Mark Scheme (Results)

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Pearson Edexcel International GCSE
Mathematics B (4MB0/01) Paper 1

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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.

- **Follow through marks**

  Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

  Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

- **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.

- **Probability**

  Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

  Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

  If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

  If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

- **Linear equations**

  Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

- **Parts of questions**

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

Question Number	Answer	Notes	Mark
1	$50 / 12.35$ OR $50 \times \left(\dfrac{1}{12.35}\right)$	M1	
	($50 = $) £4.05 awrt	A1	**2**

Question Number	Answer	Notes	Mark
2	$4x - 12 = 32$ **OR** $x - 3 = 8$	M1	
	$x = 11$	A1	**2**

Question Number	Answer	Notes	Mark
3	$\dfrac{20 - 16}{16} \times 100$	M1	
	25%	A1	**2**

Question Number	Answer	Notes	Mark
4	$\angle ABC = \angle ACB = \dfrac{180 - 70}{2} = 55^o$	M1	
	$\angle BCD = 125^o$	A1	
	NB: Accept angles if marked on diagram		**2**

Question Number	Answer	Notes	Mark
5(a)	0.063	B1	**1**
(b)	"6.3×10^{-2}"	B1 ft	**1**

Question Number	Answer	Notes	Mark
6(a)	1, 3, 5, 7, 9, 11, 13 NB: The numbers can be in any order NB: Ignore repeated numbers NB: Condone missing brackets	B1	**1**
(b)	2 NB: Condone missing brackets	B1	**1**

Question Number	Answer	Notes	Mark
7	$2(3)^3 - 11(3)^2 + 16(3) - 3$ (subst.) (o.e) $= 0$ **OR** Long Division: $2x^2 - 5x$ $2x^2 - 5x + 1$ **and** no remainder	M1 A1 M1 A1	 **2**

Question Number	Answer	Notes	Mark
8	$a^{\left(6\times\left(-\frac{2}{3}\right)\right)}$ (multiplying indices) $m = 4$	M1 A1	 **2**

Question Number	Answer	Notes	Mark
9	$20x^2 - 15xy - 8xy + 6y^2$ (condone 1 sign error or 1 arithmetical slip) $20x^2 - 23xy + 6y^2$	M1 A1	 **2**

Question Number	Answer	Notes	Mark
10 or	$\angle AOB = 120^o$ $\angle OAB = 30^o$ OR	M1 A1	
	$\angle BAC = 60^o$ $\angle OAB = 30^o$ (by symmetry) NB: Accept angles if marked on diagram	M1 A1	 **2**

Question Number	Answer	Notes	Mark
11	$-8 = 2m + 2$ (subst.) (o.e) $-10 = 2m$ $m = -5$	M1 A1	 **2**

Question Number	Answer	Notes	Mark
12	$\frac{2}{5} \times 420$ 168 g	M1 A1	 **2**

Question Number	Answer	Notes	Mark
13	5 x £1.25 + 3 x £0.39 + £1.69 =£9.11 89p (£10 – "£9.11") – follow through from their value above, provided that their value is obtained from a correct method	M1 A1 A1ft	**3**

Question Number	Answer	Notes	Mark
14	Cross-section area = $\frac{1}{2} \times 2 \times 3 \times \sin 30$ (=1.5) Volume = "1.5" x 5cm = 7.5 cm^3	M1 M1 (dep) A1	**3**

Question Number	Answer	Notes	Mark
15(a)	0.94	B1	**1**
(b)	1 – "0.94" (ft from their answer to (a)) $0.06 , \frac{6}{100}$	M1 A1 ft	**2**

Question Number	Answer	Notes	Mark
16	(i) $\frac{c}{a} = \frac{1}{b} - \frac{1}{a}$ **OR** (ii) $\frac{1}{b} = \frac{1}{a} + \frac{c}{a}\left(= \frac{1+c}{a} \right)$ **OR** (iii) $\frac{1}{a} = \frac{a-cb}{ab}$ **OR** (iv) $b = a - cb$ (*ie multiply both sides by ab*) **OR** above expressions $\times (-1)$	M1	
	(i) $\frac{c}{a} = \frac{a-b}{ab}$ (oe) **OR** $c = \frac{a}{b} - \frac{a}{a}$ (oe) **OR** (ii) $\frac{a}{b} = 1 + c$ **OR** (iii) & (iv) $cb = a - b$ $c = \frac{a-b}{b}$ **OR** $\frac{a}{b} - 1$ (cao) **NB:** *No algebraic **nor** sign slips allowed*	M1 (DEP) A1	**3**

Question Number	Answer	Notes	Mark
17(a)	*g, y*	B1	**1**
(b)	*g, w, y, z*	B1	**1**
(c)	7	B1	**1**

	NB: Condone with or without brackets in (a), (b) and (c)
	In parts (a) and (b) **ignore**
	    (i) Order of elements
	    (ii) Repeated elements		

Question Number	Answer	Notes	Mark
18(a)	$\dfrac{210}{360}\times\text{Total}=420$ (o.e)	M1	
	Total = 720 calls	A1	**2**
(b)	"720" $-$ (420 + 160 + 64)	M1	
	76 delivery calls	A1 ft	**2**

Question Number	Answer	Notes	Mark
19(a)	$\begin{pmatrix} 10 & -2x \\ -12x+3 & -7 \end{pmatrix}$	B2 (-1eeoo)	**2**
(b)	$-2x=4$ **OR** "$-12x+3$" $=27$	M1	
	$x=-2$	A1	**2**

Question Number	Answer	Notes	Mark
20	$20=\dfrac{k}{2^2}$	M1	
	$k=80$	A1	
	$r=\sqrt{\dfrac{"80"}{5}}$	M1 (DEP)	
	$r=4$	A1	
	OR		
	$20\times 2^2 = r^2 \times 5$ (o.e)	M1 A1	
	$r=\sqrt{\dfrac{20\times 2^2}{5}}$ (o.e)	M1 (DEP)	
	$r=4$	A1	**4**

Question Number	Answer	Notes	Mark
21(a)	$10\sqrt{15}$	B1	
	NB: This can be awarded if seen in part (b)		**1**
(b)	$\dfrac{4\sqrt{3}+"10\sqrt{15}"}{2\sqrt{3}}$ OR $\dfrac{4\sqrt{3}+5\sqrt{20}\sqrt{3}}{2\sqrt{3}}$	M1	
	$\dfrac{2\sqrt{3}\left(2+5\sqrt{5}\right)}{2\sqrt{3}}$	M1 (DEP)	
	$a=2$, $b=5$ OR $2+5\sqrt{5}$	A1	**3**

Question Number	Answer	Notes	Mark
22(a)	$\overrightarrow{AB} = \overrightarrow{OB} - \overrightarrow{OA} = \begin{pmatrix} 6 \\ 1 \end{pmatrix} - \begin{pmatrix} 2 \\ 4 \end{pmatrix}$ $\overrightarrow{AB} = \begin{pmatrix} 4 \\ -3 \end{pmatrix}$ Special Case: $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$ with or without working scores M1 A0	B2 (-1 for eeoo)	**2**
(b)	$\left|\overrightarrow{AB}\right| = \sqrt{"4"^2 + "(-3)"^2}$ $\left|\overrightarrow{AB}\right| = 5$ NB: Any square roots must be evaluated for the award of the A mark	M1 A1	**2**

Question Number	Answer	Notes	Mark
23(a)	S labelled	B1	**1**
(b)	T labelled	B1	**1**
(c)(i)	$306^\circ \left(\pm 3^\circ\right)$	B1 (using M slide pen)	**1**
(c)(ii)	9 or 10 km	B1	**1**

Question Number	Answer	Notes	Mark
24(a)	(a) (5, 0) OR $x = 5, y = 0$	B1	**1**
(b)	$x + y \leq 5$ (o.e)	B1	
	$x - y \leq 5$ (o.e)	B1	
	$x \geq 0$	B1	**3**
	NB: Allow weak inequalities		

Question Number	Answer	Notes	Mark
25(a)	The particle is stationary. (o.e)	B1	**1**
(b)	$\frac{1}{2} \times 4 \times 25 \quad (= 50)$ $\frac{1}{2} \times 2 \times 30 \;+\; \frac{1}{2} \times 4 \times 25$ 80 km	M1 M1 (dep) A1	**3**

Question Number	Answer	Notes	Mark
26(a)	2	B1	**1**
(b)	4	B1	**1**
(c)	0x1 + 1x1 + 2x5 + 3x2 + 4x4 + 5x4 + 6x3 (=71)	M1	
	$\dfrac{"71"}{20}$ ft from total above	M1	
	$\dfrac{71}{20}$ or 3.55	A1	**3**

Question Number	Answer	Notes	Mark
27(a)	$\left(\dfrac{6}{10}\right)^2$ or $\left(\dfrac{10}{6}\right)^2$ seen (o.e)	B1	
	$\left(\dfrac{6}{10}\right)^2 \times 550$	M1	
	198 cm^2	A1	**3**
(b)	$\left(\dfrac{10}{6}\right)^3$ or $\left(\dfrac{6}{10}\right)^3$ seen (o.e)	B1	
	$\left(\dfrac{10}{6}\right)^3 \times 189$	M1	
	875 cm^3	A1	**3**

Question Number	Answer	Notes	Mark
28(a)	$\dfrac{\mathrm{d}y}{\mathrm{d}x} = 3x^2, \ +5x, \ -2$	B1, B1, B1	**3**
	NB: B1, B1, B0 maximum if more than 3 terms are given		
(b)	"$3x^2 + 5x - 2$" = 0 $(3x - 1)(x + 2)$	M1 M1 (factorising trinomial quadratic) A1,A1	
	$\therefore x = \dfrac{1}{3}$ or 0.333 (or better) , $x = -2$		**4**

Question Number	Answer	Notes	Mark
29(a)	Radius = 6cm	B1	**1**
(b)	$12^2 - \pi"36"$ **OR** $12^2 - \pi"6^2"$ (oe)	B1 ft	**1**
(c)	$\dfrac{12^2 - \pi"6"^2}{12^2} \times 100$	M1	
	21.45 (using 3.142) **-> 21.5**		
	OR 21.43 (using 22/7) -> **21.4**	A1	**2**

Question Number	Answer	Notes	Mark
	Penalise incorrect rounding ONCE only in this question, the first time it occurs.		
30(a)	$\tan 20 = \dfrac{BD}{3}$	M1	
	$BD = 1.0919 \rightarrow 1.09$ cm	A1	**2**
(b)	$\cos 40 = \dfrac{"1.09"}{AD}$	M1	
	$AD = 1.4229 \rightarrow 1.42, 1.43$ cm		
	(1.4254 using 1.0919)	A1	**2**
(c)	$\dfrac{2}{\sin 40} = \dfrac{"1.42"}{\sin \angle AED}$	M1	
	$\sin \angle AED = \dfrac{"1.42" \times \sin 40}{2}$	M1 (dep)	
	$\angle AED = 27.154$		
	(27.361 using "1.43")		
	$\angle AED = 27.2, 27.3, 27.4$	A1	**3**
or	X is on AE st DX is perpen to AE		
	$\sin 40 = \dfrac{DX}{"1.42"}$ ($DX = 0.9128$)	M1	
	$\sin \angle AED = \dfrac{"0.9128"}{2}$	M1 (dep)	
	$\angle AED = 27.155$		
	$\angle AED = 27.361$ (using "1.43" -> $DX = 0.9192$)		
	so $\angle AED = 27.2, 27.3, 27.4$	A1	**3**