

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)	$6y - 3y = 7 + 9$ $3y = 16$	$5\frac{1}{3}$ 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)	$360 - (108 \text{ to } 112)$ or $180 + (72 \text{ to } 68)$	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" × 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= <u>3,4,6 or 7</u> then R = <u>3,4,6 or 7</u>	(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	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	
					A1	cao dep on M2 scored
						Total 6 marks

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

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

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

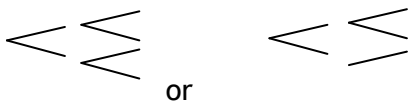
11.		both denoms = same multiple of 12 $\frac{2x+9x}{12}$ or $\frac{4x+18x}{24}$ oe			M1	Any multiple of 12 acceptable
			$\frac{11x}{12}$	3	M1	$\frac{2x}{12} + \frac{9x}{12}$ or $\frac{4x}{24} + \frac{18x}{24}$ (intention to add correct fractions)
					A1	cao
						Total 3 marks

12.	(a)	(grad =) $-\frac{4}{8}$ oe (= - 0.5) Y intercept = 4			B1	- 0.5 oe seen
			$y = "-0.5"x + 4$	3	B1	(can be implied from final answer) (correct y intercept)
					B1ft	(ft grad only if $\frac{v}{h}$ 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	accept $x > -1$
					B1	accept $y > x$
					B1ft	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 $\frac{8 \pm \sqrt{64 - 48}}{2}$		M2	M1 for 1 correct factor or $(x + 6)(x + 2)$
			$x = 6$ or 2	3	A1 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		M1	correct sub/elimin to get 1 eqn 1 unknown
			$-1.5, -3$	3	A1 A1 Ans only = M0A0A0
					Total 6 marks

14.		$\frac{1}{2} \times 6 \times 4 \times \sin x^\circ = 6.75$ oe $\sin x^\circ = \frac{6.75}{12}$ or $\frac{9}{16}$ or 0.5625			M1 M1 A1	isolating sin x awrt 34.2
			34.2	3		
					Total 3 marks	

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

Q		Working	Answer	Mark	Notes	
16.	(a)		$\frac{1}{4}$ on Black branch Correct tree structure		B1 B1	
			Labels and values correct	3	B1	
	(b)	$\frac{3}{4} \times \frac{2}{3}$	$\frac{1}{2}$	2	M1 ft A1	Allow ft if ww selected from tree diagram or $\frac{3}{4} \times \frac{3}{4}$ cao
	(c)	$\frac{3}{4} \times \frac{2}{3} \times \frac{1}{2}$ or $\frac{3}{4} \times \frac{1}{3}$ or $\frac{1}{4}$ $(\frac{3}{4} \times \frac{2}{3} \times \frac{1}{2}) + (\frac{3}{4} \times \frac{1}{3}) + (\frac{1}{4})$	$\frac{3}{4}$	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.		$\frac{84}{360}$ or $\frac{7}{30}$ or 0.23.. $\frac{84}{360} \times \pi \times 45^2$	1480	3	M1 M1 A1	$360 \div 84$ or 4.2857... or 4.29 or $\frac{30}{7}$ $\pi \times 45^2 \div "4.29"$ awrt 1480 (3 sf) sc 1485 or 1490 from $\pi=22/7$ seen M2A1
Total 3 marks						

18.		$\frac{AC}{\sin 110} = \frac{3.4}{\sin 30}$ oe $AC = 3.4 \times \frac{\sin 110}{\sin 30}$	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 $r^2 + 4r - \frac{33}{4} = 0$ oe $(4r^2 + 16r - 33 = 0)$ $(2r - 3)(2r + 11) = 0$	1.5	4	M1 ie correct equation based on areas. M1 correct equation = 0 M1 $\frac{-4 \pm \sqrt{4^2 + 4 \times \frac{33}{4}}}{2}$ or $\frac{-16 \pm \sqrt{16^2 + 16 \times 33}}{8}$ A1 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	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 + kc = a + c} or {kc = 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 + kc 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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