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Mark Scheme (Results)

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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** *Solving for m* 26 = -3*m* + *c* 2 = 5*m* +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 = 8*x* (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.	$\frac{x(x+2)-2.x}{2(x+2)}$ **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.	$\angle BDA = 59°$ **and** $\angle ABD = 59°$ $\angle$ 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 $x = 1$ -> 5.25 and $x = 2$ -> 4.5) 2	M1 A1 A1 M1 A1 A1	3 3	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.	$\overrightarrow{AB} = \begin{pmatrix} 6 \\ -8 \end{pmatrix}$ (*or* $\overrightarrow{BA} = \begin{pmatrix} -6 \\ 8 \end{pmatrix}$)	B1		
	$\sqrt{(\text{“}6\text{”}^2 + \text{“}8\text{”}^2)}$	M1		
	10 (from completely correct working)	A1	3	3
15.	240 **OR** 6x40 **OR** 48 (can be implied)	B1		
	$3x + 102 + 60 + 30 = \text{“}240\text{”}$ **OR** $\frac{192+60+30+3x}{6} = 40$	M1		
	16	A1	3	3
16.	$AX \cdot 3 = 12 \times 4$ (o.e)	M1		
	$AX = 16$	A1		
	$AO = (\text{“}16\text{”} + 3)/2 = 9.5$ cm	A1 ft	3	3
	OR ($r = AO$): $(2r-3) \times 3 = 12 \times 3$, $6r = 57$ (1 slip)	M1, A1		
	($x = OX$): $3 \times (x+3+3) = 12 \times 3$, $x = 6.5$	M1, A1		
	$AO = 9.5$ cm	A1 ft	3	3
17.	2, 9 or 11 seen	B1		
	$\frac{2+9}{11}$ (allow one numerical error)	M1		
	1	A1	3	3
18.	(x = exterior angle)			
	$8x + x = 180°$ **OR** $8\left(\frac{360}{n}\right) + \left(\frac{360}{n}\right) = 180$ (o.e)	M1		
	$x = 20$ **OR** “$3240 = 180n$”	A1		
	$360/\text{“}20\text{”}$ **OR** “$3240/180$”	M1 DEP		
	$n = 18$	A1	4	4
	OR			
	(e = interior angle)			
	$e = 8 \times (180 - e)$	M1		
	$e = 160$	A1		
	$n = \frac{360}{180 - \text{“}160\text{”}}$	M1 DEP		
	$n = 18$	A1	4	4

Question Number	Working	Notes		Mark
19.	($\sqrt{512}$ =) 16√2 **OR** $8\sqrt{8}$	B1		
	($\sqrt{72}$ =) 6√2 **OR** $3\sqrt{8}$	B1		
	10√2	B1		
	10	B1	4	4
20.	$7^2 = 4^2 + 5^2 - 2.4.5.\cos A$	M1		
	$2x4x5x\cos A = 4^2 + 5^2 - 7^2$	M1		
	$\cos A = (4^2 + 5^2 - 7^2)/2x4x5$ (= $-\frac{8}{40}$ = -0.2) o. **NB:** Allow **1** sign slip in the above 3 M marks	M1 dep		
	= 102°, 258°, 462°, …	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))	B1	1	
	(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)	B1	1	
	(c) $x = 3$ $y = 1$ **NB:** (1) Above values **must** be from their diagram. (2) Accept (3, 1)	B1 ft B1 ft	2	4
22.	(a) 1/3 **OR** 0.333 **OR** 33.3%	B1	1	
	(b) 2, 3, 5, 7, 11	B1	1	
	(c) correct diagram (ft on "(b)")	B1 ft	1	
	(d) "15"/36 **OR** "$\frac{5}{12}$" **OR** "0.417" **OR** "41.7% (ie ft on "15" circled outcomes in (c))	B1 ft	1	4
23.	(a) $\begin{pmatrix} 17 & 12+4a \\ 6+2a & 8+a^2 \end{pmatrix}$	B2(-1ee)	2	
	(b) $a = -3$, $\lambda = 17$	B1 B1	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 x 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.	(a) three terms, at least one correctly differentiated $15 + 4t - 3t^2$	M1 A1	2	
	(b) "(a)" = 0	M1		
	$t = 3$ c.a.o from a correct eq^n	A1		
	s("3")	M1 DEP		
	36	A1	4	6
29.	**NB:** Penalise ncc **ONCE** only in this question (a) $10/AD = \sin 26°$	M1		
	22.8 cm	A1	2	
	(b) $16/"22.8" = \tan \angle CAD$	M1		
	35.0°/35. 1° (accept 35)	A1	2	
	(c) any correct trig/Pythagorean method for AC Eg $\sin"35.0" = \frac{16}{AC}$ **OR** $AC^2 = 16^2 + "22.8"^2$ (AC = 27.86)	M1		
	$\frac{AB}{"27.86"}$ = cos "29.0" **OR** $\sin(26 + "35.0") = \frac{AB}{"27.86"}$	M1 DEP		
	OR Extend BC to G so that BG is perpendicular to EG DG = 16 x cos 26 AB = 10 + "16 x cos 26"	M1 M1 DEP		
	24.3/24.4 cm	A1	3	7

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