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Mark Scheme November 2008

IGCSE

IGCSE Mathematics (4400)

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November 2008 IGCSE 4400 Maths Mark Scheme – Paper 3H

Q	Working	Answer	Mark	Notes
1.	$\frac{11.7}{6.5}$		**2**	M1 for 11.7 or 6.5
		1.8		A1 Accept $\frac{9}{5}$ etc
				Total 2 marks

2. (a)			$7(p-3)$	**1**	B1	cao	
(b)	$4x + 20$ seen	or $x + 5 = 3$		**3**	M1	for $4x + 20$ seen	or M2 for $x + 5 = 3$
	$4x = 12 - 20$				M1	for $4x = 12 - 20$ or for $4x = 12 - 5$ following $4x + 5 = 12$	
			−2		A1		
							Total 4 marks

Q	Working	Answer	Mark	Notes
3. (a)	$1\times10+2\times9+3\times3+4\times17+5\times11$ or 10+18+9+68+55 or 160		**3**	M1 for at least 3 correct products and summing them
	$\frac{\text{"160"}}{50}$			M1 (dep) for division by 50
		3.2		A1 Accept 3 if $\frac{160}{50}$ seen
(b)(i)		$\frac{17}{50}$	**3**	B1 Accept 0.34 or 34%
(ii)	$\frac{10+3}{50}$ or $\frac{10}{50}+\frac{3}{50}$			M1
		$\frac{13}{50}$		A1 Accept 0.26 or 26%
(c)	'No' ticked and eg *The scores are not equally likely. 4 is most likely.*		**1**	B1
				Total 7 marks

4. (a)		translation	**2**	B1	Accept translated, translate etc	These marks are independent but award no marks if the answer is not a single transformation
	7 to the left and 1 down or $\begin{pmatrix}-7\\-1\end{pmatrix}$			B1		
(b)		rotation	**3**	B1	Accept rotated, rotate etc	
		90°		B1	Accept quarter turn Accept 270°clockwise	
		(0, 0)		B1	Accept origin, *O*	
					Total 5 marks	

Q	Working	Answer	Mark	Notes
5. (a)	$\frac{35}{100}\times 180$ or 63		**3**	M1 M2 for $\frac{65}{100}\times 180$
	180 − "63"			M1 dep
		117		A1 cao
(b)	$\frac{84}{0.35}$ or $84\times\frac{100}{35}$		**3**	M2 for $\frac{84}{0.35}$ or $84\times\frac{100}{35}$ M1 for $\frac{84}{35}$ or 2.4
		240		A1
(c)	$\frac{442}{0.65}$ or $442\times\frac{100}{65}$		**3**	M2 for $\frac{442}{0.65}$ or $442\times\frac{100}{65}$ M1 for $\frac{442}{65}$ or 6.8 or 65% = 442
		680		A1 cao
				Total 9 marks

6.	$\pi\times r^2\times 7.6$		**3**	M2 if $r = \frac{4.3}{2}$ or 2.15 (M1 if r = 4.3 may be implied by answer rounding to 441)
		110		A1 for answer rounding to 110 ($\pi \rightarrow 110.367$ … 3.14 → 110.311 …
				Total 3 marks

Q	Working	Answer	Mark	Notes
7.	$\frac{2}{5}\times\frac{7}{4}$ or $\frac{14}{35}\div\frac{20}{35}$		**3**	B2 for $\frac{2}{5}\times\frac{7}{4}$ (B1 for inverting second fraction ie $\frac{7}{4}$) or B1 for 2 fractions with a denominator of 35 etc B1 for correct numerators
	$\frac{14}{20}$			B1 eg for $\frac{14}{20}$ oe or correct cancelling
				Total 3 marks

8.	(a)(i)		p^6	**2**	B1 cao
	(ii)		q^5		B1 cao
	(b)	$12x-3-8x+12$		**2**	M1 for 3 correct terms
			$4x+9$		A1 cao
	(c)	$y^2+5y+3y+15$		**2**	M1 for 3 correct terms or $y^2 + 8y + c$ or … + 8y + 15
			$y^2+8y+15$		A1 cao
					Total 6 marks

Q	Working	Answer	Mark	Notes	
9.	$\cos x° = \frac{5.4}{8.7}$ or 0.6206…		**3**	M1 for cos A1 for $\frac{5.4}{8.7}$ or 0.6206…	or M1 for sin and $\frac{\sqrt{"46.53"}}{8.7}$ following correct Pythagoras and A1 for value which rounds to 0.78 or M1 for tan and $\frac{\sqrt{"46.53"}}{5.4}$ following correct Pythagoras and A1 for value which rounds to 1.26
		51.6		A1 for answer rounding to 51.6	
					Total 3 marks

Q	Working	Answer	Mark	Notes
10. (a)		(2, 7)	**2**	B2 B1 for 2 B1 for 7
(b)	eg $\frac{13-1}{5-(-1)}$ or $\frac{12}{6}$ or $\frac{6}{3}$		**4**	M1 for clear attempt to use $\frac{\text{vertical difference}}{\text{horizontal difference}}$
	2			A1
		$y = 2x + 7$ or $y = "2"x + 7$		B2 for $y = 2x + 7$ or $y = "2"x + 7$ B1 for $y = 2x + c$ or for $y = "2"x + c$ where $c \neq 7$ or for $2x + 7$, $"2"x + 7$, L = $2x + 7$, L = $"2"x + 7$ etc ft from their "2" only if it supported by working such as a fraction or numbers indicated on a diagram, even though it may not have gained M1
				SC If no other marks scored, award B1 for $y = mx + 7$ for any m inc $m = 1$
				Total 6 marks

Q	Working	Answer	Mark	Notes
11. (a)	4 10 19 33 54		**1**	B1 cao
(b)		Points	**2**	B1 Allow $\pm$ ½ sq ft from sensible table
		Curve		B1 or line segments (dep on 4 pts correct or ft correctly or 5 ordinates from (a) plotted correctly and consistently within intervals but not above end points)
(c)	27 (or 27½) indicated on graph or stated		**2**	M1 for 27 (or 27½) indicated on graph or stated
		$\approx$ 66		A1 ft from sensible graph
				Total 5 marks

Q	Working	Answer	Mark	Notes
12. (a)	$\frac{10}{6}$ oe or $\frac{6}{10}$ oe seen		**3**	B1 for $\frac{10}{6}$ oe (1.666…) or $\frac{6}{10}$ oe (0.6) or $\frac{2}{3}$ (0.666…)
	$5.1\times\frac{10}{6}$ or $5.1\div\frac{6}{10}$ or 8.5			M1 for $5.1\times\frac{10}{6}$ or $5.1\div\frac{6}{10}$ or $5.1\times\frac{2}{3}$ or 8.5
		3.4		A1 cao
(b)	(scale factor)^2 eg $\left(\frac{6}{10}\right)^2$ or $\frac{36}{100}$ or $\left(\frac{10}{6}\right)^2$ or $\frac{100}{36}$		**3**	M1 M2 for $\frac{\frac{1}{2}\times 6\times 5.1\sin\theta}{\frac{1}{2}\times(10+6)\times 3.4\sin\theta}$ or $\frac{\frac{1}{2}\times 6\times 5.1\sin\theta}{\frac{1}{2}\times 10\times 8.5\sin\theta-\frac{1}{2}\times 6\times 5.1\sin\theta}$
	eg 100 − 36, 64, $1-\frac{36}{100}$, $\frac{64}{100}$			M1
		$\frac{9}{16}$ oe		A1
				Total 6 marks

Q	Working	Answer	Mark	Notes
13. (a)	4.5 1.9 3.1 4.1		**2**	B2 for all correct (B1 for 2 or 3 correct)
(b)		Points	**2**	B1 Allow $\pm$ ½ sq ft from table if at least B1 scored in (a)
		Curve		B1 ft from their points if at least 5 points are correct or ft correctly
(c)(i)		2	**2**	B1 cao
(ii)		1.6 or 1.7		B1 for answer which rounds to 1.6 or 1.7 ft from curve if B1 scored for curve in (b) Condone >1 dp
				Total 6 marks

14. (a)		$3b(3a-4b)$	**2**	B2 B1 for $3(3ab-4b^2)$ or $b(9a-12b)$ or for two factors one of which is $3b$ or $(3a-4b)$ and the other is linear
(b)		$8a^3b^6$	**2**	B1 B1 for 8 B1 for a^3b^6
				Total 4 marks

Q	Working	Answer	Mark	Notes
15. (a)	$\frac{7}{9}\times\frac{6}{8}$		**2**	M1
		$\frac{42}{72}$ oe		A1 for $\frac{42}{72}$ oe inc $\frac{7}{12}$
(b)	$\frac{7}{9}\times\frac{2}{8}+\frac{2}{9}\times\frac{7}{8}$		**3**	M1 for one of correct products $\frac{7}{9}\times\frac{2}{8}$ or $\frac{2}{9}\times\frac{7}{8}$ M1 for sum of both correct products or M2 for $1-(a)-\frac{2}{9}\times\frac{1}{8}$ *SC* M1 for $\frac{7}{9}\times\frac{2}{9}$ or $\frac{2}{9}\times\frac{7}{9}$ M1 for $\frac{7}{9}\times\frac{2}{9}+\frac{2}{9}\times\frac{7}{9}$
		$\frac{28}{72}$ oe		A1 for $\frac{28}{72}$ oe inc $\frac{7}{18}$
				Total 5 marks

16. (a)(i)		54	**2**	B1
(ii)	angle between chord & tangent = angle in alternate segment			B1 Accept 'alternate segment'
(b)	angle *BCD* = 90°		**2**	B1
	angle in a semicircle is a right angle			B1 Accept if 'semicircle' seen
(c)(i)		102	**2**	B1
(ii)	opposite angles of a cyclic quadrilateral are supplementary			B1 Accept if 'opposite' and 'cyclic' seen ('Alternate segment' is an alternative)
				Total 6 marks

Q	Working	Answer	Mark	Notes
17. (a)	$10x = 7.\dot{7}$		**2**	M1 Accept $100x = 77.\dot{7}$
		$\frac{7}{9}$ oe		A1
(b)(i)		$\frac{y}{90}$	**3**	B1
(ii)	eg $9d = 1 + \frac{y-1}{10}$ or $90d = 10 + y - 1$ or $90d = y + 9$ or $\frac{10+y-1}{90}$ or $0.1 + 0.0\dot{y}$			M1 for equation which would give a correct answer or for an expression which, if simplified would give a correct answer or for $0.1 + 0.0\dot{y}$ but **not** for $9d = 1.y - 1$ or similar
		$\frac{9+y}{90}$ or $\frac{1}{10} + \frac{y}{90}$		A1 isw and award 2 marks if $\frac{9+y}{90}$ or $\frac{1}{10} + \frac{y}{90}$ seen
				Total 5 marks

Q	Working	Answer	Mark	Notes
18.	$\frac{2}{x+2}+\frac{x}{(x+2)(x+3)}$		**5**	B1 for factorising x^2+5x+6
	$\frac{2(x+3)+x}{(x+2)(x+3)}$ or $\frac{2(x+3)}{(x+2)(x+3)}+\frac{x}{(x+2)(x+3)}$ or $\frac{2(x^2+5x+6)+x(x+2)}{(x+2)(x^2+5x+6)}$			B1 for correct single fraction even if unsimplified or for correct sum of two fractions with the same denominator ft from incorrect factorisation
	$\frac{2x+6+x}{(x+2)(x+3)}=\frac{3x+6}{(x+2)(x+3)}$ or $\frac{2x+6+x}{x^2+5x+6}=\frac{3x+6}{x^2+5x+6}$			B1 for $\frac{2x+6+x}{(x+2)(x+3)}$ or $\frac{2x+6+x}{x^2+5x+6}$
	$\frac{3(x+2)}{(x+2)(x+3)}$			B1
		$\frac{3}{x+3}$		B1 cao
				SC if no denominator, award 3rd B1 for $2x + 6 + x$ and 4th B1 for $3(x + 2)$
				Total 5 marks

Q	Working	Answer	Mark	Notes
19.	$\frac{45}{360}\times\pi\times6.7^2-\frac{1}{2}\times6.7^2\times\sin45°$		**5**	M1 for $\frac{45}{360}$ oe
				M1 for $\pi\times6.7^2$ or value which rounds to 141 seen
				M1 for completely correct method of finding the area of triangle *OAB* eg $\frac{1}{2}\times6.7^2\times\sin45°$ or $6.7\times\sin22.5°\times6.7\times\cos22.5°$
	17.628... (or 17.619...) − 15.871...			A1 for either area correctly evaluated rounded or truncated to 1 dp
		1.76 or 1.75		A1 for answer rounding to 1.76 if π key used ($\pi\rightarrow$1.7572...) or for answer rounding to 1.75 if π = 3.14 used (3.14 → 1.7483...)
				Total 5 marks

Q	Working	Answer	Mark	Notes
20.	eg $r^2 + 9 = (r+2)^2$ $r^2 + 3^2 = (r+2)^2$ $r = \sqrt{(r+2)^2 - 9}$ $r + 2 = \sqrt{r^2 + 9}$		**5**	M2 for correct use of Pythagoras' Rule M1 for $r^2 + 3^2$ or $r^2 + 9$ or $(r+2)^2$
	$r^2 + 9 = r^2 + 4r + 4$			B1
	$4r = 5$			M1
		$1\frac{1}{4}$ or 1.25		A1 Accept $\frac{5}{4}$
				Total 5 marks

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