

# Mark Scheme Summer 2008

IGCSE

## IGCSE Mathematics (4400)

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## Contents

1.	4400/1F	5
2.	4400/2F	13
3.	4400/3H	21
4.	4400/4H	37




Summer 2008 IGCSE Maths Mark Scheme - Paper 1F

Q	Working	Answer	Mark	Notes
1. (a)		7006	1	B1 cao
(b)		9000	1	B1 cao
(c)		hundreds	1	B1 Accept 500, 100
(d)		326	1	B1 cao
<b>Total 4 marks</b>				

2. (a)(i)		cube	1	B1 Accept rectangular box
(ii)		prism	1	B1 Condone omission of 'pentagonal'
(iii)		cone	1	B1
(b)		8	1	B1 cao
<b>Total 4 marks</b>				

3. (a)		Egypt and Malaysia	1	B1
(b)(i)		20	3	B1 cao
(ii)	$\frac{20}{100}$			M1 for $\frac{20}{100}$
(c)		$\frac{1}{5}$		A1 ft from "20"
(d)(i)		14	1	B1 Accept 13 or 14
(ii)		Kenya	2	B1
(e)(i)		0.43		B1 cao
(ii)		$35 < \bar{\text{bar}} < 40$	2	B1
		61		B1 cao
<b>Total 9 marks</b>				

4. (a)			1	B1	
(b)	$10 \times 2 + 1$		2	M1	
(c)	$\frac{37 - 1}{2}$	21		A1 cao	
			2	M1	
		18		A1 cao	
(d)	eg 60 is even, number of sticks is always odd, first number is odd and 2 is added each time, multiplying by 2 and adding 1 will always give an odd number of sticks		1	B1	May refer to number sequence of stick pattern - need not do both
(e)		$n = 2p + 1$	3	B3	for $n = 2p + 1$ oe eg $n = p2 + 1, 1 + p \times 2 = n$ B2 for $2p + 1$ oe B1 for $n = \text{linear function of } p$ eg $n = p + 1$
					<b>Total 9 marks</b>

5. (a)	25 - 18		2	M1	for 25 - 18, 18-25, 18 to 25 etc
		7		A1 cao	
(b)	18 19 21 22 23 24 24 25 or 22, 23 or $\frac{8}{2}$ or 4 or $\frac{9}{2}$ or $4\frac{1}{2}$		2	M1	Also award for 18 19 21 22 23 24 25 i.e. with one 24 omitted
		22.5		A1 cao	
					<b>Total 4 marks</b>

<b>6.</b>	(a)		24	2	B2	B2 for 23-25 inc B1 for 22 or 26
	(b)	$6 \times 2 + (4.5 \pm 0.2) \times 2$ oe		2	M1	for $6 \times 2 + (4.5 \pm 0.2) \times 2$ oe
		20.6-21.4			A1	for 20.6-21.4 inc SC if M0, award B1 for 20
	(c)	0		1	B1	Accept 'none', 'zero'
	(d)	2		1	B1	cao
	(e)(i)	$115^\circ - 119^\circ$		2	B1	
	(ii)	obtuse			B1	
	(f)	4, 3		2	B2	B1 for 4 B1 for 3
						<b>Total 10 marks</b>

<b>7.</b>	(a)		$2p$	1	B1	Accept $p2, 2 \times p$ etc
	(b)		$4xy$	1	B1	Accept $xy^4, 4 \times xy$ etc
	(c)		$9g - 5h$	2	B2	B1 for $9g$ B1 for $- 5h$ or $+ - 5h$
						<b>Total 4 marks</b>

<b>8.</b>	(a)(i)		27	1	B1	cao
	(ii)		20	1	B1	cao
	(iii)		25	1	B1	cao
	(iv)		23	1	B1	cao
	(b)		$\frac{5}{9}$	2	M1	fraction with denominator of 9
					A1	or B2 for 0.55, 0.56, 55%, 56% or better but not for 0.6, 60% B1 for 5 in 9, 5 : 9 5 out of 9
						<b>Total 6 marks</b>

9. (a)		$\frac{8}{18}, \frac{12}{27}$ etc	1	B1	
(b)	$65 \div 5$ or $13$ or $4 \times 65$ or $260$		2	M1	
(c)	$0.875$ $0.9$ $0.85$ $0.88$	52	2	A1 cao	
		$\frac{17}{20}, \frac{7}{8}, \frac{22}{25}, \frac{9}{10}$		M1	2 fractions converted to decimals or percentages or fractions with the same denominator
				A1	SC if M0, award B1 for 3 fractions in correct order
					<b>Total 5 marks</b>

10.	$180 - 2 \times 73$ oe		3	M2	for $180 - 2 \times 73$ oe
		34		M1	for unmarked base angle identified as $73^\circ$ or $146^\circ$ seen
				A1	cao
					<b>Total 3 marks</b>

11. (a)(i)		6859	2	B1	cao
(ii)		6860		B1	cao
(b)	$\frac{17.28}{2.4}$		2	M1	for 17.28 or 2.4 or $-0.114\dots$ seen
		7.2		A1	for 7.2 oe inc $7\frac{1}{5}$ and $\frac{36}{5}$
					<b>Total 4 marks</b>

12.	2 arcs, radius 6 cm, centres A and B		2	M1	
	triangle within guidelines			A1	
					<b>Total 2 marks</b>



13. (a)	$\frac{4.8}{100} \times 23500$ or 1128	3	M1	or M2 for 23 500 × 1.048 oe
	23 500 + "1128"			
(b)	29 832 - 28 250 or 1582	3	M1	or M1 for $\frac{29832}{28250}$ or 1.056 or 105.6 M1 for "1.056" - 1 or "105.6" - 100
	$\frac{1582}{28250} \times 100$ or $\frac{1582}{29832} \times 100$			
		5.6	A1	cao (Do NOT award for 5.3)
				<b>Total 6 marks</b>

14.	$\frac{1-0.6}{2}$	2	M1	for 1 - 0.6 or 0.4 or $\frac{x}{2}$ where $0 < x < 1$
	0.2 oe			
				<b>Total 2 marks</b>

15. (a)	Enlargement scale factor 2 centre (1, 3)	3	B3 B1 for enlargement, enlarge etc B1 for 2, × 2, two, $\frac{2}{1}$ , 1 : 2, 2 : 1 B1 for (1, 3) Condone omission of brackets but do not accept $\begin{pmatrix} 1 \\ 3 \end{pmatrix}$	These marks are independent but award no marks if answer is not a single transformation
(b)	Reflection in the line $y = x$	2	B2 B1 for reflection, reflect etc B1 for $y = x$ oe inc eg 'in line from (2,2) to (5,5)', 'in dotted line shown'	
				<b>Total 5 marks</b>

16.	3 + 1 or 4 seen	2	M1 for 3 + 1 or 4 seen A1 for 210 cao	<b>Total 2 marks</b>

17. (a)(i)		1, 9, 17	2	B1 cao	Brackets not necessary
(ii)	1, 5, 9, 13, 17, 25, 33			B1 cao (B0 if 1 or 9 or 17 repeated)	
(b)	eg No members in common. The intersection is empty. None of the members of A & C are the same. They don't have the same numbers. No numbers are in both A and C.	1		B1	
					<b>Total 3 marks</b>

18. (a)	$\frac{8 \times 3}{2}$ oe		2	M1 for $\frac{8 \times 3}{2}$ oe A1 cao	
(b)	$\tan x^\circ = \frac{3}{8} = 0.375$	12	3	M1 for tan A1 for $\frac{3}{8}$ or 0.375	or M1 for sin following correct Pythagoras and A1 for 0.3511... or M1 for cos following correct Pythagoras and A1 for 0.9363...
		20.6		A1 for 20.6 or better (Accept 20.55604... rounded or truncated to 4 sig figs or more )	
					<b>Total 5 marks</b>

19. (a)	$7x - 7 = 5 - 2x$ $7x + 2x = 5 + 7$ or $9x = 12$		3	M1 for $7x - 7$ seen M1 for $7x + 2x = 5 + 7$ or $9x = 12$ or for $7x + 2x = 5 + 1$ or $9x = 6$ following $7x - 1 = 5 - 2x$
		$1\frac{1}{3}$ oe		A1 for $1\frac{1}{3}$ oe inc $\frac{4}{3}, \frac{12}{9}, 1.3, 1.33$
	(b)(i)	$4x \leq 16$	4	M1 for $4x \leq 16$ A1 for $x \leq 4$
	(ii)	1 2 3 4		B2 B1 for 3 correct and none wrong or for 4 correct and 1 wrong
				<b>Total 7 marks</b>

20. (i)		57.5	2	B1 Accept 57.49, 57.499, 57.4999 etc
(ii)		56.5		B1 cao
				<b>Total 2 marks</b>

21.	$55 \times 7 + 65 \times 21 + 75 \times 15 + 85 \times 14 + 95 \times 3$ or $385 + 1365 + 1125 + 1190 + 285$ or 4350		4	M1 for finding products $f \times x$ consistently within intervals (inc end points) and summing them M1 (dep) for use of halfway values (55, 65, ...) or (55.5, 65.5, ...)
	$\frac{"4350"}{60}$			M1 for $\frac{"4350"}{60}$ (dep on 1st M1) for division by 60 or for $\frac{"4380"}{60}$ if 55.5, 65.5, ... used
		72.5		A1 for 72.5 Accept 73 if first two M marks awarded
				<b>Total 4 marks</b>

Summer 2008 IGCSE Maths Mark Scheme - Paper 2F

Q	Working	Answer	Mark	Notes
1.		800, 888, 1008, 1080, 1800	1	B1 This order
(a)				
(b)		-7	1	B1
(c)		8, 14	2	B1B1 -B1 each extra
(d)		1, 5, 7, 35	2	B2 B1 for any two, with no extras.
				<b>Total 6 marks</b>

2.		12	1	B1
(a)				
(b)		7	1	B1
(c)		Dave's Sports	1	B1 or Sports or Dave or the 4 <sup>th</sup> one
(d)		4 <sup>1</sup> / <sub>4</sub> circles drawn	1	B1 Allow if intention clear
				<b>Total 4 marks</b>

3.		5/8	1	B1
(a)				
(b)		3 sectors shaded	1	B1 Allow if intention clear
				<b>Total 2 marks</b>

<b>4.</b>	(a)(i)		48, 96	2	B1B1f	Allow written in the sequence, with nothing on line or with 192, 384 on line ft dep on first number $\geq 24$
	(a)(ii)		x 2 oe	1	B1	or doubling etc
	(b)(i)		8, 6	2	B1B1d ep	
	(b)(ii)		0	1	B1	
	(b)(iii)	10 - 99x2 oe	-188	2	M1 A1	Allow 10 - 100x2 or -190 cao
						<b>Total 8 marks</b>

<b>5.</b>	(a)		Isosceles	1	B1	Allow any recognisable spelling
	(b)		B & D	1	B1	
	(c)(i)		Enlargement	1	B1	or enlarge or enlarged or enlarging etc
						<b>Total 3 marks</b>

<b>6.</b>	(i)	Mark A	A at 0.5	1	B1	If no cross, mark the point on the line
	(ii)	Mark B	B at 1	1	B1	level with the centre of the letter. If no
	(iii)	Mark C	C 1cm - 3cm from O	1	B1	letters shown, no marks.
						<b>Total 3 marks</b>

<b>7.</b>	(a)(i)		m or cm	1	B1
	(a)(ii)		tonnes or kg	1	B1 Not ton
	(a)(iii)		m <sup>2</sup> , are, hectare	1	B1 or metre squared or square metre
	(b)	5.2 x 10 000	52 000	2	M1 A1 or 100 x 100
					<b>Total 5 marks</b>

<b>8.</b>	(a)	12 - (-4) or 12 + 4 or -16		2	M1 A1	Allow without bracket
	(b)	-4 -3	16	2	M1 A1	
			-7	2	M1 A1	
						<b>Total 4 marks</b>

<b>9.</b>	(a)		1525	1	B1	Allow with any punctuation or none
	(b)	Attempt difference 3:25 to 5:10 1 hour + 35 min + 10 min		3	M1 M1 A1	Accept 1.85, 1hr 85min, 2.15, 2hr 15min or 60 + 35 + 10, 120 - 15, 2hr - 15min cao
			1h 45mins			<b>Total 4 marks</b>

10.	(a)		70	1	B1
	(b)	$180 - (30 + 70)$	80	2	M1 A1f ft "70" if used.
	(c)	$360 - (70 + 130 + 85)$	75	2	M1 A1 or 360 - 285
					<b>Total 5 marks</b>

11.	(a)	Measure angles for walk & bike "90" / "60" x 28 oe			M1 M1 Walk 60, Bike 90, allow 2° error Accept "90"/"60", "60"/"90", "60"/"28", "2.14", "28"/"60", "0.466"
	(b)	$50/150 \times 360$	42 ( $\pm 2$ )	3	A1 Integer required
					M1 Accept 50/150, 150/50, 360/150, 150/360 cao
					<b>Total 5 marks</b>

12.	(a)	$580 \times 0.10$ or $58(.00)$ + 4			M1 M1 A1 dep
	(b)	$78.60 - 4(.00)$ or $78.60/0.10$ "74.60" / 0.10 oe	£62.(00)	3	M1 M1 A1 786 - 40
					<b>Total 6 marks</b>



<b>13.</b>	(a)		3:5	1	B1 or 3 to 5
	(b)	15/40	$\frac{3}{8}$	2	M1 or 0.375 or 37.5% A1 cao
					<b>Total 3 marks</b>

<b>14.</b>	(a)		6	1	B1
	(b)	$8w = 17 + 7$	3	2	M1 A1
	(c)	$6x - 2x = 7 - 13$ or $2x - 6x = 13 - 7$ $4x = -6$ or $-4x = 6$	$x = -1\frac{1}{2}$ oe	3	M1 M1 A1 6x - 2x + 13 - 7 = 0 or 2x - 6x - 13 + 7 = 0 Accept -6/4 or -3/2 (not 6/-4 or 3/-2)
	(d)	$y - 2 \times 5 = 4 \times 5$ or $y/5 = 4 + 2$	$y = 30$	2	M1 A1
					<b>Total 8 marks</b>

<b>15.</b>	(a)		250±2	2	B2 B2 for angle 248 to 252 inclusive. B1 for angle 190 to 260 inclusive
	(b)		305±3	2	B2 Award B1 for a bearing 270° < angle < 360°
					<b>Total 4 marks</b>

<b>16.</b>	(a)	$20/2$ or $(20 + 1)/2$	6	M1 A1	2		
	(b)		Yes, no or not nec'y with consistent reason	B2	Can't tell	B1	
					2		<b>Total 4 marks</b>

<b>17.</b>	(a)	$3 - 5x - 2$	13	M1 A1	2		
	(b)		$5y - 10$	B1	1		
	(c)		$w(w + 5)$	B2	2	B1 for two factors that multiply to give at least one correct term. SC $w(w + 5w)$ B1	
							<b>Total 5 marks</b>

<b>18.</b>	(a)	$30 \times 0.2$	6	M1 A1	2	or $30 \div 5$	
	(b)	$0.2 + 0.1$	0.3 oe	M1 A1	2		
							<b>Total 4 marks</b>

19.	8/12 or 3/12	$8/_{12}, 3/_{12}$	2	M1 A1	Accept $(4x2)/(4x3)$ or $(3x1)/(4x3)$ SC Multiply bs by 12 B1 Decimal methods M0 A0	Total 2 marks
For other responses not covered by this mark scheme but which, in your opinion, may be worthy of credit, send to review.						

20.	(a)	$3^{14}$	1	B1		
	(b)	$7^3$	1	B1		
	(c)	$5^n = \frac{5^2 \times 5^7}{5^3}$ or $n + 3 - 7 = 2$ $n = 6$	2	M1 A1	Accept $5^{n+3} = 5^9$	Total 4 marks

21.	$\frac{1}{2} \times 3 \times 4$ $3 \times 15$ and $4 \times 15$ and $5 \times 15$	192	4	M1 M2 A1	M1 for any ONE of these cao	Total 4 marks
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22.	$8x = 12$ or $8y = -4$	$x = 1.5$ oe $y = -0.5$ oe	3	M1 A1 A1	Eliminate one variable correctly. Accept $3x + 5x - 8 = 4$ or $5(4 - y)/3 - y = 8$ oe	Total 3 marks
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23.	(a)		4.8	1	B1
	(b)	$5^2 - "4.8"^{1/2}$ or 1.96 $\sqrt{(5^2 - "4.8"^{1/2})}$	1.4	3	M1 M1dep A1  cao
					<b>Total 4 marks</b>

Summer 2008 IGCSE Maths Mark Scheme - Paper 3H

Q	Working	Answer	Mark	Notes
1.	$\frac{17.28}{2.4}$		2	M1 for 17.28 or 2.4 or - 0.114... seen
		7.2		A1 for 7.2 oe inc $7\frac{1}{5}$ and $\frac{36}{5}$
				<b>Total 2 marks</b>

2.	$\frac{1-0.6}{2}$		2	M1 for 1 - 0.6 or 0.4 seen or $\frac{x}{2}$ where $0 < x < 1$
		0.2 oe		A1 for 0.2 oe
				<b>Total 2 marks</b>

3. (a)	Enlargement scale factor 2 centre (1, 3)		3	B3 B1 for enlargement, enlarge etc B1 for 2, $\times 2$ , two, $\frac{2}{1}$ , 1 : 2, 2 : 1 B1 for (1, 3) Condone omission of brackets but do not accept $\begin{pmatrix} 1 \\ 3 \end{pmatrix}$
(b)	Reflection in the line $y = x$		2	B2 B1 for reflection, reflect etc B1 for $y = x$ oe inc eg 'in line from (2,2) to (5,5)', 'in dotted line shown'
				These marks are independent but award no marks if answer is not a single transformation <b>Total 5 marks</b>

4.	3 + 1 or 4 seen		2	M1 for 3 + 1 or 4 seen A1 for 210 cao	
		210			
					<b>Total 2 marks</b>

5.	(a)(i)		2	B1 cao	Brackets not necessary
	(ii)	1, 5, 9, 13, 17, 25, 33		B1 cao (B0 if 1, 9 or 17 repeated)	
	(b)	eg No members in common. The intersection is empty. None of the members of A & C are the same. They don't have the same numbers. No numbers are in both A and C.	1	B1	
					<b>Total 3 marks</b>

6.	$\tan x^\circ = \frac{3}{8} = 0.375$		3	M1 for tan A1 for $\frac{3}{8}$ or 0.375	or M1 for sin and $\frac{3}{\sqrt{73}}$ following correct Pythagoras and A1 for 0.3511... or M1 for cos and $\frac{8}{\sqrt{73}}$ following correct Pythagoras and A1 for 0.9363...
		20.6		A1 for 20.6 or better (Accept 20.55604... rounded or truncated to 4 sig figs or more )	
					<b>Total 3 marks</b>

7.	$\pi \times 7.8$ or $2\pi \times 3.9$		2	M1 for $\pi \times 7.8$ or $2\pi \times 3.9$ A1 for 24.5 or for answer which rounds to 24.49, 24.50 or 24.51 ( $\pi \rightarrow 24.5044...$ 3.14 $\rightarrow$ 24.492 3.142 $\rightarrow$ 24.5076)	
		24.5			
					<b>Total 2 marks</b>

8. (a)		$n = 2p + 1$ oe	3	B3 for $n = 2p + 1$ oe eg $n = p2 + 1, 1 + p \times 2 = n,$ $n = p + p + 1$ B2 for $2p + 1$ oe B1 for $n =$ linear function of $p$ eg $n = p + 1$
(b)	$2p = n - 1$ or $\frac{n}{2} = p + \frac{1}{2}$		2	M1 for $2p = n - 1$ or $\frac{n}{2} = p + \frac{1}{2}$
		$\frac{n-1}{2}$ oe		A1 for $\frac{n-1}{2}$ oe inc $\frac{n}{2} - \frac{1}{2}$
				<b>Total 5 marks</b>

9. (a)	$7x - 7 = 5 - 2x$ $7x + 2x = 5 + 7$ or $9x = 12$		3	M1 for $7x - 7$ seen M1 for $7x + 2x = 5 + 7$ or $9x = 12$ or for $7x + 2x = 5 + 1$ or $9x = 6$ following $7x - 1 = 5 - 2x$
(b)(i)	$4x \leq 16$	$1\frac{1}{3}$ oe	4	A1 for $1\frac{1}{3}$ oe inc $\frac{4}{3}, \frac{12}{9}, 1.\dot{3}, 1.33$
		$x \leq 4$		M1 for $4x \leq 16$ A1 for $x \leq 4$
(ii)		1 2 3 4		B2 B1 for 3 correct and none wrong or for 4 correct and 1 wrong
				<b>Total 7 marks</b>



10. (a)	29 832 – 28 250 or 1582 seen		3	M1 M1 for $\frac{1582}{28250}$ or $\frac{1582}{29832}$ or 0.056 or 0.053...	or M1 for $\frac{29832}{28250}$ or 1.056 or 105.6 M1 for “1.056” – 1 or “105.6” – 100	or M1 for $\frac{28250}{29832}$ or 0.9469... or 94.69... M1 for 1 – “0.9469” or 100 – “94.69”
		5.6		A1 cao (Do NOT award for 5.3)		
(b)	$\frac{28141}{1.052}$ or $28141 \times \frac{100}{105.2}$		3	M2 for $\frac{28141}{1.052}$ or $28141 \times \frac{100}{105.2}$  M1 for $\frac{28141}{105.2}$ , 105.2%=28141		
		26 750		A1 cao or 267.5(0) seen		
						<b>Total 6 marks</b>

11. (a)		$60 < p \leq 70$	1	B1	Accept 60-70
(b)	$55 \times 7 + 65 \times 21 + 75 \times 15 + 85 \times 14 + 95 \times 3$ or $385 + 1365 + 1125 + 1190 + 285$ or 4350		4	M1	for finding at least four products $f \times x$ consistently within intervals (inc end points) and summing them
				M1	(dep) for use of halfway values (55, 65, ...) or (55.5, 65.5, ...)
	$\frac{"4350"}{60}$			M1	"4350" $\frac{\quad}{60}$ (dep on 1st M1) for division by 60 "4380" or for $\frac{\quad}{60}$ if 55.5, 65.5, ... used
				A1	for 72.5 Award 4 marks for 73 if first two M marks awarded
(c)	30 (or 30½) indicated on graph or stated		2	M1	for 30 (or 30½) indicated on graph or stated
		124 or 125		A1	Accept any value in range 124-125 inc eg 124, 124.5, 125
(d)	Use of $p = 131$ on graph		2	M1	for use of $p = 131$ shown on graph or implied by 47, 48 or 49 stated
		$\approx 12$		A1	Accept any value in range 11-13 inc
				<b>Total 9 marks</b>	

12.	$3^2$ or 9 or value which rounds to 3.39 seen		2	M1	for $3^2$ or 9 or value which rounds to 3.39 seen
		36		A1	for 36 cao
				<b>Total 2 marks</b>	

13.	finds int angle of hexagon $\frac{(6-2) \times 180}{6}$	finds ext angle of hexagon $\frac{360}{6}$		5	M1 for $\frac{(6-2) \times 180}{6}$ or $\frac{360}{6}$	Award M1 A1 for int angle of hexagon shown as 120° or ext angle shown as 60° on printed diagram or on candidate's own diagram	If there is clear evidence the candidate thinks the interior angle is 60° or the exterior angle is 120°, do not award these two marks.
	120	60			A1 for 120 or 60		
	int angle of polygon = 150 or ext angle of polygon = 30				B1 int angle of polygon = 150 or ext angle of polygon = 30	Award B1 for int angle of polygon shown as 150° or ext angle shown as 30° on printed diagram or on candidate's own diagram	
	$\frac{360}{30}$ or $\frac{180(n-2)}{n} = 150$ oe				M1 for $\frac{360}{30}$ or $\frac{180(n-2)}{n} = 150$ oe		
			12		A1 for 12 Award no marks for an answer of 12 with no working. Award 5 marks for an answer of 12 if at least 2 of the previous 4 marks scored.		
							<b>Total 5 marks</b>

14. (a)			1	B1	cao
(b)		$5(2y - 3)$ $3pq(3p + 4q)$	2	B2	B1 for $3pq(\dots)$ or $\dots(3p + 4q)$ or $3p(3pq + 4q^2)$ or $3q(3p^2 + 4pq)$ or $pq(9p + 12q)$ or $3(3p^2q + 4pq^2)$ ie for two factors, one of which is $3pq$ or $(3p + 4q)$ , or for correct, but incomplete, factorisation
(c)(i)		$(x - 2)(x + 8)$	3	B2	B1 for one correct factor or $(x + 2)(x - 8)$
(ii)		2, -8		B1	ft from (i) if two linear factors
					<b>Total 6 marks</b>

15. (a)(i)		57.5	2	B1	for 57.5, 57.49, 57.499, 57.4999 etc but NOT for 57.49
(ii)		56.5		B1	for 56.5 Also accept 56.50
(b)	62.5 - "56.5"		2	M1	for 62.5 - "56.5" Accept 62.49, 62.499, 62.4999 etc instead of 62.5
		6		A1	for 6, 5.9, 5.999 etc ft from "56.5"
					<b>Total 4 marks</b>

16. (a)	$\frac{5}{9} \times \frac{5}{9}$		2	M1 for $\frac{5}{9} \times \frac{5}{9}$		Sample space method - award 2 marks for a correct answer, otherwise no marks
		$\frac{25}{81}$		A1 for $\frac{25}{81}$ or 0.31 or better		
(b)	$\frac{1}{9} \times \frac{1}{9}$ or $\frac{1}{81}$		3	M1 for $\frac{1}{9} \times \frac{1}{9}$ or $\frac{1}{81}$	SC M1 for $\frac{1}{9} \times \frac{1}{8}$ or $\frac{1}{72}$	Sample space method - award 3 marks for a correct answer, otherwise no marks
	$\frac{1}{9} \times \frac{1}{9} \times 4$ oe			M1 for $\frac{1}{9} \times \frac{1}{9} \times 4$ oe	M1 for $\frac{1}{9} \times \frac{1}{8} \times 4$ oe	
		$\frac{4}{81}$		A1 for $\frac{4}{81}$ or 0.05 or better		
						<b>Total 5 marks</b>

17. (a)	$d = k\sqrt{h}$		3	M1 for $d = k\sqrt{h}$ but not for $d = \sqrt{h}$ Also award for $d =$ some numerical value $\times \sqrt{h}$		
	$54 = 15k$			M1 for $54 = 15k$ Also award for $54 = k\sqrt{225}$		
(b)		$3.6\sqrt{h}$ oe		A1 for $3.6\sqrt{h}$ oe Award 3 marks if answer is $d = k\sqrt{h}$ but $k$ is evaluated as 3.6 oe in any part		
		28.8	1	B1 ft from "3.6" $\times 8$ except for $k = 1$ , if at least M1 scored in (a) (1 d.p. accuracy or better in follow through)		
(c)	$\sqrt{h} = \frac{61.2}{"3.6"}$		2	M1 for $\sqrt{h} = \frac{61.2}{"3.6"}$ except for $k = 1$		
		289		A1 cao		
						<b>Total 6 marks</b>

18.	$a = \frac{6.8}{\sin 35^\circ} = \frac{6.8}{\sin 64^\circ}$		3	M1	for correct statement of Sine rule
	$a = \frac{6.8 \sin 35^\circ}{\sin 64^\circ}$			M1	for correct rearrangement
		4.34		A1	for 4.34 or 4.3395... rounded or truncated to 4 figures or more
				<b>Total 3 marks</b>	

19.	$\text{eg } \frac{12}{\sqrt{8}} = \frac{12}{2\sqrt{2}} = \frac{12}{2\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{12\sqrt{2}}{4}$ $\frac{12}{\sqrt{8}} = \frac{12}{2\sqrt{2}} = \frac{6}{\sqrt{2}} = \frac{6\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{6\sqrt{2}}{2}$ $\frac{12}{\sqrt{8}} = \frac{12}{\sqrt{8}} \times \frac{\sqrt{8}}{\sqrt{8}} = \frac{12\sqrt{8}}{8} = \frac{3 \times 2\sqrt{2}}{2}$ $\frac{12}{\sqrt{8}} = \frac{12}{\sqrt{8}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{12\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{12\sqrt{2}}{\sqrt{16}}$		2	B1 B1	<p>for use of <math>\sqrt{8} = 2\sqrt{2}</math> or <math>\sqrt{8} \times \sqrt{2} = \sqrt{16}</math></p> <p>for multiplication of numerator and denominator by <math>\sqrt{2}</math> or <math>\sqrt{8}</math> (in either order)</p> <p>SC B1 for <math>12 = 3\sqrt{16}</math></p> <p>or for both <math>\left(\frac{12}{\sqrt{8}}\right)^2 = \frac{144}{8} = 18</math></p> <p>and <math>(3\sqrt{2})^2 = 9 \times 2 = 18</math></p> <p>NB only total of 1 mark for either of these approaches</p>
				<b>Total 2 marks</b>	

20. (a)(i)		59	2	B1	cao
(ii)	<p>angle at the centre  = twice angle at the circumference  or  angle at the circumference  = half the angle at the centre</p>			B1	<p>Three key points must be mentioned  1. angle at centre/middle/O/origin  2. twice/double/2x or half/ <math>\frac{1}{2}</math> as appropriate  3. angle at circumference/edge/perimeter  (NOT e.g. angle R, angle PRQ, angle at top,  angle at outside)</p>

20. (b)	180 - (x + 36) oe seen (possibly marked on diagram as size of $\angle ACB$ )	5	B1	for 180 - (x + 36) oe seen, either on its own or as part of an equation (This mark may still be scored, even if brackets are later removed incorrectly.)
				SC
	$x = 2(180 - (x + 36))$ or $x = 2(180 - x - 36)$ or $180 - (x + 36) = \frac{x}{2}$ or $180 - x - 36 = \frac{1}{2}x$		M1	(Max of 2 M marks) for omission of brackets in $-(x + 36)$ or their incorrect removal $x = 2(180 - (x + 36))$ or $x = 2(180 - x + 36)$ or $180 - x + 36 = \frac{1}{2}x$ or $180 - 36 + x = \frac{1}{2}x$
	$x = 360 - 2x - 72$ or $x + \frac{1}{2}x = 180 - 36$		M1	$x = 360 - 2x + 72$ or $x + \frac{1}{2}x = 180 + 36$ (Note - incorrect simplification results in an answer of $x = 144$ )
	$3x = 360 - 72$ or $3x = 288$ or $\frac{3}{2}x = 180 - 36$ or $\frac{3}{2}x = 144$		M1	
		96	A1	cao

Please note that there is an alternative method on the next page.



20. (b)	OR				
	$\frac{x}{2}$ oe seen (possibly marked on diagram as size of $\angle ACB$ )		5	B1	
	$x + 36 + \frac{x}{2} = 180$			M1	
		96		A1	cao
			Total 7 marks		

21. (a)	tan drawn at (3, 6.5)		3	M1	tan or tan produced passes between points (2, $0 \leq y \leq 4$ ) and (4, $9 \leq y \leq 12$ )
	$\frac{\text{vertical difference}}{\text{horizontal difference}}$			M1	finds their $\frac{\text{vertical difference}}{\text{horizontal difference}}$ for two points on tan or finds their $\frac{\text{vertical difference}}{\text{horizontal difference}}$ for two points on curve, where one of the points has an x-coordinate between 2.5 and 3 inc and the other point has an x-coordinate between 3 and 3.5 inc
(b)		2.5-6.5 inc		A1	dep on both M marks
(c)(i)	line joining (-1, 11) & (1, 13)	-1.7	1	B1	Accept answer in range -1.7 - -1.65
			4	M1	
(ii)	produces line to cut curve again	12		A1	cao
				M1	
		4		A1	ft from line
				<b>Total 8 marks</b>	

first part - finds area of  $\triangle BCD$  and/or length of  $BD$

<b>22.</b>	Area of $\triangle BCD = 2$	6	B1	for area of triangle $BCD$
	$(BD^2 \Rightarrow) 2^2 + 2^2$ or $\left(\frac{BD}{2}\right)^2 + \left(\frac{BD}{2}\right)^2 = 2^2$ or $\frac{BD}{2} = \cos 45^\circ$ or $\sin 45^\circ$ or $\frac{BD}{2} = 2 \cos 45^\circ$ or $2 \sin 45^\circ$		M1	for correct start to Pythagoras or trig for finding $BD$ or $\left(\frac{BD}{2}\right)$
	$(BD \Rightarrow) \sqrt{8}$ or $2\sqrt{2}$ or 2.83 or better (2.8284...) or $\left(\frac{BD}{2}\right) = \sqrt{2}$ or $\frac{\sqrt{8}}{2}$ or 1.41 or better (1.4142....)		A1	for lengths $BD$ or $\left(\frac{BD}{2}\right)$ correct

second part method 1 - uses Pythagoras to find  $AM$ , where  $M$  is midpoint of  $BD$

	$AM^2 = 10^2 - \left(\frac{BD}{2}\right)^2$		M1	
	$AM = \sqrt{98}$ or $7\sqrt{2}$ or 9.90 or better (9.8994...)		A1	for $\sqrt{98}$ or $7\sqrt{2}$ 9.90 or better
		16	A1	for 16 or answer rounding to 16.0
			<b>Total 6 marks</b>	

second part method 2 - finds angle A either using Cosine Rule or by first finding  $\frac{A}{2}$  using trig

	$\cos A = \frac{10^2 + 10^2 - BD^2}{2 \times 10 \times 10} \text{ or } \frac{192}{200} \text{ or } 0.96$ $\text{or } \sin \frac{A}{2} = \frac{BD/2}{10} \text{ or } \frac{\sqrt{8}}{20} \text{ or } 0.141 \text{ or better}$ <p style="text-align: right;">(0.14142...)</p>	M1		
	(A =) 16.3 or better (16.2602...)	A1		for angle A correct
		A1	16	for 16 or answer rounding to 16.0
		<b>Total 6 marks</b>		

second part method 3 - finds angle ABD (or angle ADB) using trig or Cosine Rule

	$(\cos \angle ABD =) \frac{BD/2}{10} \text{ or } (\cos \angle ABD =) \frac{10^2 + BD^2 - 10^2}{2 \times 10 \times BD}$ $\text{or } \cos \angle ABD = \frac{\sqrt{8}}{20} \text{ or } 0.141 \text{ or better (0.14142...)}$ $(\angle ABD =) 81.9^\circ \text{ or better (81.8698...)}$	M1		
		A1		for 16 or answer rounding to 16.0
		A1	16	for 16 or answer rounding to 16.0
		<b>Total 6 marks</b>		

Summer 2008 IGCSE Maths Mark Scheme - Paper 4H

Q	Working	Answer	Mark	Notes
1. (a)	$6x - 2x = 7 - 13$ or $2x - 6x = 13 - 7$ $4x = -6$ or $-4x = 6$			M1 $6x - 2x + 13 - 7 = 0$ or $2x - 6x - 13 + 7 = 0$ M1 A1
(b)	$y - 2 \times 5 = 4 \times 5$ or $y/5 = 4 + 2$	$x = -1 \frac{1}{2}$ oe  $y = 30$	3  2	Accept $-6/4$ or $-3/2$ (not $6/-4$ or $3/-2$ )  M1 A1
				<b>Total 5 marks</b>

2. (a)		$250 \pm 2$	2	B2 B2 for angle 248 to 252 inclusive. B1 for angle 190 to 260 inclusive
(b)		$305 \pm 3$	2	B2 Award B1 for a bearing $270^\circ < \text{angle} < 360^\circ$
				<b>Total 4 marks</b>

3. (a)	$20/2$ or $(20 + 1)/2$	6	2	M1 A1
(b)		Yes, no or not nec'y with consistent reason	2	B2 Can't tell B1
				<b>Total 4 marks</b>

4	(a)	$3 - 5x - 2$	13	2	M1 A1
	(b)		$5y - 10$	1	B1
	(c)		$w(w + 5)$	2	B2
					B1 for two factors that multiply to give at least one correct term. SC $w(w + 5w)$ B1
					<b>Total 5 marks</b>

5.	(a)	$30 \times 0.2$	6	2	M1 A1
	(b)	$0.2 + 0.1$	0.3 oe	2	M1 A1
					or $30 \div 5$
					<b>Total 4 marks</b>

6.		$8/12$ or $3/12$	$8/12, 3/12$	2	M1 A1
					Accept $(4 \times 2) / (4 \times 3)$ or $(3 \times 1) / (4 \times 3)$ SC Multiply bs by 12 B1 Decimal methods M0 A0
					<b>Total 2 marks</b>

<b>7.</b>	(a)		$3^{14}$	1	B1
	(b)		$7^3$	1	B1
	(c)	$5^n = \frac{5^2 \times 5^7}{5^3}$ or $n + 3 - 7 = 2$	$n = 6$	2	M1 A1
	(d)	Product of positive integer powers of both 2 and 3 only	$24$ or $2^3 \times 3$	2	M1 A1
					<b>Total 6 marks</b>

<b>8.</b>		$\frac{1}{2} \times 3 \times 4$ $3 \times 15$ and $4 \times 15$ and $5 \times 15$	192	4	M1 M2 A1 cao
					<b>Total 4 marks</b>

<b>9.</b>		$8x = 12$ or $8y = -4$	$x = 1.5$ oe $y = -0.5$ oe	3	M1 A1 A1
					<b>Total 3 marks</b>

10.	(a)		4.8	1	B1	
	(b)	$5^2 - "4.8" \times 2$ or 1.96 $\sqrt{(5^2 - "4.8" \times 2)}$	1.4	3	M1 M1dep A1	
					cao	<b>Total 4 marks</b>

11.	(a)		123.47 & 123.53	2	B2	B1 for 123.37 & 123.43 (equal to 1dp) or 123.57 & 123.63
						<b>Total 2 marks</b>

12.	(a)		63	1	B1	cao
	(b)	$4 \times 5/8$ oe	2.5	2	M1 A1	or $8 \div 2 = 4$ so $5 \div 2 = \dots$ , or $4 \div 1.6$
		or $\sqrt{6^2 + 5^2 - 2 \times 6 \times 5 \cos 20^\circ}$ or $(5 \times \sin 20^\circ) / \sin 63^\circ$	2.15 1.92			M1 for complete trig method. A1 for answer to 3SF.
	(c)	$6 \times 8/5$ oe	9.6	2	M1 A1	
		or $\sqrt{4^2 + 8^2 - 2 \times 4 \times 8 \cos '97^\circ'}$ or $(8 \times \sin '97^\circ') / \sin 63^\circ$ or $(4 \times \sin '97^\circ') / \sin 20^\circ$	9.37 8.91 11.6			M1 for complete trig method. A1 for answer to 3SF.
						<b>Total 5 marks</b>



13.	(a)		$\frac{2}{3}$ correctly placed once Correct structure All correct	3	B1 B1 B1	correct 4 new lines, ignore labels/probs including labels/probs
	(b)	$\frac{2}{3}x^2/3$ $1-\frac{2}{3}x^2/3$ or $\frac{1}{3}x^2/3$ or $\frac{1}{3}x^2/3 + \frac{1}{3}x^1/3$ or $\frac{1}{3}x^2/3 + \frac{2}{3}x^1/3 + \frac{1}{3}x^1/3$	$\frac{5}{9}$ oe	3	M1 M1 A1	$\frac{1}{3}x^2/3$ or $\frac{2}{3}x^1/3$ or $\frac{1}{3}x^1/3$
						<b>Total 6 marks</b>

14.	(a)(i)	vert diff/horiz diff for any 2 points on L	0.5 oe	2	M1 A1	
	(a)(ii)	$y = "0.5"x + \text{constant}$	$Y = "0.5"x + 1$ oe	2	M1f A1f	SC "0.5"x + 1 or L = "0.5"x + 1 B1
	(b)		$x \leq 4$ $y \geq -1$ $Y \leq 0.5x + 1$ oe	3	B1 B1 B1	All inequalities wrong way round B1
						<b>Total 7 marks</b>

15.		$3.1^2 + 3.9^2 - 2 \times 3.1 \times 3.9 \times \cos 80^\circ$ $9.6 + 15.2 - 4.2$	4.54	3	M1 M1 A1	$3.1^2 + 3.9^2 - 24.2 \times \cos 80^\circ$ or 20.6
						<b>Total 3 marks</b>

16.	(a)	$\frac{5 \pm \sqrt{((-5)^2 - 4 \times 3)}}{2}$ $\frac{5 \pm \sqrt{13}}{2}$			M1 M1
	(b)	$y < 3$ or $y > -3$	4.30 and 0.697	3	A1 M1 A1
		$-3 < y < 3$		2	allow 4.3 and 0.697 Allow $y \leq 3$ or $y \geq -3$ A1
					<b>Total 5 marks</b>

17.	(a)	Try to find area of 2-4 block. Try to find total area.			M1 M1 A1
	(b)	Half total area or try to find middle of distribution	40%	3	M1f A1
			4	2	ft dep on M1 for total area in (a) A1 Cao
					<b>Total 5 marks</b>

18.		$x \times 4 = 3 \times 14$ oe			M1 A1
		$x = 10.5$ oe		2	$\frac{x}{14} = \frac{3}{4}, \frac{3}{(3+4)} = \frac{x}{(x+14)}, \frac{4}{(3+4)} = \frac{14}{(x+14)}$ A1
					<b>Total 2 marks</b>

<b>19.</b>	(a)		2t - 6	2	B1B1	
	(b)	2 x 5 - 6			M1f	Sub t = 5 in "ds/dt" dep on linear f(t)
	(c)	$d("2t - 6^n")/dt$	4	2	A1	M0 for (2 x 5 - 6)/5 Cao
			2	2	M1 A1	Attempt diff "ds/dt" dep on linear f(t) Cao
						<b>Total 6 marks</b>

<b>20.</b>	(a)	$14 \times 10^{12}$ oe	$1.4 \times 10^{13}$	2	M1 A1	or 1.4e13
	(b)(i)		16	1	B1	cao
	(b)(ii)	$(p + q) \times 10^{15} = r \times 10^p$	$(p + q)/10$ oe	2	M1 A1	may be seen in (i) $0.1(p + q), (p + q) \times 10^{-1},$ $\frac{p \times 10^{15} + q \times 10^{15}}{10^{16}}$
						<b>Total 5 marks</b>

<b>21.</b>	(a)(i)		a + b oe	1	B1	
	(a)(ii)		-a oe	1	B1	
	(a)(iii)		b - a oe	1	B1	
	(b)		5	1	B1	
						<b>Total 4 marks</b>

22.	$\frac{1}{2} \times 6 \times 8 \times \sin x^\circ = 12$ $\sin x^\circ = 0.5$ 30	$x = 150$	4	M1 M1 A1 A1 allow $x = 30$	Total 4 marks
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23.	(a)	$\frac{(x-3)(x+3)}{x(x+3)}$	$\frac{x-3}{x}$	M1 M1 A1 3	
	(b)	$\frac{1}{x^2} - 3$ or $1 - \frac{3}{x^2}$	$1 - \frac{3}{x}$ ft $\frac{x+3}{x}$ only	M1 A1 2	
		$1 - 3x^2$		A1 cao	Total 5 marks



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