

Mark Scheme (Results)

Summer 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
  - eeo – each error or omission
  - awrt – answer which rounds to

- **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: eg. 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	$\frac{8}{5} \times 155$		2	M1
		248 (cars)		A1
				<b>Total 2 marks</b>

Question	Working	Answer	Mark	Notes
2		$x = 3$	2	B1
		$y = -2$		B1
				<b>Total 2 marks</b>

Question	Working	Answer	Mark	Notes
3	$\tan e^\circ = \frac{9-5}{20}$		2	M1
		$e^\circ = 11.3^\circ$		A1 isw if possible (eg if angle of elevation has been identified)
				<b>Total 2 marks</b>

Question	Working	Answer	Mark	Notes
4	Three terms having common difference of 3		2	M1
		-1, 2, 5		A1 No working scores M0A0
				<b>Total 2 marks</b>

Question	Working	Answer	Mark	Notes
5	$3 \times 5$ and $7 \times 1$ seen		2	M1
		8		A1 cao
				<b>Total 1 marks</b>

Question	Working	Answer	Mark	Notes
6		(-2, -9)	2	B2 (-1eeoo)
				SC: B1 B0 for $\begin{pmatrix} -2 \\ -9 \end{pmatrix}$
				<b>Total 2 marks</b>

Question	Working	Answer	Mark	Notes
7	$n \leq -\frac{23}{9}$		2	M1 oe
		$n = -3$		A1
	<b>OR</b> (Trial and inspection)			
	Noting that $9 \times (-2) + 50 = 30$ ( $>27 -$ (oe)) AND $9 \times (-3) + 50 = 23$ ( $<27 -$ (oe))			M1
		$n = -3$		A1
				<b>Total 2 marks</b>

Question	Working	Answer	Mark	Notes
8	$42 = 2 \times 3 \times 7$ $84 = 2 \times 2 \times 3 \times 7$ $154 = 2 \times 7 \times 11$ Prime factors of two of 42, 84 and 154		2	M1
	<b>OR</b>			<b>OR</b>
	Any two of: $42 = 3 \times 14$ $84 = 6 \times 14$ $154 = 11 \times 14$			M1
	<b>OR</b>			<b>OR</b>
	Attempt at factor tree for two of the numbers involving at least 2 divisions			M1
		HCF = 14		A1
				<b>Total 2 marks</b>

Question	Working	Answer	Mark	Notes
9	$81 = 3^4$		3	M1
	$\therefore 4 = 3x - 11$			M1 dep, equating indices
		$x = 5$		A1
				<b>Total 3 marks</b>

Question	Working	Answer	Mark	Notes
10	$\frac{1+2a}{a-1} = 5$		3	M1 oe, allow 1 sign error
	$1+2a = 5(a-1)$			M1 oe, dep
		$a = 2$		A1
				<b>Total 3 marks</b>

Question	Working	Answer	Mark	Notes
11	People over 60 = $\frac{23}{100} \times 50$ (000 000)		3	M1
	Women over 60 = $\frac{58}{100} \times \frac{23}{100} \times 50$ (000 000)"			M1 dep
		7 million		A1 cao
				<b>Total 3 marks</b>

Question	Working	Answer	Mark	Notes
12	$y + b = \frac{a}{x^2}$ OR $yx^2 + bx^2 = a$		3	M1
	$x^2 = \frac{a}{y+b}$			M1 dep
	$x = \sqrt{\frac{a}{y+b}}$			A1
				SC: $x = \sqrt{\frac{a}{y-b}}$ scores M1 M0 A0
				<b>Total 3 marks</b>

Q	Working	Answer	Mark	Notes
13 (a)	<p>A Venn diagram with two overlapping circles, G and H. The number 2 is written in the region of G that does not overlap with H. The number 10 is written in the intersection of G and H. The number 9 is written in the region of H that does not overlap with G. The number 11 is written in the bottom left corner of the diagram area.</p>		2	B2 (-1eeoo)
(b)		20	1	B1
				<b>Total 3 marks</b>

Question	Working	Answer	Mark	Notes
14 (a)		0.24	1	B1 Allow 6/25, 24%
(b)	"0.24" × 600		2	M1
		144		A1 ft
				<b>Total 3 marks</b>

Question	Working	Answer	Mark	Notes
15 (a)		81	1	B1
(b)	$1.2... \times 10^n$		2	M1
		$1.23... \times 10^{-2}$		A1 awrt
				<b>Total 3 marks</b>

Question	Working	Answer	Mark	Notes
16 (a)		$e$	1	B1
(b)		$i, j$	1	B1
(c)		$b, c, d$	1	B1
				<b>Total 3 marks</b>

Question	Working	Answer	Mark	Notes
17	$\frac{18\sqrt{36}}{3\sqrt{24}} - \frac{6\sqrt{12}}{3\sqrt{24}}$		3	M1
	$6\sqrt{\left(\frac{36}{24}\right)} - 2\sqrt{\left(\frac{12}{24}\right)}$			M1 independent
	<b>OR</b>			<b>OR</b>
	$\frac{36}{\sqrt{24}} - \frac{6\sqrt{12}}{3\sqrt{24}}$			M1
	$\frac{3 \times 6}{\sqrt{6}} - 2\sqrt{\left(\frac{12}{24}\right)}$			M1 dep
		$\sqrt{54} - \sqrt{2}$		A1
				<b>Total 3 marks</b>

Question	Working	Answer	Mark	Notes
18	$AC^2 = 8^2 + 10^2$		4	M1
	$r = \frac{\sqrt{(8^2 + 10^2)}}{2}$			M1 oe
	$\text{Area} = \pi \times \left( \frac{\sqrt{(8^2 + 10^2)}}{2} \right)^2$			M1 dep
		129 cm <sup>2</sup>		A1 awrt
				<b>Total 4 marks</b>

Question	Working	Answer	Mark	Notes
19	Rearranging so that the coefficient of $x$ or $y$ is the same in both equations <b>OR</b> isolating $x$ or $y$		4	M1
	Subtracting or adding equations <b>OR</b> substitution of $x$ or $y$ to obtain an expression for $y$ or $x$			M1
		$x = \frac{13}{10}, 1.3$		A1
		$y = \frac{29}{10}, 2.9$		A1
				<b>Total 4 marks</b>

Question	Working	Answer	Mark	Notes
20 (a)	$\frac{1}{2} \times 50 \times 3$		2	M1 oe
		75 km		A1
(b)		25 km/h	1	B1
(c)		1.5 hours	1	B1 Allow $\pm 1\text{ss} = 0.05$ hours
				<b>Total 4 marks</b>

Question	Working	Answer	Mark	Notes
21 (a)		<i>smallest</i> = 0.5	2	B1
		<i>largest</i> = 4		B1
(b)	$\frac{(-2)^0 + \frac{63}{105} + 4 + 0.5}{4}$		2	M1 oe
		1.525		A1 cao
				<b>Total 4 marks</b>

Question	Working	Answer	Mark	Notes
22 (a)		$\frac{7}{20}$	1	B1 oe
(b)	2 of $\frac{7}{20} \times \frac{3}{19}$ , $\frac{3}{20} \times \frac{7}{19}$ and $\frac{10}{20} \times \frac{9}{19}$		3	M1 oe
	$\frac{7}{20} \times \frac{3}{19} + \frac{3}{20} \times \frac{7}{19} + \frac{10}{20} \times \frac{9}{19}$			M1 dep, oe
		$\frac{132}{380}$ (oe), 0.347		A1
				<b>Total 4 marks</b>

Question	Working	Answer	Mark	Notes
23	$4x - 6x = 4$		4	M1 oe
	$16y + 3y = 19$			M1 oe
		$x = -2$		A1
		$y = 1$		A1
				<b>Total 4 marks</b>

Question	Working	Answer	Mark	Notes
24 (a)	Point <i>B</i> correctly labelled		1	B1
(b)	Using a bearing east of <i>A</i> and using bearing $037^\circ$ from <i>B</i>		2	B1
	Point <i>M</i> correct and correctly labelled			B1
(c)		22.6 km ( $\pm 0.5\text{km} = 1\text{mm}$ )	1	B1
				<b>Total 4 marks</b>

Question	Working	Answer	Mark	Notes
25 (a)		arc, centre <i>A</i> , 6cm radius drawn	1	B1
(b)	Angle bisector, arcs drawn		2	M1
		Angle bisector drawn from <i>A</i> into <i>ABCD</i> and is at least 6 cm long.		A1
(c)		6.9 ( $\pm 0.2$ ) cm	1	B1
(d)		Region shaded	1	B1
				<b>Total 5 marks</b>

Question	Working	Answer	Mark	Notes
26 (a)	$12 = 2\pi r$		3	M1 oe
	$\text{Area} = \frac{72}{360} \times \pi \times \left(\frac{6}{\pi}\right)^2$			M1 dep
		$\text{Area} = \frac{36}{5\pi} \text{cm}^2$		A1 awrt $0.73\pi$
(b)	$\frac{72}{360} \times 12 + \frac{6}{\pi} + \frac{6}{\pi}$		3	M1
	3 correct lengths			M1 dep
		$\frac{12(\pi+5)}{5\pi}$		A1 cc
				<b>Total 6 marks</b>

Question	Working	Answer	Mark	Notes
27 (a)	One of $\frac{1}{2}$ or $+\frac{1}{2x^2}$		2	M1 oe
		$\frac{1}{2} + \frac{1}{2x^2}$		A1 oe
(b)	$\frac{1}{2} + \frac{1}{2x^2} = \frac{3}{x} - 2$		5	M1 oe
	$x^2 + 1 = 6x - 4x^2$			M1 dep
		$5x^2 - 6x + 1 = 0$		A1
	$(5x - 1)(x - 1)$			M1
		$x = \frac{1}{5}, 1$		A1
				<b>Total 7 marks</b>

Question	Working	Answer	Mark	Notes
28 (a)	$\frac{5}{\sin 60} = \frac{AC}{\sin 40}$		3	M1
	$AC = \frac{5 \times \sin 40}{\sin 60}$			M1 dep
		$AC = 3.71 (3.711)$		A1
(b)	$\frac{DC}{3.711} = \tan 60 \quad (DC = 6.428)$		4	M1
	$\angle BCD = 10^\circ$			M1
	$\Delta BCD = \frac{1}{2} \times 5 \times 6.428 \times \sin 10^\circ$			M1 dep
	<b>OR</b>			<b>OR</b>
	One of $\frac{1}{2} \times 6.428 \times 3.71$ OR $\frac{1}{2} \times 5 \times 3.711 \times \sin 80$			M1
	$\Delta BCD = \frac{1}{2} \times 6.428 \times 3.71 - \frac{1}{2} \times 5 \times 3.711 \times \sin 80$			M1 dep
		$\Delta BCD = 2.79$		A1
				<b>Total 7 marks</b>

Question	Working	Answer	Mark	Notes
29	$A = \frac{\lambda}{1}L$		4	M1 oe
	$\therefore B = L - A = L - \frac{\lambda}{1}L = L(1 - \lambda)$			M1 dep
	$(\therefore A : B = \lambda : 1 - \lambda)$ $\therefore A : B = \frac{\lambda}{1 - \lambda} : 1$			M1 dep
	<b>OR</b>			<b>OR</b>
	$\therefore (1 - \lambda)A = \lambda B$			M1 dep
	$\therefore \frac{A}{B} = \frac{\lambda}{1 - \lambda}$			M1 dep
		$\therefore \mu = \frac{\lambda}{1 - \lambda}$		A1
				<b>Total 4 marks</b>

