



Mark Scheme (Results)

Summer 2018

Pearson Edexcel International GCSE
In Mathematics B (4MB1)
Paper 01R

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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**
 - o M marks: method marks
 - o A marks: accuracy marks
 - o B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
 - o cao – correct answer only
 - o ft – follow through
 - o isw – ignore subsequent working
 - o SC - special case
 - o oe – or equivalent (and appropriate)
 - o dep – dependent
 - o indep – independent
 - o awrt – answer which rounds to
 - o eeo – 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: 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.

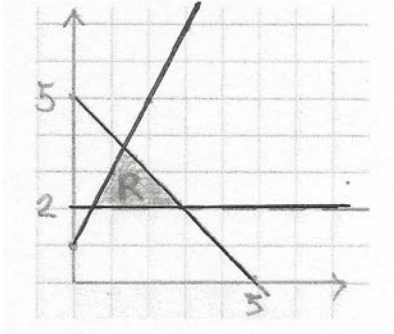
- **Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another part.

Question	Working	Answer	Mark	Notes	Sub-Total	Total
1	$\frac{23}{8} \times \frac{8}{5}$		M1	Need to see $\frac{23}{8} \times \frac{8}{5}$ and $\frac{23}{5}$ or $\frac{184}{40}$		2
		$4\frac{3}{5}$	A1	NB no marks for an answer without any working. Must be the mixed fraction in its simplest form		
2	$360 \div 12$ or $180(n-2) = 168n$ oe		M1	$360 \div (180-168)$ NB $180(n-2) = 168$ is M0		2
		30	A1			
3	$(1.7 \times 10^7) \div (1.5 \times 10^3)$		M1	for $1.1(3) \times 10^n$ or correct value to 2 or more significant figures. Eg 11333.33... 11000, 11300		2
		1.1×10^4	A1	cao 1.1×10^4		
4	$-3 \times 7x^{-4} - 5x^4$		M1	for one correct term (allow $-3 \times 7x^{-4}$)		2
		$-21x^{-4} - 5x^4$	A1	oe e.g. $-\frac{21}{x^4} - 5x^4$		
5	$\frac{12}{3-\sqrt{5}} \times \frac{3+\sqrt{5}}{3+\sqrt{5}}$ or $12 = 3a + 3b\sqrt{5} - a\sqrt{5} - 5b$ and $3a - 5b = 12, 3b - a = 0$ oe		M1			2
	$\frac{36+12\sqrt{5}}{9-5}$ or $4b = 12$ or $4a = 36$	$9+3\sqrt{5}$	A1	Correct expansion/correct method for solving simultaneous equations with a correct answer and no errors. NB no marks for answer without any working.		

Question	Working	Answer	Mark	Notes	Sub-Total	Total
6	$\angle EFG = 63^\circ$		M1	May be marked on diagram		3
	$\angle GEF = 54^\circ$ or $\angle BEF$ or $\angle DEG = 126^\circ$		M1	Allow 180 – "their $\angle FEG$ " from correct work May be marked on diagram		
		126	A1			
7	e.g. $8x + 14y = -40$ $4x - y = 4$ $(-)\underline{8x - 2y = 8}$ $(-)\underline{4x + 7y = -20}$ $16y = -48$ $-8y = 24$ or $y = 4x - 4$ and $2x + 3.5(4x - 4) = -10$		M1	First stage of method to eliminate one variable – allow one error only in multiplication or one sign error eg $4x = 4 - y$ – with intention to add or subtract as appropriate or correct substitution.		3
	e.g. $4x - -3 = 4$		M1	Dep on first M1 method to find second variable or starting again.		
		$x = 0.25$ $y = -3$	A1	for both 0.25 oe and -3 dep on first M1		
8	$0.6^3 \times 0.4 (= \frac{54}{625} (0.0864))$		M1			3
	$0.6^3 \times 0.4 \times 4$		M1	Dep on 1 st M1		
		0.3456	A1	$\frac{216}{625}$ or 0.346 or 0.345 NB if working shown can allow 0.35		
9	$3 - 2x = 5(2x - 3)$ or $3 - 2x = 10x - 15$		M1	or $\frac{3}{5} - \frac{2}{5}x = 2x - 3$ oe		3
	$3 + 15 = 10x + 2x$ or $-2x - 10x = -15 - 3$ oe e.g. $18 = 12x$ or $2.4x = 3.6$, etc		M1	dep on first M1 for isolating x terms and numerical terms		
		1.5	A1	oe dep on at least one M1		

Question	Working	Answer	Mark	Notes	Sub-Total	Total
10	19.45 or 19.35 or 2.35 or 2.45		B1			3
	$(b =) 19.45 - 2 \times 2.35$		M1	Or for $UB_1 - 2 \times LB_2$ or $UB_1 = 2 \times LB_2 + b$ where $19.4 < UB_1 \leq 19.5$ & $2.3 \leq LB_2 < 2.4$		
		14.75	A1			
11	$3(x^3 + a) = 4(c - x^3)$ oe		M1			3
	$3x^3 + 4x^3 = 4c - 3a$ or $3a - 4c = -4x^3 - 3x^3$		M1	Collecting x terms on one side and other terms on the opposite side oe. Do not ISW		
		$\sqrt[3]{\frac{4c-3a}{7}}$	A1	NB A0 for $\pm \sqrt[3]{\frac{4c-3a}{7}}$ $3\sqrt{\frac{4c-3a}{7}}$		
12	$5^{3k+4} = 125$		M1	Allow $\frac{750}{6}$		3
	$3k + 4 = 3$		M1	Dep first M1 Writing “125” as a power of 5 and equating powers, 0.33(0.33...)		
		$-\frac{1}{3}$	A1	cao		
13	$\left[\frac{BE^2}{9.6^2} = \right] \left(\frac{9}{16}\right) \text{ or } \left(\frac{27}{21+27}\right)$ oe		M1	For $\frac{9}{16}$ or $\frac{27}{21+27}$ Alternate $h = 10$, $0.5BE \times x = 27$		3
	$[BE =] \sqrt{\frac{9}{16}} \times 9.6$		M1	Alternate $(9.6 + BE)(10 - x) = 42$		
		7.2	A1			

Question	Working	Answer	Mark	Notes	Sub-Total	Total
14 (a)(i)	$y = 2$		B1	correct line	1	
(ii)	$x + y = 5$		B1	correct line (condone incorrect labelling)	1	
(iii)	$y = 2x + 1$		B1	correct line	1	
(b)		R correctly placed	B1	Do not award if lines incorrect Ignore labelling of lines	1	4
15	$\frac{1}{5} \times \left(\frac{120}{5} \times 3 \right) (=14.4(0))$		M1	or (Barry:) $\frac{3}{5} \times \frac{1}{5} (= \frac{3}{25})$		
	$0.35 \times \left(\frac{120}{5} \times 2 \right) (=16.8(0))$		M1	or (Carlos:) $\frac{35}{100} \times \frac{2}{5} (= \frac{14}{100} = \frac{7}{50})$		
	$\frac{'14.4' + '16.8'}{120} = \frac{'31.2'}{120}$		M1	Dep on M2 or for $'\frac{3}{25}' + '\frac{7}{50}'$		
		$\frac{13}{50}$ or 0.26	A1			

Question	Working	Answer	Mark	Notes	Sub-Total	Total
16 (a)		$6w^5y^8$	B2	B1 for 2 terms correct as part of a product. Do not ISW	2	4
(b)		$3a^2c$	B2	B1 for 2 terms correct as part of a product, allow $3a^2c^1$. Do not ISW	2	
17	$OBA = 52^\circ$		M1	may be marked on diagram		4
	$AOB = 76^\circ$ or $BAC = 128^\circ$		M1	may be marked on diagram must be identified as correct angles		
		14	A1			
	e.g. angle between tangent and radius = 90° base angles/radii equal / isosceles triangle Angle sum of triangle Angle sum of triangle = 180 Angle sum of straight line Angle sum of straight line = 180		B1	for 2 correct reasons for method used		
18 (a)	$\begin{pmatrix} -4 \\ 2 \end{pmatrix} + \begin{pmatrix} -2 \\ 6 \end{pmatrix}$ or $\begin{pmatrix} -2 \\ 6 \end{pmatrix} - \begin{pmatrix} 4 \\ -2 \end{pmatrix}$	$\begin{pmatrix} -6 \\ 8 \end{pmatrix}$	M1 A1	oe	2	4
(b)	$\sqrt{"(-6)"^2 + "8"^2}$		M1ft	ft part(a). Condone missing minus.	2	
		10	A1ft	ft part (a)		

Question	Working	Answer	Mark	Notes	Sub-Total	Total
19	$(3x+2) \times \frac{5}{3x^2-7x-6} \left[-\frac{5}{x+3} \right]$		M1	For $\times$ by reciprocal condone missing bracket round $3x+2$		4
	$(3x+2) \times \frac{5}{(3x+2)(x-3)} \left[-\frac{5}{x+3} \right]$		M1	Factorising correctly		
	$\frac{5(x+3)-5(x-3)}{(x-3)(x+3)}$		M1	Correct method for combining into a single fraction		
	$\frac{5x+15-5x+15}{(x+3)(x-3)}$					
		$\frac{30}{x^2-9}$	A1	or $\frac{30}{(x+3)(x-3)}$		
20	$\overrightarrow{AP} = -\mathbf{a} + \frac{5}{6}(\mathbf{a} + 3\mathbf{b}) \left[= -\frac{1}{6}\mathbf{a} + \frac{5}{2}\mathbf{b} \right]$		M1	For correct vector for $\overrightarrow{AP}$		4
	$\overrightarrow{AD} = -\mathbf{a} + n\mathbf{b} \text{ or } -\mathbf{a} + (5+n)\mathbf{b}$		M1	indep allow $\overrightarrow{OD} = \mathbf{a} + n\overrightarrow{AP}$		
	$\overrightarrow{AD} = 6\left(-\frac{1}{6}\mathbf{a} + \frac{5}{2}\mathbf{b}\right) \left[= -\mathbf{a} + 15\mathbf{b} \right]$		M1	or $AD = 6AP$ or $1 - \frac{1}{6}n = 0$ and $\overrightarrow{OD} = 15\mathbf{b}$		
	$OB : OD = 5 : 15$	1 : 3	A1	Seeing 5 : 15 or $5\mathbf{b} : 15\mathbf{b}$ equals 1 : 3 from correct working		

Question	Working	Answer	Mark	Notes	Sub-Total	Total	
21	$\sqrt{8^2 + 15^2} (=17)$		M1	Using Pythagoras correctly		5	
	$10 \times 9 + 18 \times 9 + 15 \times 9$		M1	correct areas of the 3 rectangles			
	$\frac{18+10}{2} \times 15$ or $10 \times 15 + \frac{8 \times 15}{2}$ [=210]		M1	Attempt at area of trapezium			
	$2 \times "210" + 10 \times 9 + 18 \times 9 + 15 \times 9 + "17" \times 9$		M1	dep on previous method marks – for adding the six areas together			
		960	A1				
22 (a)	$[T =] \frac{k}{y^2}$		M1	For $\frac{k}{y^2}$	3	5	
	$0.32 = \frac{k}{5^2}$		M1	Subst 0.32 for T and 5 for y			
		$T = \frac{8}{y^2}$	A1	NB SCB1 for $0.32 = \frac{k}{\sqrt{5}}$			
(b)	$200 = \frac{"8"}{y^2}$		M1		2		
		0.2	A1	oe			

Question	Working	Answer	Mark	Notes	Sub-Total	Total
23 (a)		$(x+5)^2 - 32$	B2	or for $p = 5$ and $q = -32$ B1 for $(x + 5)^2$, B1 for -32	2	5
(b)	$(x + '5')^2 = '32'$		M1	ft from (a)		
	$x + '5' = \pm\sqrt{'32'}$		M1	ft		
		$-5 \pm \sqrt{32}$	A1	$-5 \pm 4\sqrt{2}$ gets A0 SCB1 for use of formula with correct answers although $-5 \pm 4\sqrt{2}$ is B0	3	
24 (a)	$(-2)^3 - 3 \times (-2)^2 - 2a + 12 (=0)$ Or $(-2)^3 - 3 \times (-2)^2 - 2 \times -4 + 12$ $2a = -8$ or $-2a = 8$ or $2a = -20 + 12$, $a = -4$ Or $-8 - 12 + 8 + 12 = 0$ so $a = -4$		M1		2	5
			A1	no working gains zero marks		
(b)	$(x + 2)(x^2 - 5x + 6)$ or $x^2(x - 3) - 4(x - 3)$		M1	Allow a sign error		
	$x^2 - 5x + 6 = (x - 2)(x - 3)$		M1	For factorising any 3 term quadratic which when expanded, the result gives at least 2 of the 3 terms from their trinomial, e.g. $(x - 6)(x - 1)(=0)$ will give x^2 and +6 terms or $(x^2 - 4)(x - 3)$ Indep of previous M mark		3
		$(x+2)(x-3)(x-2)$	A1			

Question	Working	Answer	Mark	Notes	Sub-Total	Total
25 (a)	$1 - (0.15 + 0.13 + 0.2 + 0.32)$		M1		2	
		0.2	A1			
(b)	$\frac{0.32}{0.13} \times 39$ or $0.32 \times (39 \div 0.13)$ or 0.32×300		M1	oe	2	
		96	A1			
(c)	0.15×360		M1	oe	2	6
		54	A1			
26(a)		$\begin{pmatrix} 16 & 3 \\ -4 & 11 \end{pmatrix}$	B2	-1eeoo	2	
(b)		$\begin{pmatrix} 11 & 0 \\ -3 & 10 \end{pmatrix}$	B2	-1eeoo	2	
(c)		$\begin{pmatrix} 12 & -7 \end{pmatrix}$	B1	for matrix of correct order or for 12 and -7 seen. Allow $10 + 2$, $-15 + 8$ or $5 \times 2 + 2 \times 1$ and $5 \times -3 + 2 \times 4$	2	6
			B1	fully correct including brackets		

Question	Working	Answer	Mark	Notes	Sub-Total	Total
27	$\angle EOD = \frac{360 \times 3.5\pi}{12\pi} \text{ oe } (= 105)$		M1	method to find angle EOD		
	$ED = \sqrt{6^2 + 6^2 - 2 \times 6 \times 6 \times \cos 105}$ or $ED = 2 \times 6 \sin 52.5 \text{ oe } (= 9.52) \text{ oe}$		M1	method to find length ED		
	$DC \times (DC + "9.52") = 9 \times 16$		M1	correct equation for DC Allow 9.5 or better for ED		
	$DC^2 + 9.52DC - 144 (= 0) \text{ oe}$		M1	Dep on previous M mark. correct equation in form to solve		
	$DC = \frac{-9.52 + \sqrt{9.52^2 - 4 \times 1 \times -144}}{2 \times 1}$		M1	Dep on previous two M marks fully correct method to find DC		
		8.15	A1			6