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Mark Scheme (Results)

January 2015

Pearson Edexcel International GCSE Mathematics B (4MB0) Paper 01

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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.

- **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
  - eeoo – each error or omission

- **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.
  Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.
  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 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.
  If there is no answer on the answer line then check the working for an obvious answer.

- **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 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 in another.

Question	Working	Answer	Mark	Notes
1.	$\frac{25}{8}\times\frac{10}{41}$ OR $3.125 \div 4.1$		2	M1
		$\frac{125}{164}$		A1 No working M0A0
				Total 2 marks

Question	Working	Answer	Mark	Notes
2.	$4+\frac{1}{2x^2}$ (1 term correct)		2	M1
		$4+\frac{1}{2x^2}$ (oe)		A1
				Total 2 marks

Question	Working	Answer	Mark	Notes
3.	Prime factors of two of 28, 30 and 45		2	B1
		1260		B1
				Total 2 marks

Question	Working	Answer	Mark	Notes
4. (a)		2	1	B1
(b)		2	1	B1
				Total 2 marks

Question	Working	Answer	Mark	Notes
5. (i)		8x – 18 (oe)	1	B1
(ii)		$x = 3$	1	B1 ft
				Total 2 marks

Question	Working	Answer	Mark	Notes
6.	$\frac{-2-3}{-5-1}$		2	M1 oe, allow one sign incorrect
		$\frac{5}{6}$, awrt 0.833		A1
				Total 2 marks

Question	Working	Answer	Mark	Notes
7.	$\frac{408\times5}{8}$		2	M1
		255		A1
				Total 2 marks

Question	Working	Answer	Mark	Notes
8. (a)		200 000 000	1	B1
(b)		2×10^8	2	B1 ft B1 ft
				Total 3 marks

Question	Working	Answer	Mark	Notes
9. (i)		81, -243	2	B1, B1
(ii)		Multiply by -3 (oe)	1	B1
				Total 3 marks

Question	Working	Answer	Mark	Notes
10. (a)		Circles around one of x = -5 or x = -1 and corresponding line drawn in the correct direction **Both** end points identified, using the correct symbols **and** either one correct line drawn between the two correct points or two correct lines drawn which are overlapping Accept alternative correct notation e.g. ( ), [ ]	2	B1 B1
		-4, -3, -2, -1	1	B1
				Total 3 marks

Question	Working	Answer	Mark	Notes
11.		$\angle ABD = 55^o$ (Angles in the same segment) Angle calculation using ($\angle$ sum of triangle) as a reason $\therefore \angle ACB = \angle CAB = 35^o$ $\therefore \Delta ABC$ is isos. Δ (i.e. cc)	3	M1 B1 A1
				Total 3 marks

Question	Working	Answer	Mark	Notes
12.		$y \leq 2$	3	B1
		$y \geq x - 2$		B1
		$y \geq 4 - 2x$		B1 Accept weak inequalities
				Total 3 marks

Question	Working	Answer	Mark	Notes
13.		$\{w, x\}, \{w, y\}, \{w, z\}, \{x, y\}, \{x, z\}, \{y, z\}$	3	B1, B1, B1 (-1 eeoo)
				Total 3 marks

Question	Working	Answer	Mark	Notes
14.	Number of bricks = 1000 (can be implied) and $\frac{350}{1000}$		3	B1
	$"\frac{350}{1000}"\times 360$			M1
		126^{o}		A1
				Total 3 marks

Question	Working	Answer	Mark	Notes
15. (a)	Arcs drawn above and below *AC*		2	M1
	Perpendicular bisector drawn accurately			A1
(b)		4.3 ($\pm$0.1) cm	1	B1
				Total 3 marks

Question	Working	Answer	Mark	Notes
16.	$3x - x(2 - x + x^2)$ (Removed inner brackets) OR $3x-2x+x^2(1-x)$ (Removed outer brackets)		3	M1
	$3x - 2x + x^2 - x^3$ (Removed all brackets)			M1 DEP
		$x + x^2 - x^3$		A1
				Total 3 marks

Question		Working	Answer	Mark	Notes
17.	(a)(i)		-6	3	B1
	(a)(ii)		$f(x) \geq -6$		B1 ft (Allow $y \geq -6$)
	(b)		3/2 OR 1.5		B1
					Total 3 marks

Question		Working	Answer	Mark	Notes
18.	(a)		1 hour 30 mins , 90 mins, $1\frac{1}{2}$ hours	1	B1
	(b)	$\frac{175\text{km}}{2\text{ hrs}}$ (oe)		2	M1
		87.5 km/ h			A1
	(c)		1212 ($\pm$3mins)	1	B1
					Total 4 marks

Question	Working	Answer	Mark	Notes
19.		$\mathbf{AB} = \begin{pmatrix} 5 & 4 \\ 13 & 10 \end{pmatrix}$	4	B1
		$\mathbf{BA} = \begin{pmatrix} 9 & 14 \\ 4 & 6 \end{pmatrix}$		B1
		$\begin{pmatrix} -4 & -10 \\ 9 & 4 \end{pmatrix}$		B2 ft (-1 eeoo)
				Total 4 marks

Question	Working	Answer	Mark	Notes
20.	$28 = \frac{k}{3^2}$		4	M1
		$k = 252$		A1
	$x = (\pm)\sqrt{\left(\frac{"252"}{63}\right)}$			M1
		$x = \pm\ 2$		A1
				Total 4 marks

Question		Working	Answer	Mark	Notes
21.	(a)	$\angle ABC = \frac{(2\times 6-4)\times 90}{6}$ (oe)		2	M1
			$\angle ABC = 120^o$		A1
	(b)	$\angle EAF = 30^o$ or $\angle FEA = 30^o$ $\angle BAD = 60^o$ or $\angle FAD = 60^o$ or $\angle ADE = 60^o$ or $\angle AED = 90^o$	$\angle EAF = 30^o$ $\angle FAD = 60^o$ $\angle DAE = 30^o$	3	B1 B1 B1
					Total 5 marks

Question		Working	Answer	Mark	Notes
22.	(a)		5	1	B1
	(b)	Rearranging minutes in ascending/descending order		2	M1
			6		A1
	(c)	$\frac{6+5+11+9+4+8+5+14+6+5+4}{11}$		2	M1
			7		A1
					Total 5 marks

Question	Working	Answer	Mark	Notes
23.	$\frac{4}{\sin\angle CBA}=\frac{5}{\sin 30}$		5	M1
	$\angle CBA=\sin^{-1}\left(\frac{4\times\sin 30}{5}\right)$			M1 DEP
	$\frac{BC}{\sin"126.422"}=\frac{5}{\sin 30}$			M1 DEP
	$BC = \frac{5\times\sin"126.422"}{\sin 30}$			M1 DEP
	OR (Cosine rule)			**OR**
	$5^2=4^2+BC^2-2\times4\times BC\times\cos 30^o$			(M1)
	Attempt to rearrange above into a trinomial quadratic in *BC* (allow 1 sign incorrect)			(M1 DEP)
	$BC^2-6.928BC-9 = 0$ (correct signs)			(M1 DEP)
	$BC=\frac{-(-"6.928")\pm\sqrt{6.928^2-4\times1\times(-9)}}{2\times1}$			(M1 DEP)
	OR Dropping perpendicular from *A* to *BC* [*AN*]			**OR**
	Finding *CN* (= 3.464…)			(M1)
	Finding *AN* (= 2) and $\angle ABC$ (= 23.578)			(M1 DEP)
	Finding *BN* (= 4.583)			(M1 DEP)
	Adding *CN* to *BN*			(M1 DEP)
		BC = 8.05		A1
				Total 5 marks

Question	Working	Answer	Mark	Notes
24.	Area of rectangle = 10 000 cm^2		5	B1
	Height of triangle = $\sqrt{(5^2-3^2)}$			M1
	Area of 1 triangle = $\frac{1}{2}\times 6\times\sqrt{(5^2-3^2)}$ (=12)			M1 DEP
	OR Heron's formula			**OR**
	$s=\frac{5+5+6}{2}$ $(=8)$			M1
	Area of 1 triangle = $\sqrt{8\times(8-5)\times(8-5)\times(8-6)}$			M1 DEP
	Fraction = $\frac{300\times"12"}{10000}\times 100$			M1 DEP
		Fraction = 35% (cao)		A1
				Total 5 marks

Question	Working	Answer	Mark	Notes
25. (a)	$60^2=50\times DA$		2	M1
		DA = 72 cm		A1
(b)	$AC=\sqrt{"72"^2-60^2}$		3	M1
		AC = awrt 39.8 cm		A1
		Radius = "19.9" cm		B1 ft
				Total 5 marks

Question	Working	Answer	Mark	Notes
26. (a)	$90 + 28t - 3t^2$ (2 terms correct)		2	M1
		$90 + 28t - 3t^2$		A1
(b)	"$90 + 28t - 3t^2$ " $= 0$		4	M1 oe
	$\frac{+28 \pm \sqrt{(-28)^2 - 4\times(3)\times(-90)}}{2\times 3}$			M1 DEP
		$\sqrt{1864}$ or 43.17		B1
		Awrt 11.9		A1
				Total 6 marks

Question	Working	Answer	Mark	Notes
27. (a)	$10^2 = 5^2 + 13^2 - 2\times 5\times 13\times \cos\angle BAC$		3	M1
	$\angle BAC = \cos^{-1}\left(\frac{5^2 + 13^2 - 10^2}{2\times 5\times 13}\right)$			M1 DEP
		$\angle BAC = 43.691$ -> **43.7^o**		A1
(b)	$CY = 13 \sin$"43.69" (= 8.980)		4	M1
	$BY = \sqrt{10^2 - "13\times \sin 43.69"^2}$ (=4.400)			M1
	$\Delta BCY = \frac{1}{2}\times "8.980" \times "4.400"$			M1
		$\Delta BCY = 19.76$->**19.8** (**19.7** using 43.7)		A1
				Total 7 marks

Question	Working	Answer	Mark	Notes
28. (a)	$6(-3)^3 + 11(-3)^2 + k(-3) + 6 = 0$		2	M1
	OR Attempt at $(x+3)\overline{)6x^3+11x^2+kx+6}$			
	"$6 - 3(21 + k) = 0$"			(M1) oe, cao
		$k = -19$		A1
(b)	$6x^2 - 7x \ \ldots$		4	M1
		$6x^2 - 7x + 2$		A1
	attempt to factorise trinomial quadratic			M1
		$(x + 3)(2x - 1)(3x - 2)$		A1
				Total 6 marks

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