Mark Scheme (Results)

Summer 2018

Pearson Edexcel International GCSE
In Mathematics B (4MB1)
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
  - awrt – answer which rounds to
  - 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: 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

Question	Working	Answer	Notes	Mark	Sub-Total	Total
1		3, 8, 13	-1 for every error or omission	B2		2
2		234°	180 + 54	M1 A1		2
3	$\frac{(75-69)}{75}\times 100$	8	M1 for $\frac{\pm(75-69)}{75}$ or $\frac{\pm(75-69)}{69}$	M1 A1		2
4		$A(-3,8)$	B1 for each coordinate SC B1B0 for $(1,-2)$ SC B1B0 for $(8,-3)$	B2		2
5(a)		I		B1	1	2
5(b)		I N		B1	1	
6		2π $4\sqrt{2}$	-1 for each error or omission	B2		2

Question	Working	Answer	Notes	Mark	Sub-Total	Total
7	$2\frac{1}{4}=\frac{9}{4}$ $\frac{1}{3}\times\frac{9}{4}=\frac{3}{4}$ $\frac{7}{8}-\frac{3}{4}$	 $\frac{1}{8}$	 Correctly multiplying $\frac{1}{3}$ and their "$\frac{9}{4}$" 	B1 M1 A1dep		3
8	$16x=\left(7.1\times10^{7}\right)-\left(5.2\times10^{5}\right)$ $x=\frac{\left(7.1\times10^{7}\right)-\left(5.2\times10^{5}\right)}{16}$ $x=4405000$	 4.405×10^{6}	 M1 for correct order of operations to make x the subject Accept 4.41×10^{6} M2 for 4.41×10^{n} or 4.405×10^{n} or 4.4×10^{6}	M1 M1 A1		3

Question	Working	Answer	Notes	Mark	Sub-Total	Total
9	$\sqrt{80} = \left(\sqrt{16\times 5} =\right) 4\sqrt{5}$ $\sqrt{180} = \sqrt{36\times 5} = 6\sqrt{5}$ $3\sqrt{180} - 2\sqrt{80} = 3\left(6\sqrt{5}\right) - 2\left(4\sqrt{5}\right)$	$10\sqrt{5}$	M1 for one term simplified correctly M2 for both terms simplified correctly (with one step of working for $\sqrt{180}$)	M1 M1 A1		3
10	$\det = 4(2x) - 1(5x)$ $8x - 5x = 9 \Rightarrow x = ...$	$x = 3$	Sets their determinant = 9 and attempts to solve	B1 M1 A1		3
11	$\frac{3(x+2) - 4(2x-1)}{(2x-1)(x+2)}$ $\frac{3x+6-8x+4}{(2x-1)(x+2)}$	$\frac{5(2-x)}{(2x-1)(x+2)}$	M1 for correct first stage M1 for correct expansion of numerator in single fraction (allow one sign slip Final answer - allow $10-5x$ in numerator or $2x^2+3x-2$ in the denominator	M1 M1dep A1		3

Question	Working	Answer	Notes	Mark	Sub-Total	Total
12(a)		64		B1	1	3
12(b)	$\frac{180-"64"}{2}-32$	 26	M1 for $\angle ACB = 32, \angle OCB = 38$	M1 A1	2	
13	$(16n^2+24n+9)-(16n^2-24n+9)$ $=48n$	 $12(4n)$ so is a multiple of 12	Either bracket expanded correctly Or equivalent e.g. $\frac{48n}{12}=4n$	M1 A1 A1		3
14	$(\lvert\mathbf{a}\rvert=)\sqrt{(2x-1)^2+(-3)^2}$ $(2x-1)^2+9=25 \Rightarrow x=...$	 $x=\frac{5}{2}$ or $-\frac{3}{2}$	Attempt at modulus (or square) of **a** Getting to pre-factorising stage or at least one solution for x	M1 M1 A1		3
15	$AB = AD$ - triangle is isosceles $BC = CD$ - tangents to a circle from an external point are equal in length (either circle or length) $AC = AC$ - common side	 Congruent from SSS	M1 for each A1 for all three + SSS	M1 M1 A1		3

Question	Working	Answer	Notes	Mark	Sub-Total	Total
16(a)		$16x^{10}$	B1 for either 16 or for x^{10}	B2	2	4
16(b)		$81y^{12}$	B1 for either 81 or for y^{12}	B2	2	
17(a)	LB = 295.5 and 209.5 $2(295.5)+2(209.5)$	1010	One correct lower bound	M1 A1	2	4
17(b)	UB = 296.5 and 210.5 $296.5\times 210.5 \quad = 62413.25$	62413	One correct upper bound	M1 A1	2	
18	$297 = k\left(\frac{1}{3}\right)^{-3}$ $k = 11$ $x^2 = \left(\sqrt[3]{\frac{"11"}{704}}\right)^2$	$\left(x^2\right) = \frac{1}{16}$	SC B1 for $297 = \frac{k}{\sqrt[3]{\frac{1}{3}}}$ Or equivalent Or equivalent	M1 M1 M1dep A1		4

Question	Working	Answer	Notes	Mark	Sub-Total	Total
19	$5(2x+y)-x(2x+y)$ $(2x-y)(2x+y)$ $\frac{(5-x)(2x+y)}{(2x-y)(2x+y)}$	$\frac{5-x}{2x-y}$ or $\frac{x-5}{y-2x}$	Correct first step for factorising numerator One term correctly factorised Both terms correct Final answer	M1 M1 M1 A1		4
20		Heights at (10), 8, 4, 3.5 and 10 Widths at (0 - 2), 2 - 5, 5 - 8, 8 - 12, 12 - 15	B1 for each correct bar (widths and heights). For full marks scale on freq. density axis required. SC if no marks then B1 for correct scale	B4		4

Question	Working	Answer	Notes	Mark	Sub-Total	Total
21	Area of sector $= \frac{35}{360} \times \pi \times 8^2$		Correct method for sector area	M1		4
	Area of triangle $= \frac{1}{2}(8)(8)\sin 35^\circ$		Correct method for triangle area	M1		
	Area of segment = 19.54… – 18.35…		Area of sector – area of triangle (dependent on previous M marks)	M1		
		1.19	Correct answer	A1		
22	$\left(\frac{972}{4500}\right)^{\frac{1}{3}}$ (length scale factor) oe		M1 for $\frac{972}{4500}$	M2		4
	$\left\{\left(\frac{972}{4500}\right)^{\frac{1}{3}}\right\}^2$		Squaring their $\left(\frac{972}{4500}\right)^{\frac{1}{3}}$ - dependent on first M mark	M1 DEP		
		540		A1		

Question	Working	Answer	Notes	Mark	Sub-Total	Total
23	$\frac{11}{18}\times\frac{10}{17}\times\frac{9}{16}$ and $\frac{7}{18}\times\frac{6}{17}\times\frac{5}{16}$		M1 for one correct term	M2		4
	$1-\frac{11}{18}\times\frac{10}{17}\times\frac{9}{16}-\frac{7}{18}\times\frac{6}{17}\times\frac{5}{16}$		Attempt at correct calculation (or equivalent)	M1 DEP		
		$\frac{77}{102}$	Or equivalent	A1		
	OR					
	$\frac{11}{18}\times\frac{10}{17}\times\frac{7}{16}$ and $\frac{11}{18}\times\frac{7}{17}\times\frac{6}{16}$		M1 for one correct term	M2		
	$3\left(\frac{11}{18}\times\frac{10}{17}\times\frac{7}{16}\right)+3\left(\frac{11}{18}\times\frac{7}{17}\times\frac{6}{16}\right)$		Attempt at correct calculation (or equivalent)	M1 DEP		
		$\frac{77}{102}$		A1		

Question	Working	Answer	Notes	Mark	Sub-Total	Total
24(a)	Area of circle $=\pi\left(\frac{k}{2}\right)^2$ Area of square $=\frac{1}{2}k^2$ or Area of quarter-square = $\frac{1}{8}k^2$ $A=\frac{1}{4}\pi k^2-\frac{1}{2}k^2+\frac{1}{8}k^2$		Correct expression for the area of the circle Correct expression for area of square or quarter-square $8A=2\pi k^2-3k^2$ - note that answer given so sufficient working must be shown	M1 M1 A1	3	5
24(b)	$8A=k^2(2\pi-3)$ $k^2=\frac{8A}{2\pi-3}$	$k=\sqrt{\frac{8A}{2\pi-3}}$	Correct factorisation	M1 A1	2	
25(a)	$v=3t^2-12t+15$	$(a) = 6t - 12$	Two terms correct for M1	M1 A1 A1	3	5
25(b)	$6t-12=0$	$v_{\min}=3$	Sets their a equal to zero	M1 A1	2	

Question	Working	Answer	Notes	Mark	Sub-Total	Total
26(a)	$y = -2x + 8$	-2	Complete re-arrangement to make y the subject	M1 A1	2	6
26(b)	$A(0,8)$ $B(4,0)$ Area $= \frac{1}{2}(4)(8)$	16	Follow through final two marks for $A(0, 8)$ and $B(0,4)$	B1 B1 M1 A1	4	
27	$(3x+1)^2 = (x+3)^2 + (2x)^2 - 2(x+3)(2x)\cos(120^\circ)$ $9x^2 + 6x + 1 = x^2 + 6x + 9 + 4x^2 + 2x^2 + 6x$ $x^2 - 3x - 4 = 0$ $(x+1)(x-4) = 0$ $\frac{\sin\theta}{x+3} = \frac{\sin 120^\circ}{3x+1}$	27.8	Expand brackets (condone at most one error) Simplifying to TQ Solving trinomial quadratic marking rules Sine rule with their value for x substituted or in terms of x – independent of previous M marks	M1 M1 M1 M1 M1 A1		6

Question	Working	Answer	Notes	Mark	Sub-Total	Total
28(a)	$4x-8<1+x \Rightarrow 3x<9$	$x<3$	Expanding and re-arranging to $ax < b$ with either a or b correct	M1 A1	2	7
28(b)	$2x^2-7x-9\le 0 \Rightarrow (2x-9)(x+1)\le 0$ $x=\frac{9}{2}$ or -1	$-1\le x\le \frac{9}{2}$	Rewriting and solving trinomial quadratic marking rules Chooses inside region for their critical values	M1 A1 M1 A1	4	
28(c)		$-1\le x<3$	Follow through their values but must be correct inequalities and dependent on all previous M marks	B1ft	1	