MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method marks, awarded for a valid method applied to the problem.

A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B Mark for a correct result or statement independent of Method marks.

When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation 'dep' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

Abbreviations

awrt answers which round to
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
nfww not from wrong working
oe or equivalent
rot rounded or truncated
SC Special Case
soi seen or implied

Question	Answer	Marks	Guidance
1	$-8 + 4a - 2b - 2 = 0$ oe	**B1**	
	$27 + 9a + 3b - 2 = 40$ oe	**B1**	
	Solves *their* linear equations in a and b to find the value of one unknown	**M1**	
	$a = 2$ and $b = -1$ nfww	**A2**	**A1** for $a = 2$ or $b = -1$
2	Correct graph of $y = \lvert x - 2 \rvert$ AND $x \leqslant -2.5$, $x \geqslant -0.25$	**3**	**B1** for correct graph of $y = \lvert x - 2 \rvert$ and **B1** for $x \leqslant -2.5$ or $x \geqslant -0.25$ or **B1 STRICT FT** for *their* critical values from the two intersections of *their* straight-line section of graph providing it has negative gradient

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Question	Answer	Marks	Guidance
3(a)	4! × 3! oe	**M1**	
	144	**A1**	
3(b)	${}^4C_2 \times {}^9C_5 + {}^4C_3 \times {}^9C_4 + {}^4C_4 \times {}^9C_3$ oe	**M2**	**M1** for one correct product
	1344	**A1**	
	Alternative method		
	${}^{13}C_7 - ({}^4C_1 \times {}^9C_6 + {}^9C_7)$ oe	**(M2)**	**M1** for ${}^{13}C_7 - {}^4C_1 \times {}^9C_6$ or ${}^{13}C_7 - {}^9C_7$ oe
	1344	**(A1)**	
4(a)	$\frac{(1-\sin x)^2 + \cos^2 x}{\cos x(1-\sin x)}$ or $\frac{1-2\sin x+\sin^2 x+\cos^2 x}{\cos x(1-\sin x)}$ oe	**M1**	Common denominator
	$\frac{2-2\sin x}{\cos x(1-\sin x)}$ oe	**A1**	Use of $\cos^2 x + \sin^2 x = 1$
	$\frac{2(1-\sin x)}{\cos x(1-\sin x)}$ and correct completion to given answer, 2sec x	**A1**	Fully justified with sufficient detail
4(b)	$\cos\frac{\theta}{2} = \frac{2}{3}$ oe	**M1**	
	At least one correct half angle: 48.19[89…] or 311.8[10…]	**A1**	
	$[\theta =]$ 96.4 or 96.37[9…], 623.6 or 623.62[06…]	**A1**	and no other angles in range
5(a)	$(x-4)^2 + (y-2)^2 = 40$ oe, isw or $x^2 + y^2 - 8x - 4y - 20 = 0$ oe, isw	**B2**	**B1** for $r^2 = 40$ or $r = \sqrt{40}$ oe, soi
5(b)	$16 + (y-2)^2 = 40$ oe	**M1**	**FT** *their* equation of the circle providing it is the equation of a circle
	$(y-2)^2 = 24$ or $y^2 - 4y - 20 = 0$	**A1**	Obtain correct quadratic equation in any form
	$(0, 2 \pm \sqrt{24})$ isw or equivalent exact form	**A1**	

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