4400 IGCSE Mathematics
Summer 2007
Paper 4H

Q	Working	Answer	Mark	Notes
1. (i)		$x + 2x + 1 + 3x - 5 = 17$	**1**	B1 B1 oe eg $6x - 4 = 17$ ISW not '$= p$'
(ii)	$6x = 21$ or $6x - 21 = 0$ etc	$x = 3.5$ oe eg $^{21}/_{6}$	**2**	M1 ft (i) if $6x = c$ A1
				Total 3 marks

2.	9 seen $7/9 \times 27$ or $7 \times 27/9$ oe	21	**3**	B1 M1 dep B1 A1 21 seen, & ans = 3 B1M1A0
				Total 3 marks

3.	$5x - 20 = 35$ $5x = 55$	11	**3**	M1 M1 or M2 for $x - 4 = 7$ A1
				Total 3 marks

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4. (a)	$\frac{7 \times 50}{2}$ or 7, 50, 2		**2**	B1 for 7 and 2 B1 for 50
(b)	175			M1 $\frac{(6\text{or}7) \times (48\text{or}50)}{2 \text{ or } 3}$ correctly eval'd eg 168
		200 or 100	**2**	A1 A1f If no wking: ft (a)
(c)		Num incr or 6.8 & 47.6 incr denom decr or 2.09 decr		B2 any two of these B1 B2 any two of these
		(b) rnded up (not rnd to 1 sf)		B1
		or '175' rnded to 200	**2**	B1 any one of these Ignore other
				Total 6 marks

5. (a)	$(2 + 3)/2 \times 6$ or $2 \times 6 + {}^{1}/_{2} \times 6 \times 1$ oe			M1
		15	**2**	A1
(b)	${}^{15}/_{20} \times 1000$ | 1000×15 | $1000 \times 15 / 20$			M1 or 0.75 M1 ft '15' for M1M1 only
		750	**3**	A1
				Total 5 marks

Q	Working	Answer	Mark	Notes
6.	$x + 3 = 7x$ | $7y = 7x + 21$ $(6x = 3$ oe) | $(6y = 21)$	$x = {}^1/_2$, $y = 3{}^1/_2$	**3**	M1 $y = 7(y-3)$ $y = 7y-21$ $0 = 6x - 3$ A1 A1
				Total 3 marks

7.	(a)	tan used		M1	(sin or cos) & ($\sqrt{(4.2^2+5.1^2)}$ or (6.61) used
		$\tan x = 5.1/4.2$ or $\tan x = 1.2\ldots$ oe		M1	$\sin x = 5.1/\sqrt{(4.2^2+5.1^2)}$ or $\cos x = 4.2/\sqrt{(4.2^2+5.1^2)}$
		$x = 50.5\ldots$	**3**	A1	
	(b)	$\sin 29 = AB/5$ or $c/\sin 29 = 5/\sin 90$		M1	$BC = 5\cos 29$
		$AB = 5\sin 29$		M1	$AB = \sqrt{(52+(5\cos 29)2)}$ or $5\cos 29 \times \tan 29$
		$AB = 2.42\ldots$ cm	**3**	A1	
					Total 6 marks

8.	(a)	$1 - (0.1 + 0.2 + 0.1)$ or $1 - 0.4$ oe		M1	or 0.6 in table
		0.6	**2**	A1	allow in table if not contrad on line
	(b)	$0.2 + 0.1$ or $1 - (\text{'}0.6\text{'} + 0.1)$		M1	or 0.3 seen
		0.3	**2**	A1	
	(c)	(Poss) overlap or mut excl or doesn't wk for B or Y } No or poss or poss yes }	**2**	B2 Can't tell & (No or poss) B1 Correct reason only: B1 Incorrect reason: B0 Unqualified Yes: B0	
					Total 6 marks

Q	Working	Answer	Mark	Notes
9.	$4^2 + 6^2$ (= 52) $\sqrt{(4^2 + 6^2)}$ or $\sqrt{}$"52" or $2\sqrt{13}$	h = 7.21….	**3**	M1 M1 M1 dep A1
				Total 3 marks

10.	(a)	V/H in any correct triangle attempted Grad = 2, may be embedded or implied	y = '2'x + 1	**4**	M1 eg $\frac{3-1}{1-0}$ not $\frac{3}{1}$ A1 M1 B2f B1f for grad. B1 for y-int (lin eqn) or B1f for just '2'x + 1 No wking, ans $2x + 1$: M1A1 B1
	(b)		$y = -2x \pm c$	**1**	B1 $y = -2x \pm$ any no. (not 5) or letter or $y = -2x$
	(c)		(0, -4)	**1**	B1
					Total 6 marks

11.	(a)		56	**1**	B1
	(b)	$x/20 = 6/12$ or $4/8$ oe	10 or 10.0….	**2**	M1 or $x/\sin 30 = 20/\sin(180–30–56)$ A1
	(c)	$y/10 = 4/6$ or $8/12$ oe	6.6 to 6.7 incl oe	**2**	M1 or $y = \sqrt{(4^2+8^2–2\times4\times8\times\cos'56')}$ or $y/\sin 56 = 8/\sin(180–30–56)$ A1 (a)(b): ft (a) M-mks only
					Total 5 marks

Q	Working	Answer	Mark	Notes
12. (a)	a^7 / a^2 or a × a^4 or $a^3 \times a^2$		M1	
		a^5	**2**	A1	
(b)		x^3	**1**	B1	
(c)	Correctly cancel numbers or $(x + 1)$		M1	eg $^1/_2$ or 0.5 or denom = 2 or $\frac{3(x+1)}{6}$ or $\frac{3x+3}{6}$ or $k(x + 1)$ $(k \neq 1)$
		$^1/_2(x + 1)$ or $0.5(x + 1)$ or $\frac{x+1}{2}$ or $\frac{x}{2}+\frac{1}{2}$ or equiv	**2**	A1	Not ISW
				Total 5 marks

13. (a)	Attempt arrange one set in order			M1	
	State or indicate correct 15 & 4 or14 & 6			M1	NB: IQR for B = 8, check wking
		A: 11 B: 8	**4**	A1	
				A1	
(b)		A more spread or gter dispersion or less consistent than B	**1**	B1	B1f Consistent with (a). Ignore other. Not: gter "range" or "difference" or "more constant" or "gter IQR" or "gter variance"
					Total 5 marks

Q	Working	Answer	Mark	Notes
14.	$5x - 7 = x^2 - 1$ or $5x - 7 = (x - 1)(x + 1)$ $x^2 - 5x + 6 = 0$ $(x - 2)(x - 3)$ (= 0) or $\frac{5 \pm \sqrt{(-5)^2 - 4 \times 6}}{2}$	$x = 2$ or 3	**4**	M1 condone $5x - 7 = x - 1 \times x + 1$ M1 allow different order with = 0 M1 $(x - 2.5)^2 + 6 - 6.25$ A1 T & I or no wking: 4 mks or 0 mks
				Total 4 marks

15.	2 overlapping circles, 12 in overlap 6 in H only 2 in T only	14	**4**	M1 M1 or 6 play H only M2 M1 or 20–6, 6+12+x=20, 20-18, 35-33: M3 A1 ans 2: M3A0
				Total 4 marks

16.	$9^2 + 5^2 - 2 \times 5 \times 9 \times \cos x = 6^2$ $90\cos x = 70$ or $-90\cos x = -70$ $(\cos x = {}^{70}/_{90})$	$x = 38.9$ or better	**3**	M1 or $\cos x = \frac{9^2+5^2-6^2}{2\times5\times9}$ M2 M1 A1
				Total 3 marks

Q	Working	Answer	Mark		Notes
17. (ai)		-2	**1**	B1	or $x \neq -2$ or $x = -2$
(ii)		$x < 1$	**2**	B2	B1 for $x \leq 1$ or 0, -1, -2, -3 . . .
(b)	$\sqrt{9}$ or $\sqrt{(10-1)}$			M1	
	$\frac{1}{\text{her}\sqrt{9}+2}$			M1	or $\frac{1}{\sqrt{x-1}+2}$
		$^1/_5$ or 0.2	**3**	A1	ignore ans = -1
(c)	$y = \sqrt{(x-1)}$ | - 1, $\sqrt{}$			M1	M1 $y = \sqrt{(x-1)}$
	$y^2 = x - 1$ | Reverse order			M1	M1dep $x = \sqrt{(y-1)}$
	$x = y^2 + 1$ | squ, + 1			M1	M1 $x^2 = y - 1$
		$(g^{-1}(x) =) x^2 + 1$ oe	**4**	A1	$y^2 + 1$ M3 $y = x^2 + 1$ M3 $x = x^2 + 1$ M3 SC $(g^{-1}(x) =) (x+1)^2$: B1
					condone $\sqrt{x}$-1 if next step correct
					Total 10 marks

18. (a)	$^1/_6 \times {}^1/_6 \times {}^1/_6$ alone			M1	0.17^3 or 0.16^3 or better. Not $\times k$
		$^1/_{216}$ or 0.0046…	**2**	A1	
(b)	1,1,4 or 1,2,6 or 2,1,6 seen or implied			M1	ie one route
	1, 1, 4 and 1, 2, 6 (or 2, 1, 6) seen or implied			M1	ie two routes incl 1, 1, 4
	$(^1/_6)^3 \times 3$			M1	ie three routes and correct exp'n
		$^1/_{72}$ or $^3/_{216}$ or 0.014 or better	**4**	A1	$(^1/_6)^3 \times 2$ or $^1/_{108}$, no wking: M0A0
					Total 6 marks

Q	Working	Answer	Mark	Notes
19. (a)	$^1/_2 \times 5 \times 5 \times \sin 60$	10.8...	2	M1 $^1/_2 \times 5 \times \sqrt{(5^2 - (^5/_2)^2)}$ or $^1/_2 \times 5 \times 4.33$ A1 $(25\sqrt{3})/4$ M1A0
(b)	sect = $^1/_6 \times \pi \times 5^2$ or 13.1 "10.8"+2($^1/_6 \times \pi \times 5^2$ – "10.8") or "10.8" + 2×2.26 or $2 \times {}^1/_6 \times \pi \times 5^2$ – "10.8"	15.4 cm^2	3	M1 M1 Δ + 2(sect - Δ) or 2 × sect - Δ Allow eg $\Delta = {}^1/_2 \times 5 \times 5$ A1
				Total 5 marks

20 (i)		20	1	M1	B1
				A1	
(ii)		30	2	B2	or 1 sq reps freq of 5 seen anywhere: B1
					Total 3 marks

21. (a)		$(4x - 1)(4x + 1)$	1	B1	
				M1	13 or 39 or 41 or 123 as factor
(bi)	$16 \times 10^2 - 1$ seen or implied			M1	factors 3, 13, 41 or 39, 41 or 13, 123
	$(4 \times 10 - 1)(4 \times 10 + 1)$ or 39×41	$3 \times 13 \times 41$	3	A1	Ans 3 × 533 M0A0
				M1	or tree including 1000 or 10 and 100
(ii)	1599×10^3 or 1599×1000				
		'3×13×41' × $2^3 \times 5^3$ oe	2	A1f	ft her (i) × $2^3 \times 5^3$
					Total 3 marks