

Mark Scheme (Results)

June 2011

International GCSE
Mathematics (4MB0) Paper 01

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Publications Code UG028414

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4MB0 Summer 2011 - Paper 1

Question Number	Working	Notes	Mark
1.	Common difference of 5 2, 7, 12, 17	M1 A1	2 2
2.	$\frac{26-2}{-3-5}$ OR $\frac{2-26}{5+3}$ OR <u>Solving for m</u> $26 = -3m + c$ $2 = 5m + c$ Full method for obtaining m (no slips) -3	M1 M1 A1	 2 2
3.	10, 12, 14	B2 (-1eeoo)	2 2
4.	$3 + 20 = 8x$ (rem. denom. and x isolated, one arithmetical slip) $2\frac{7}{8}$ OR 2.875 OR 2.88 OR $\frac{23}{8}$	M1 A1	 2 2
5.	3 or 7 identified as a common factor 21	M1 A1	 2 2
6.	$x(x - y) + z(x - y)$ OR $x(x + z) - y(x + z)$ (no slips) $(x + z)(x - y)$	M1 A1	 2 2
7.	$\frac{55.43}{115} \times 100$ OR $55.43 / 1.15$ OR $55.43 \times \frac{20}{23}$ £ 48.20	M1 A1	 2 2
8.	$\frac{x(x+2)-2x}{2(x+2)}$ OR $\frac{x^2+2x-2x}{2x+4}$ OR $\frac{x(x+2)}{2(x+2)} - \frac{2x}{2(x+2)}$ (no slips) $\frac{x^2}{2(x+2)}$ OR $\frac{x^2}{2x+4}$	M1 A1	 2 2
9.	One term correctly differentiated $6x^2 + 12x^{-5}$	M1 A1	 2 2

Question Number	Working	Notes	Mark	
10.	$\angle BDA = 59^\circ$ and $\angle ABD = 59^\circ$ \angle in same segment for one of above angles Cc inc. reason for an isos Δ NB: The last B mark is dependent on the previous two.	B1 B1 B1	3	3
11.	$24 - 3x < 20$ (Rem. denom., one arithmetical slip) NB: Use of “=” instead of inequality: award M1 once the correct inequality has been indicated eg in line below $4 < 3x$ (o.e) 2 OR <u>Trial and error</u> Subs $x = 1$ and $x = 2$ into $6 - \frac{3x}{4}$ Correctly (st $x = 1 \rightarrow 5.25$ and $x = 2 \rightarrow 4.5$) 2	M1 A1 A1 M1 A1 A1	3	3
12.	$540/5$ (108) “108” x 12 (o.e.) Other Possible Methods: $\frac{2}{12}N$ and $\frac{7}{12}N$ $\frac{5}{12}N = 540$ OR $S =$ smallest share, $L =$ largest share Use of $\frac{S}{2}$ OR $\frac{L}{7}$ $\frac{S}{2} = \frac{S+540}{7}$ OR $\frac{L}{7} = \frac{L-540}{2}$ £ 1296	B1 M1 B1 M1 B1 M1 A1	3	3
13.	Using 4.5 $\frac{1}{2}\pi \cdot 9^2 - \pi \cdot “4.5”^2$ 63.6 cm^2	B1 M1 A1	3	3

Question Number	Working	Notes	Mark
14.	$\begin{matrix} \text{UM} \\ AB = \begin{pmatrix} 6 \\ -8 \end{pmatrix} \end{matrix} \text{ (or } \begin{matrix} \text{UM} \\ BA = \begin{pmatrix} -6 \\ 8 \end{pmatrix} \end{matrix})$ $\sqrt{("6")^2 + ("8")^2}$ <p>10 (from completely correct working)</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>3</p>	3
15.	<p>240 OR 6x40 OR 48 (can be implied)</p> $3x + 102 + 60 + 30 = "240"$ <p>OR</p> $\frac{192 + 60 + 30 + 3x}{6} = 40$ <p>16</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>3</p>	3
16.	$AX \cdot 3 = 12 \times 4 \quad (\text{o.e})$ $AX = 16$ $AO = ("16" + 3)/2 = 9.5 \text{ cm}$ <p>OR</p> $(r = AO): (2r-3) \times 3 = 12 \times 3, \quad 6r = 57 \quad (1 \text{ slip})$ $(x = OX): 3 \times (x+3+3) = 12 \times 3, \quad x = 6.5$ $AO = 9.5 \text{ cm}$	<p>M1</p> <p>A1</p> <p>A1 ft</p> <p>M1, A1</p> <p>M1, A1</p> <p>A1 ft</p> <p>3</p>	3
17.	<p>2, 9 or 11 seen</p> $\frac{2+9}{11} \quad (\text{allow one numerical error})$ <p>1</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>3</p>	3
18.	<p>(x = exterior angle)</p> $8x + x = 180^\circ \quad \text{OR} \quad 8\left(\frac{360}{n}\right) + \left(\frac{360}{n}\right) = 180 \quad (\text{o.e})$ $x = 20 \quad \text{OR} \quad "3240 = 180n"$ $360/"20" \quad \text{OR} \quad "3240/ 180"$ $n = 18$ <p>OR</p> <p>(e = interior angle)</p> $e = 8 \times (180 - e)$ $e = 160$ $n = \frac{360}{180 - "160"}$ $n = 18$	<p>M1</p> <p>A1</p> <p>M1 DEP</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>M1 DEP</p> <p>A1</p> <p>4</p> <p>4</p>	4

Question Number	Working	Notes	Mark
19.	$(\sqrt{512} =) 16\sqrt{2}$ OR $8\sqrt{8}$ $(\sqrt{72} =) 6\sqrt{2}$ OR $3\sqrt{8}$ $10\sqrt{2}$ 10	B1 B1 B1 B1	 4 4
20.	$7^2 = 4^2 + 5^2 - 2 \cdot 4 \cdot 5 \cdot \cos A$ $2 \cdot 4 \cdot 5 \cdot \cos A = 4^2 + 5^2 - 7^2$ $\cos A = (4^2 + 5^2 - 7^2) / (2 \cdot 4 \cdot 5) (= -\frac{8}{40} = -0.2)$ o. NB: Allow <u>1</u> sign slip in the above 3 M marks $= 102^\circ, 258^\circ, 462^\circ, \dots$	M1 M1 M1 dep A1	 4 4
21.	(a) correctly labelled line (line going through (0, -5) and (4, 3)) or correct gradient plus line going through (2.5, 0)) (b) correctly labelled line (line going though (0, 4) and (4, 0) or correct gradient plus line going through (4, 0)) NB: (1) Penalise labelling once . (2)The lines must be sufficiently long to identify their intersection in (c) (c) $x = 3$ $y = 1$ NB: (1) Above values must be from their diagram. (2) Accept (3, 1)	B1 B1 B1 ft B1 ft	1 1 2 4
22.	(a) $1/3$ OR 0.333 OR 33.3% (b) 2, 3, 5, 7, 11 (c) correct diagram (ft on "(b)") (d) "15"/36 OR " $\frac{5}{12}$ " OR "0.417" OR "41.7%" (ie ft on "15" circled outcomes in (c))	B1 B1 B1 ft B1 ft	1 1 1 1 4
23.	(a) $\begin{pmatrix} 17 & 12+4a \\ 6+2a & 8+a^2 \end{pmatrix}$ (b) $a = -3,$ $\lambda = 17$	B2(-1ee) B1 B1	2 2 4

Question Number	Working	Notes		Mark
24.	Heights: 4.8, 7.2, 6.4, 1.1 OR 24, 36, 32, 5.5	B1, B1, B1 B1	4	4
25.	(a) attempt at construction (3 sets of arcs seen), accuracy (b) attempt at construction (2 sets of arcs seen) accuracy (c) 60 (± 1) mm	M1 A1 M1 A1 B1	2 2 1	5
26.	(a) $\frac{1}{2} \times \frac{1}{2} x \times [x + (x + 4)]$ $\frac{1}{4} x(2x + 4)$ OR $\frac{1}{2} x(x + 2)$ OR $0.5x^2 + x$ (b) “ $2x^2 + 4x = 4 \times 84$ ” (o.e) $x^2 + 2x - 168 = 0$ (o.e. ie a quadratic but c.a.o) $(x + 14)(x - 12) = 0$ (o.e, method for solving 3 term quadratic) $x = 12$ (c.a.o)	M1 A1 M1 A1 M1 (INDEP) A1	2 4	6
27.	$\frac{1}{3} + \frac{1}{5} + \frac{1}{4} \left(= \frac{47}{60} \right)$ “13x/60” = 26 120 OR “13/60” = 26 blue sweets (1/60 = 26/13 =) 2 40 (Red) 24 (Yellow) 30 (Green)	M1 M1 A1 M1 A1 A1 A1 A1	6	6

Question Number	Working	Notes	Mark
28.	<p>(a) three terms, at least one correctly differentiated</p> $15 + 4t - 3t^2$ <p>(b) “(a)” = 0</p> $t = 3 \quad \text{c.a.o from a correct eq}^n$ $s(“3”)$ 36	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>M1 DEP</p> <p>A1</p>	<p>2</p> <p>4</p> <p>6</p>
29.	<p>NB: Penalise ncc ONCE only in this question</p> <p>(a) $10/AD = \sin 26^\circ$</p> 22.8 cm <p>(b) $16/“22.8” = \tan \angle CAD$</p> $35.0^\circ/35.1^\circ \text{ (accept 35)}$ <p>(c) any correct trig/Pythagorean method for AC</p> <p>Eg $\sin “35.0” = \frac{16}{AC}$ OR $AC^2 = 16^2 + “22.8”^2$ $(AC = 27.86)$</p> $\frac{AB}{“27.86”} = \cos “29.0”$ <p>OR $\sin(26 + “35.0”) = \frac{AB}{“27.86”}$</p> <p>OR Extend BC to G so that BG is perpendicular to EG $DG = 16 \times \cos 26$ $AB = 10 + “16 \times \cos 26”$</p> $24.3/24.4 \text{ cm}$	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>M1 DEP</p> <p>M1</p> <p>M1 DEP</p> <p>A1</p>	<p>2</p> <p>2</p> <p>3</p> <p>7</p>

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