IGCSE November 2006 – Paper 4H Final Mark Scheme					
Question No.	**Working**	**Answer**	**Mark**	**Notes**	
1	$\frac{6.46}{3.4}$	1.9	2	M1 A1	for 3.4 cao
					Total 2 marks

2 a		$6t+15$	1	B1	cao
b		y^3-3y^2	2	B2	B1 for y^3, B1 for $-3y^2$
c	$x^2+7x+3x+21$	$x^2+10x+21$	2	M1 A1	Condone 1 error
d		p^7q^8	2	B2	B1 for p^7, B1 for q^8. Allow p^7 x q^8
					Total 7 marks

3	$\frac{45}{1+4}$	9	2	M1 A1	36 or 9:36 M1A0 cao
					Total 2 marks

4 a				B3	for $P = 2(n+1)$ oe	(a&b) Ignore units
					B2 for $2(n+1)$ oe or n = $^{P}/_{2} - 1$ oe B2 for $P = 2n+1$ oe or $P = n+1\times 2$ oe	
		$P = 2(n+1)$	3		B1 for P = any f(n) (not P = n) B1 for 2n + 1 oe or $n+1\times 2$ oe B0 for muddle eg n+1 = x 2 = P	
b	$P = 2n+2$			M1	$2n+2$ seen	or M2 for
	$2n = P-2$	$\frac{P-2}{2}$ or $\frac{P}{2}$ - 1	3	M1 A1		$\frac{P}{2} = n+1$ or P – 2 ÷ 2
					SC ft from $P = 2n+1$ or 2n + 1 only M1 for $2n = P-1$ or P - 1 ÷ 2 A1 ft for $\frac{P-1}{2}$ oe	
						Total 6 marks

5	$\frac{5456}{7.75}$			M1	for $\frac{5456}{\text{time}}$ or 732 seen
				B1	for 7.75 or 465 if ...x 60 or "km/m"
		704	3	A1	cao
					Total 3 marks

6 ai	eg "9 is not a member of $\mathcal{E}$", "It is not an even number" "$\mathcal{E}$ is only even nos", "9 is odd"		1	B1	for either interpreting statement or for giving a reason
ii		6, 12, 18	1	B1	Condone omission of brackets
b		6, 12	2	B2	B1 for 6 or 3, 6, 12
					Total 4 marks

7	$\pi \times 4.7^2 \times 8.3$			M2	for $\pi \times 4.7^2 \times 8.3$
					M1 for $\pi \times 9.4^2 \times 8.3$ or 2303 - 2305
		576	3	A1	for 575.7-576.1
					Total 3 marks

8	$-7 = 4x - 1$			M1	for substituting correctly
		− 1½ oe	2	A1	
					Total 2 marks

9 a	$48 \times \frac{3}{8}$			M1	
		18	2	A1	cao ans $^{18}/_{48}$: M1A0
b	eg $48 - 18 - 18$, $x + 48 = 2(x + 18)$			M1	
		12	2	A1f	ft from "18"
					Total 4 marks

10	eg 3 | 225 3 | 75 5 | 25 5			M2	for full systematic method of at least 3 divisions by prime numbers oe (factor trees) Condone 1 error
					Or for $3 \times 3 \times 5 \times 5$ or 3, 3, 5, 5
					M1 for 225 written as correct product with only one non-prime
		$3^2 \times 5^2$	3	A1	
					Total 3 marks

11 a	eg enlargement, (scale factor) 3, (centre) (1,2)			B3	B1 for enlargement	Not single trans: B0B0B0
			3		B1 for 3, B1 for (1,2)	
b		Correct triangle	2	B2	B1 for 1 to the left B1 for 3 up	
					Total 5 marks	

12	$12x + 10y = 10$	$6x - 20y = 30$			M1	Correctly equating coefficients of x or y or rearranging to x = … or y = …
	$(15x = 25)$	$(25y = -25)$				
			$x = 1\frac{2}{3}$ (or 1.7 or better), $y = -1$	3	A1 A1	Condone 1.66 cao
						Total 3 marks

13 a		7.8×10^{7}	1	B1	cao
b		0.004 oe	1	B1	cao
c		3.75×10^{-12}	1	B1	
					Total 3 marks

14 a	$\tan\angle LMN = \frac{9.3}{5.4}$			M1	$\sin LMN = \frac{9.3}{\sqrt{(9.3^2+5.4^2)}}$ or cos etc M1A1
	$^{9.3}/_{5.4}$ or 1.722…			A1	
		59.9	3	A1	for 59.85-59.9
bi		5.45	1	B1	Accept $5.44\dot{9}$, 5.4499…
ii		5.35	1	B1	cao
c	$\frac{9.35}{"5.35"}$			M1	
		1.74766…	2	A1	for 1.74 or 1.75 or better
					Total 7 marks

15	$\frac{180\times(10-2)}{10}$ or $180 - {}^{360}/_{10}$			M1	$^{360}/_{10}$
	144 36			A1	
	180 − [360 − (60 + 144)] or 24 60 – 36 (= 24)			M1	360 – 204 = 156
	$\frac{360}{"24"}$			M1	180 x (n-2)/ n = 156 or 180 – 360/n = 156 or 2340/15 = 156
		15	5	A1	cao
					Total 5 marks

16 a		28, 50, 64, 74, 80	1	B1	cao
b		Points		B1	In (b) incr'ing y's nec'y. Not blocks end pts $\pm$ ½ square ft from sensible table condone one error
		Curve or line segments	2	B1	dep end pts or midpts thro' pts $\pm$ ½ square; ignore x < 5 dep on 4 pts correct or ft
c	cf for time of 17h found from graph			M1	In (c) incr'ing cf graph essential eg line, mark on graph
		~12	2	A1f	12 or consistent with curve
					Total 5 marks
17	$(\frac{67}{360}$ or 0.186…) x…			M1	or … ÷ ($^{360}/_{67}$ or 5.37…)
	$\frac{67}{360} \times \pi \times 8.2^2$			M1	or π x 8.2^2 ÷ $^{360}/_{67}$
		39.3	3	A1	for 39.2 - 39.32
					Total 3 marks
18 a		0.25, 2.5, 8, 15.25	2	B2	Accept rounding or truncating B1 for 2 or 3 correct
b		Points		B1f	Allow $\pm$ ½ square Condone 1 error or omission ft if at least B1 in (a)
		Curve	2	B1f	ft if at least B1 in (a)
c		1.4 – 1.47	1	B1	
d	$x^2 - \frac{3}{x} = 2x$ or indication of $y = 2x$	~2.5	2	M1 A1	indication may be mark or line on graph Must see 2x or indic'n of line y = 2x ft if at least B1 in (b)
					Total 7 marks

19	100x = 23.2323…			M1	
		$\frac{23}{99}$	2	A1	
					Total 2 marks

20	ai		61	1	B1	cao
	ii	opp angles of a cyclic quad (add to 180° or are suppl)		1	B1	
	b	90 – "61"	29	2	M1 A1f	$\angle ACB = 90°$ stated or indicated on diagram
						Total 4 marks

21	a		128, 72	2	B2	B1 for 128 cao B1 for 72 cao
	b		bar correct	1	B1	34 little squares high
						Total 3 marks

22	$\sqrt{0.36}$ or 0.6			M1	
	(1 − "0.6") × (1 − "0.6") or 0.4 × 0.4			M1	dep
		0.16	3	A1	for 0.16 oe
					Total 3 marks

23	$\frac{(2x+3)(x-4)}{(2x+3)(2x-3)}$			M1 M1	for $(2x+3)(x-4)$ for $(2x+3)(2x-3)$
		$\frac{x-4}{2x-3}$	3	A1	
					Total 3 marks

24	eg $\frac{8.6}{\sin 75°} = \frac{"a"}{\sin 48°}$ or $\frac{"b"}{\sin 57°}$			M1	
	$\frac{8.6\sin 48°}{\sin 75°}$ or 6.61(….) or $\frac{8.6\sin 57°}{\sin 75°}$ or 7.46(….)			A1	
	$\frac{1}{2}\times 8.6\times"6.616"\times\sin 57°$ or $\frac{1}{2}\times 8.6\times"7.467"\times\sin 48°$			M1	dep M1 or ½ x "6.616" x "7.467" x sin75°
		23.9	4	A1	
					Total 4 marks

25 a	$(5-x)^2+(6-x)^2=(x+4)^2$ $25-10x+x^2+36-12x+x^2 = x^2+8x+16$		4	B2 B1 B1	two of $(5-x),(6-x),(x+4)$ seen or equiv, eg (10 –x – 4) B1 for one of these correct equn not expanded correct equn expanded
b	$\frac{30\pm\sqrt{30^2-4\times 45}}{2}$		3	M1	Allow -30^2
	$\frac{30\pm\sqrt{720}}{2}$ or 28.4 & 1.584	 1.58		A1 A1	
					Total 4 marks