$	A1	$-\frac{1}{2}n + 5$
	$\frac{1}{2}n^2 - \frac{1}{2}n + 5$	A1	

Q	Answer	Mark	Comments
*15(a)	$ECB = 180 - BCD$ and $BCD = 180 - BAD$	B1	
	Opposite angles in a cyclic quad	Q1	Strand (i) - Must state this.
15(b)	$XPQ = XYS$	B1	
	$XRS = 180 - XYS$	B1	
	$QPX = 180 - XRS$	B1	
	So $PQ // RS$ as interior angles	B1	
16(a)	$\frac{-(4) \pm \sqrt{(4)^2 - 4(3)(-9)}}{2(3)}$	M1	
	$\frac{-4 \pm \sqrt{124}}{6}$	A1	
	1.19 and –2.52	A1	
16(b)	$5x^2 - 3x - 1 (= 0)$	B2	B1 If one error B0 If two errors
17	Height of cone = 12	B1	
	Radius of top cone = 2	B1	
	$\frac{1}{3} \times \pi \times 6^2 \times 12 - \frac{1}{3} \times \pi \times 2^2 \times 4$	M1	
	435.4 to 435.7	A1	
18	$AC^2 = 12^2 + 5^2$	M1	
	Their $169 = 9^2 + 10^2 - 2 \times 9 \times 10 \times \cos D$	M1	
	Angle $D = \cos^{-1}$ $\frac{81+100-\text{their } 169}{2 \times 9 \times 10} = 86.2$	M1	
	$0.5 \times 9 \times 10 \times \sin$ their $86.2 + 0.5 \times 5 \times 12$	M1	
	74.9	A1	75 with working