Mark Scheme (Results)

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Pearson Edexcel International GCSE
Mathematics A (4MB0)
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.
- 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 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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.
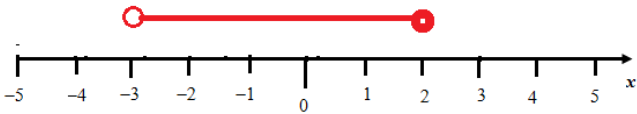
Parts of questions

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

Question	Scheme	Mark	Notes
1	$2x\left(x^2-3z\right)+z\left(x^2-3z\right)$ OR $x^2\left(2x+z\right)-3z\left(2x+z\right)$ $\left(2x+z\right)\left(x^2-3z\right)$	2	M1 A1
2	$126=2\times3^2\times7$ $612=2^2\times3^2\times17$ (prime factors of 126 or 612) OR Factor tree 2|126 612 3| 63 306 3| 21 102 7 34 HCF = 18	2	M1 A1
3	$\dfrac{960\text{ km}}{91\text{ litres}}\times4.55\text{ litres}$ (oe) 48 (km per gallon)	2	M1 A1
4 (a)	0	1	B1
(b)	2	1	B1
5	$\dfrac{8}{2+7+8}\times748$ (oe) 352 (m) M1 for either of the other two lengths of the triangle	2	M1 A1
6	Shaded area = $4^2-\dfrac{1}{4}\pi\left(4^2\right)$ (oe, can be implied) awrt 3.43 (cm²)	2	M1 A1
7	$\dfrac{360}{24}$ OR $180-\dfrac{\left(2\times24-4\right)\times90}{24}$ 15	2	M1 A1
8	$\left(100-\dfrac{8^2}{2}\right)-\left(100-\dfrac{12^2}{2}\right)$ OR $\left(100-\dfrac{12^2}{2}\right)-\left(100-\dfrac{8^2}{2}\right)$ (oe) 40 (Accept −40)	2	M1 A1

Question	Scheme	Mark	Notes
9	$(BC+10)\times10=(12+8)\times8$ (oe) $BC = 6$ (cm)	2	M1 A1
10	$(1,5)$, $(5,1)$, $(2, 4)$, $(4,2)$, $(3, 3)$ OR a 6 x 6 table with 5 possible double rolls identified OR at least 3 correct probability products added All 5 correct probability products added, $5\times\left(\dfrac{1}{6}\right)^2$ $\dfrac{5}{36}$, awrt 0.139, 13.9%	3	M1 M1 (DEP) A1
11	$\overrightarrow{OY}=\left(\begin{pmatrix}-4\\2\end{pmatrix}-\begin{pmatrix}-7\\6\end{pmatrix}\right)=\begin{pmatrix}3\\-4\end{pmatrix}$ $\left|\overrightarrow{OY}\right|=\sqrt{"3"^2+"-4"^2}$ Second M mark for the modulus of their $\overrightarrow{OY}$ but not for $\overrightarrow{OX}$ or $\overrightarrow{YX}$ **NB:** Accept working for $\overrightarrow{YO}$ 5 (obtained from correct working) M1M1A0 max if $\overrightarrow{OY}==\begin{pmatrix}-3\\4\end{pmatrix}$ used	3	M1 M1 A1
12	$\angle BCD = 45$ or $\angle DBC = 45$ and $\angle ACE=60$ **OR** Join AB $\therefore \angle ABC = 60$ (Alt. Seg Thm) $\therefore \angle RBA=75$ $\angle ACB = 75^{\circ}$ $\angle$s on straight line and Tangents to a circle have the same length. **OR** $\angle$s on straight line and Isosceles Δs **OR** (From 1st B1: Alternate Segment Thm twice)) **NB:** Accept angles on diagram	3	B1 B1 B1

Question	Scheme	Mark	Notes
13	$4x^2 + 45 = 9x^2$ Condone lack of brackets for M1 only $45 = 5x^2$ (oe) $x = 3$ Accept $x = \pm 3$	3	M1 M1 (DEP) A1
14	$\sqrt{\left(\sqrt{8}\right)^2 + 1^2}$ or 3 (Pythagoras) $\therefore (3)\left(\dfrac{\sqrt{8}}{\sqrt{\left(\sqrt{8}\right)^2 + 1^2}} + \dfrac{1}{\sqrt{\left(\sqrt{8}\right)^2 + 1^2}} \right)$ $1 + \sqrt{8}$ **NB:** No working shown scores M0 M0 A0 even if correct answer given.	3	M1 M1 (DEP) A1
15 (a)	3, 6, 9, 12, 15 only	1	B1
(b)	$C = \{6, 12, 18, \ldots, 48\}$ First B mark in (b) can be implied by $\left(A \cap B\right) \cap C' = \{3,\ 9,\ 15\}$ $\left(\text{so} \quad C' = \{3, 9, \ldots, 45\}\right)$ $\therefore \left(A \cap B\right) \cap C' = \{3,\ 9,\ 15\}$ **NB:** ft on "(a)" $\text{n}\left(\left[A \cap B\right] \cap C'\right) = 3$ (cao)	3	B1 B1 B1
16 (a)	$\begin{pmatrix} -9 & -25 \\ -4 & 26 \end{pmatrix}$	2	B2 (-1eeoo)
(b)	$\begin{pmatrix} -5 & 1 & 12 \\ 0 & -14 & -28 \end{pmatrix}$	2	B2 (-1eeoo)
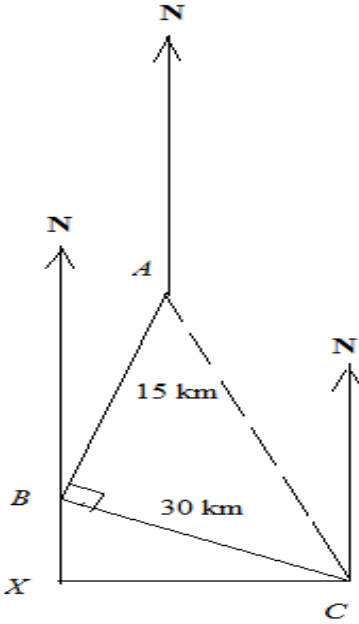
Question	Scheme	Mark	Notes
17	New $R = \dfrac{x \times 1.05}{y \times 0.75}$ or $\dfrac{1.05}{0.75}$ (oe) $= \dfrac{7}{5}R$ or 1.4 or 140 (oe) $\therefore$ increase $= \dfrac{\left("\frac{7}{5}"-1\right)R}{R} \times 100$ (oe) 3rd M mark for correct method to convert to required % e.g. $140-100, (1.4-1.0)\times100$, etc. 40%	4	M1 A1 M1 (DEP) A1

18	$w(5y-2x) = 2(x+3y) + 2(5y-2x)$
	
	 (removing denominators correctly)
	 $5yw - 2xw = 2x + 6y + 10y - 4x$ (expanding)
	
	 (**OR** $w(5y-2x) = 2(8y-x)$
	     (removing denominators)
	     $5yw - 2xw = 16y - 2x$ (expanding)
	)
	
	 $5yw - 16y = -2x + 2xw$ (collecting terms in y)
	 $y = \dfrac{2x(w-1)}{(5w-16)}, \quad \dfrac{2xw-2x}{5w-16}$ (oe)
		4	M1
			 M1
			 (M1)
			 (M1)
			 M1
			 A1

19 (a)	$\dfrac{5\times7\times9 + 2\times6\times9 - 4\times6\times7}{6\times7\times9}$ (oe, no errors) $\dfrac{255}{378}, \quad \dfrac{85}{126}$ **NB:** No working seen scores M0 A0	2	M1 A1
(b)	0.6746$\rightarrow$0.675 **NB:** ft on 4 figure accuracy of their (a) giving their "3 sf answer"	1	B1 ft
(c)	6.75×10^{-1} (or better)	1	B1 ft

Question		Scheme		Mark	Notes
20	(a)	$1 - \dfrac{4}{t^2}$	(one term correct)	3	M1 M1 (DEP) A1
		$"1 - \dfrac{4}{t^2}" = 0$	(equating their		
		f(t) to 0)			
		$t = +2$	(cao)		
		$\left("2"+\dfrac{4}{"2"}\right) - \left(8+\dfrac{4}{8}\right)$	(oe)	2	M1 A1
		4.5 (metres)			
21	(a)	$x + y = 550$		1	B1
	(b)	$22x + 12(y-50) + (12-5) \times 50 = 8600$ (oe)		1	B1
	(c)	$"\ 22x + 12"(550 - x - 50)" + (12-5) \times 50 = 8600\ "$ (oe but complete method to solve SEs for x and y with no errors) **NB:** c's SEs in (a) and (b) must be linear SEs in x and y with (a) having unit coefs. $x = 225$ $y = 325$		3	M1 A1 A1
22	(a)	$-12 < 4x \qquad$ OR $\qquad 3x \le 6$ (oe) $\qquad -3 < x$ $\qquad x \le 2$ **NB:** $-3 < x \le 2$ scores A2		3	M1 A1 A1
	(b)	 Open circle at "$x = -3$" and closed circle at "$x = 2$" One single line joining the two circles		2	B1 ft B1 ft

Question		Scheme	Mark	Notes
23	(a)	One term correct	2	M1
				A1
		$9x^2 - 30x$		
	(b)	$"9x^2 - 30x" = -25$	4	M1
				A1
		$9x^2 - 30x + 25 (=0)$		M1
				A1
		$(3x-5)^2$ (Attempt to factorise c's quadratic)		
		$x = \dfrac{5}{3}$ OR $1\dfrac{2}{3}$ OR 1.67		
24	(a)	$\dfrac{6}{\sin \angle ABC} = \dfrac{10}{\sin 50}$ oe	3	M1
				M1 (DEP)
				A1
		$\angle ABC = \sin^{-1}\left(\dfrac{6 \times \sin 50}{10}\right)$		
		$\angle ABC = 27.363 \rightarrow \mathbf{27.4}$ awrt		
	(b)	$\dfrac{AB}{\sin\left(180 - \left(50 + "\angle ABC"\right)\right)} = \dfrac{10}{\sin 50}$	3	M1
				M1 (DEP)
				(M1)
		$AB = \dfrac{10 \times \sin\left(180 + "\angle ABC)"\right)}{\sin 50}$		(M1 (DEP))
		$\left(\mathbf{OR}\right.$		
		$AB^2 = 6^2 + 10^2 - 2 \times 6 \times 10 \times \cos\left(180 - \left(50 + "\angle ABC"\right)\right)$		
		$AB = \sqrt{\left(\left(6^2 + 10^2\right) - \left(2 \times 6 \times 10 \times \cos\left(180 - \left(50 + "\angle ABC"\right)\right)\right)\right)}$		
		$\left.\right)$		
		$AB = 12.74 \rightarrow \mathbf{12.7}$ (cm) awrt		

Question	Scheme	Mark	Notes
25 (a)	$\dfrac{1}{24}+\dfrac{1}{48}+\dfrac{1}{24x}$ of the tank filled in 1 hour, so $\dfrac{1}{24}+\dfrac{1}{48}+\dfrac{1}{24x}$ (oe) **seen** $\dfrac{3x+2}{48x}$ or $\dfrac{1}{16}+\dfrac{1}{24x}$ (isw after correct answer seen)	2	M1 A1
(b)	) $\therefore$ The 3 taps fill $"\dfrac{3x+2}{48x}"\times 15$ **OR** $\left(\dfrac{1}{16}+\dfrac{1}{24x}\right)\times 15$ tanks of water in 15 hours So to fill in tank we must have $"\dfrac{3x+2}{2x}\times\dfrac{15}{24}"=1$ (tank) $45x+30=48x$ (removing denominators) $\Big($ OR $\dfrac{1}{16}+\dfrac{1}{24x}=\dfrac{1}{15}$ (M1(DEP)) $24x=240$ (M1(DEP))$\Big)$ $x=10$	4	M1 M1 (DEP) M1 (DEP) A1

Question	Scheme	Mark	Notes
26 (a)	Probability pairs (0.3, 0.7), (0.9, 0.1), (0.4, 0.6)	2	B2 (−1 each incorrect pair)
(b)	"0.3×0.1" 0.03, 3%	2	M1 A1
(c)	"0.3×0.9" OR "0.7×0.4" "0.3×0.9+0.7×0.4" $\dfrac{11}{20}$, 0.55, 55%	3	M1 M1 (DEP) A1

Question	Scheme	Mark	Notes
27 (a)	$\angle ABC = 90^{\circ}$ $AC = \sqrt{30^2 + 15^2}$ $AC = 33.54 \rightarrow$ awrt **33.5** (km)	3	M1 M1 (DEP) A1
(b)	Point *X* is st *BX* is perpendicular to *CX* (see diagram) $\angle BCX = 20^{\circ}$ $\tan \angle BCA = \dfrac{15}{30}$ $\left(\angle BCA = 26.565^{\circ}\right)$ Bearing of *A* from *C* = $270 + \left("\angle BCA" + 20\right)$ $\Big($**OR** $\tan \angle BAC = \dfrac{30}{15}$ $\left(\angle BAC = 63.435^{\circ}\right)$ $\therefore$ bearing of *C* from *A* is $200 - "63.435"$ $\left(= 136.565^{\circ}\right)$ $\therefore$ bearing of *A* from *C* is $360 - \left(180 - "136.565"\right)$ (oe) $\Big)$ $316.565 \rightarrow$ awrt **317**	4	M1 M1 M1 (DEP) (M1) (M1) (DEP) (M1) (DEP)