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Mark Scheme (Results)
Summer 2010

IGCSE

IGCSE Mathematics (4400)
Paper 4H Higher Tier

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Summer 2010 IGCSE Mathematics (4400) Mark Scheme – Paper 4H

The following questions require a seen valid method before the accuracy mark can be awarded; Q1 , Q7, Q13, Q19, Q20c & d
For other questions a correct answer implies a correct method.

Q		Working	Answer	Mark	Notes	
1. (F13c)		$6y - 3y = 7 + 9$ $3y = 16$	$5^1/_3$ oe or 5.33(...)	3	M1 M1 A1	or better; correctly collect y's & constants 2dp at least for decimal ans if 16/3 not seen (A1 dep on at least 1 M1)
						Total 3 marks

2. (F14a)	(a)	360 – (108 to 112) or 180 + (72 to 68)	248 to 252	2	M1 A1	
(F14b)	(b)	360 – (180 – 50) (=360 -130) or 180 + 50 or 50 + 50 + 130	230	2	M1 A1	cao
						Total 4 marks

3. (F16a)	(a)	1 – (0.5 + 0.2) (= 1 – 0.7)	0.3oe	2	M1 A1	decimals, fractions % ok.
(F16b)	(b)	30 × 0.2	6	2	M1 A1	cao 6/30 =M1A0
						Total 4 marks

Q		Working	Answer	Mark	Notes	
4. (F17a)	(a)	85/1.25	68	2	M1 A1	accept 85/75 or 85/1.15 accept 85000 in place of 85 cao
(F17b)	(b)	85/136 × 100	62.5	2	M1 A1	 cao
(F17c)	(c)	12 × 0.15 (= 1.8) or 180p or 180 pence 12 – "1.8"	10.20oe	3	M1 M1dep A1	1 – 0.15 =0.85 "0.85" x 12 allow 10.2
						Total 7 marks

5. (F18)		$(x^2=)\ 3.3^2 + 1.8^2$ (= 14.13) √"14.13"	3.76	3	M1 M1 A1	M2 for $\sqrt{(3.3^2+ 1.8^2)}$ dep awrt 3.76 isw for 3.758… or better in body.
						Total 3 marks

6. (F19)	(ai)		4, 5	1	B1	any order
(F19)	(aii)		6	1	B1	cao do not accept n(6)
(F19)	(bi)		(Q =) 3,4,6 or 3,4,7	1	B1	
(F19)	(bii)	sc B1 B0 for Q= 3,4,6 or 7 then R =3,4,6 or 7	(R =) 3,4,7 or 3,4,6	1	B1ft	R=3,4,7 if Q=3,4,6 // R=3,4,6, if Q=3,4,7
						Total 4 marks

Q		Working	Answer	Mark	Notes	
7. (F20a)	(a)	$7(x + 1)$ or $3(5x - 2)$ $7(x + 1) + 3(5x - 2)$	$7(x + 1) + 3(5x - 2) = 34$oe	3	M1 M1 A1	or doubled or mult out correctly or doubled or mult out correctly (and stated intention to +) i.e. $14(x + 1) + 6(5x - 2) = 68$ (can isw)
(F20b)	(b)	$7x + 7$ or $14x + 14$ or $15x - 6$ or $30x - 12$ $22x = 33$ or $44x = 66$	1.5oe	3	M1 M1 A1	can be awarded from (a) s.c. M1 for $22x = 67$ cao dep on M2 scored
						Total 6 marks

8. (F21)		$\frac{3}{2}, \frac{5}{4}$ or $\frac{6}{4}, \frac{5}{4}$ $\frac{3}{2} \times \frac{4}{5}$ or $\frac{6}{4} \times \frac{4}{5}$ or $\frac{6}{4} \div \frac{5}{4}$ etc $\frac{6}{5}$ oe		3	B1 B1 B1	converting both correctly to improper fractions Stated intention to multiply (if 2nd fraction inverted) or divide if denominators are the same (correct fractions) Must be improper fraction from previous calculation Ignore all decimal treatments.
						Total 3 marks

9. (F22)		15.75 – 14 (= 1.75) $\frac{"1.75"}{14} \times 100$	$\frac{15.75}{14} \times 100$ (=112.5) "112.5" - 100	12.5	M1 M1dep A1	allow $\frac{"1.75"}{15.75} \times 100$ (=11.1) cao	14/15.75 x 100 (=88.9) 100 – "88.9" (=11.1)
							Total 3 marks

Q		Working	Answer	Mark	Notes	
10.	(a)	4 ÷ 6. 4 x 5.2 (0.625 x 5.2) or (5.2 ÷ 1.6 etc)	3.25	2	M1 A1	M1 for proper use of sf 1.6 or 0.625 (or $x/4 = 5.2/6.4$ oe) cao
	(b)		52	1	B1	
						Total 3 marks

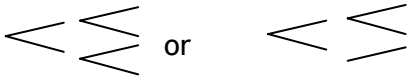
11.		both denoms = same multiple of 12 $\frac{2x+9x}{12}$ or $\frac{4x+18x}{24}$ oe	$\frac{11x}{12}$	3	M1 M1 A1	Any multiple of 12 acceptable $\frac{2x}{12}+\frac{9x}{12}$ or $\frac{4x}{24}+\frac{18x}{24}$ (intention to add correct fractions) cao
						Total 3 marks

12.	(a)	(grad =) $-{}^{4}/_{8}$ oe (= - 0.5) Y intercept = 4	y = "-0.5"x + 4	3	B1 B1 B1ft	- 0.5 oe seen (can be implied from final answer) (correct y intercept) (ft grad only if ${}^{v}/_{h}$ seen) (correct form for equation) s.c. $y = 0.5x + 4$ without working = B2
	(b)		$x \geq -1$ oe $y \geq x$ oe $y \leq$ "-0.5x + 4" oe	3	B1 B1 B1ft	accept $x > -1$ accept $y > x$ ft (a) accept $y <$ "-0.5x + 4" must be a linear eqn in x Ignore contradictions sc B1 if all inequalities are facing the wrong way
				6		**Total 6 marks**

Q		Working	Answer	Mark	Notes	
13.	(a)	$(x - 6)(x - 2)$ (= 0) or $\frac{8 \pm \sqrt{6_4 - 4_8}}{2}$	x = 6 or 2	3	M2 A1	M1 for 1 correct factor or $(x + 6)(x + 2)$ or $\frac{8 \pm \sqrt{-8^2 - 4 \times 12}}{2}$ condone one sign error Ans only = M0M0A0 Answer depended on M2 achieved
	(b)	$4x - 10x = 9$ or $2y - 5y = 9$ oe $-6x=9$ or $-3y=9$ oe	-1.5, -3	3	M1 A1 A1	correct sub/elimin to get 1 eqn 1 unknown Ans only = M0A0A0
						Total 6 marks

14.		$^1/_2 \times 6 \times 4 \times \sin x^o = 6.75$ oe $\sin x^o = {}^{6.75}/_{12}$ or $^9/_{16}$ or 0.5625	34.2	3	M1 M1 A1	 isolating sin *x* awrt 34.2
						Total 3 marks

15.	(a)	(6.8 x 20) or (0.75 x 1.6 x 20) 24 + 136	160	3	M1 M1 A1	correct fd value marked (no errors) $(1.5 \times 16) + (4 \times 34)$ M2 for 20 x 8 or 200 x 0.8 cao
	(b)	75 ÷ 3 (=25) or 75 ÷ 20 (=3.75)	block 10-13 ht 2.5cm	2	M1 A1	
						Total 5 marks

Q		Working	Answer	Mark	Notes	
16.	(a)		$^1/_4$ on Black branch Correct tree structure Labels and values correct	 3	B1 B1 B1	 or
	(b)	$^3/_4 \times {}^2/_3$	$^1/_2$	2	M1 ft A1	Allow ft if ww selected from tree diagram or ¾ x ¾ cao
	(c)	$^3/_4 \times {}^2/_3 \times {}^1/_2$ or $^3/_4 \times {}^1/_3$ or $^1/_4$ $(^3/_4 \times {}^2/_3 \times {}^1/_2)+(^3/_4 \times {}^1/_3)+(^1/_4)$	 $^3/_4$	 3	M1 M1 A1	i.e WWB or WB or B (1 correct branch) WWB + WB + B ans only: M2 A1
						Total 8 marks

17.		$^{84}/_{360}$ or $^7/_{30}$ or 0.23.. $^{84}/_{360} \times \pi \times 45^2$	1480	3	M1 M1 A1	360 ÷ 84 or 4.2857… or 4.29 or 30/7 $\pi \times 45^2 \div$ "4.29" awrt 1480 (3 sf) sc 1485 or 1490 from π=22/7 seen M2A1
						Total 3 marks

18.		$^{AC}/_{\sin 110} = {}^{3.4}/_{\sin 30}$ oe $AC = 3.4 \times {}^{\sin 110}/_{\sin 30}$	6.39	3	M1 M1 A1	awrt 6.39
						Total 3 marks

Q		Working	Answer	Mark	Notes	
19.		$\pi r \times 4 + \pi r^2 = \frac{33}{4}\pi$ oe $r^2 + 4r - {}^{33}/_4 = 0$ oe $(4r^2 + 16r - 33 = 0)$ $(2r - 3)(2r + 11) = 0$	1.5	4	M1 M1 M1 A1	ie correct equation based on areas. correct equation = 0 $\frac{-4 \pm \sqrt{4^2 + 4 \times \frac{33}{4}}}{2}$ or $\frac{-16 \pm \sqrt{16^2 + 16 \times 33}}{8}$ not "1.5 and/or $-{}^{11}/_2$" unless 1.5 clearly chosen A1 dependent on M3
						Total 4 marks

20.	(a)		49	1	B1	cao
	(b)	$(7 - 1)^2$ or 36 seen	$f(x) \geq 36$ or $y \geq 36$	2	M1 A1	allow $f \geq 36$ $x \geq 36$: M1A0 (don't accept >)
	(c)	$\frac{x}{x-1} = 1.2$ $x = 1.2(x-1)$	6	2	M1 A1	Do not accept g(1.2) = 6 method cao Answer only = M0 A0 Algebra method reqd.
	(di)	$y = \frac{x}{x-1}$ $y(x - 1) = x$ $xy - y = x$ $xy - x = y$ $x(y - 1) = y$ $x = \frac{y}{y-1}$	$\frac{x}{x-1}$	5	M1 M1 M1 M1 A1	$x = \frac{y}{y-1}$ $x(y - 1) = y$ $xy - x = y$ $xy - y = x$ $y(x - 1) = x$
	(dii)		x	1	B1	accept $[x/(x - 1)]/[(x/(x - 1) - 1]$ do not isw
						Total 11 marks

Q		Working	Answer	Mark	Notes	
21.	(a)		**a – c** oe	1	B1	
	(b)		trapezium	1	B1	
	(ci)		$k = 1$	1	B1	Accept {a + *k*c = a + c} or{ *k*c = c} all imply k=1
	(cii)		(mag) **a** = (mag) **c** oe	1	B1	Accept a = c or {a=kc} (imply sides are equal in length) or a + *k*c bisects angle *AOC*
						Total 4 marks

22.	(a)	2352000	2.352×10^4	2	M1 A1	figs 235 or 2352 cao
	(b)	$a/100 \times 10^4 + b \times 10^4 (= c \times 10^4)$	0.01a + b oe	2	M1 A1	M1 for 0.01a seen or making index powers the same or a + 100b =100c or dividing both sides by 10^4
						Total 4 marks

Total : 100 marks

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