

# Mark Scheme (Results) November 2009

IGCSE

IGCSE Mathematics (4400)  
Paper 3H Higher Tier

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## November 2009 IGCSE Mathematics (4400) Mark Scheme - Paper 3H

Q	Working	Answer	Mark	Notes	
1.	$\frac{x}{15} + \frac{y}{15}$ or $\frac{(2 \times 5) + (1 \times 3)}{(3 \times 5)}$		2	B1 denominators common multiple of 15 or 10/15 or 3/15 (accept $\frac{2 \times 5}{15}$ or $\frac{3 \times 1}{15}$ ) B1 correct answer equivalent to 13/15	
				Total 2 marks	
2.	$8y - 5y = 3 + 9$ $3y = 12$ or $3y - 12 = 0$	4oe	3	M1 correct gathering of terms M1 (can imply 1st M1) A1 Answer only or embedded answer =MOAO	
				Total 3 marks	
3.	(a) $360 \div 8 (=45)$ $(180 - "45") / 2$	$180 \times 6/8 (=135)$ "135" $\div 2$	67.5	3	M1 M1 dep A1
	(b) $360 \div 30$	$180 - 30 = 180(n-2)/n$	12	2	M1 A1
				Total 5 marks	
4.	$(1 \times 3) + (2 \times 2) + (3 \times 7) + (4 \times 13) + (5 \times 11)$ "135" $\div 36$		3.75	3	M1 must see at least 3 correct products M1 (dep) A1 accept 4 with working
				Total 3 marks	
5.	(a) $12x + 6(x + 2)$ oe	$18x + 12$	2	B2 B1 for $12x$ or $6(x + 2)$ penalise errors	
	(b) "a" = 57 $18x + 12 = 57$ or $45 \div 18$	2.5	2	M1ft "a" = linear term $b x + c$ ( $c, b \neq 0$ ) A1 cao allow numerical methods	
				Total 4 marks	

Q	Working	Answer	Mark	Notes
6. (a)		6	1	B1
(b)		1, 2	1	B1
(c)		Black cats	1	B1 Cats that are black etc
				Total 3 marks

7. (a)	$2 \times \pi \times 30$	188	2	M1 A1 188(.495...) awrt 188 or 189
(b)	$4.2^2 (=17.6(4))$ $\pi \times 2.1^2 (=13.8\dots\dots)$ "4.2 <sup>2</sup> " - " $\pi \times 2.1^2$ "	3.79	4	M1 M1 M1 dep on both previous M1 marks A1 Accept awrt 3.78 or 3.79
				Total 6 marks

8.	$0.1 + 0.05 + 0.05$ or $1 - (0.4 + 0.3 + 0.1)$	0.2	2	M1 A1
				Total 2 marks

9. (a)	$2w - 6 + 3w + 15$	$5w + 9$	2	M1 A1 M1 for 3 correct terms (no isw)
(b)	$x + 5 = 3 \times 9$	22	2	M1 A1 Answer only or embedded answer =MOA0
(c)	$5y < 13 - 7$	$y < 6/5$ oe	2	M1 A1 Must be an inequality
				Total 6 marks

10.	$2 \times (0.5 \times 8 \times 15) + (17 \times 20) + (15 \times 20) + (8 \times 20)$ $2 \times 60 + 340 + 300 + 160$	920	3	M1 M1 A1 1 correct face 60, 340, 300 or 160 All correct faces added 120 $\neq$ 2x60
				Total 3 marks

Q	Working	Answer	Mark	Notes
11.	$P^2 = ab$ or $p/\sqrt{b} = \sqrt{a}$	$P^2/b$ oe	2	M1 accept $P^2 = a \times b$ and $p \times p = a \times b$ A1
				Total 2 marks

12. (a)	$4^2 + 6^2 (=52)$ $\sqrt{"52"}$	7.21	3	M1 M1 (dep) A1 7.21(11...) awrt 7.21
(b)	Alt. $y/\sin 90 = 5/\sin 70$ M1 $y = 5 / \sin 70$ M1	$\cos 20 = 5/y$ $y = 5 / \cos 20$	5.32	3 M1 cos selected M1 A1 5.32088..... awrt 5.32
				Total 6 marks

13. (a)		Algeria	1	B1 Accept $2.4 \times 10^6$
(b)		10	1	B1 Ten times etc
(c)		$4.348 \times 10^6$ or $4.35 \times 10^6$	2	B2 B1 for digits 4348 or 4350000 or $4.3 \times 10^6$
				Total 4 marks

14.	2 lines where coeff of x or y are "equal"	$x=1, y=-1/3$	3	M1 eg $4x - 6y = 6$ or $6x - 9y = 9$ and $3x + 6y = 1$ and $6x + 12y = 2$ and then add/subtract (condone 1 num. error) or make x or y the subject in either equation & subst. A1 A1 Answers alone =MOA0
				Total 3 marks

15.	$2125 \div 0.85$ oe	2500	3	M2 M1 for $2125 \div 85 (=25)$ or $85\%=2125$ or $0.85 \times "x" = 2125$ A1 cao
				Total 3 marks

Q	Working	Answer	Mark	Notes
16. (a)	Read height at cf 100 or 100.5	54 to 56 inc	2	M1 A1
(b)	200 - (178 to 182)	18 to 22 inc	2	M1 A1
				Total 4 marks

17. (a)	$(x - y)(x + y)$		1	B1
(b)	$c^2 + 2cd + d^2 - d^2$	$c(c + 2d)$	2	M1 A1 Alt $(c + d + d)(c + d - d)$
(c)		$(2w + 3)(w - 1)$	2	B2 B1 for 1 correct factor or $(2w-3)(w+1)$ Integers only
				Total 5 marks

18.	Alt. $144\pi$ M1 $112\pi/144\pi(=7/9)$ or $32\pi/144\pi(=2/9)$ M1 $7/9 \times 360$ or $2/9 \times 360 = 80$ M1	$x/360 \times \pi \times 12^2 = 112\pi$ $(x=)112 \pi \times 360/12^2 \pi$ oe	280	4	M2 M1 for $x/360 \times \pi \times 12^2 (=0.4\pi x$ or $1.256...x)$ M1 A1
				Total 4 marks	

19. (a)	$x^2/x(x-2)$	$x/(x-2)$	2	M1 A1 M1 for $x(x-2)$ brackets not necessary
(b)	$\frac{2(x+1) - (2x - 1)}{(2x - 1)(x + 1)}$ $\frac{2x+2 - 2x + 1}{(2x - 1)(x + 1)}$	$\frac{3}{(2x - 1)(x + 1)}$ oe	4	M2 M1 for $(2x - 1)(x + 1)$ seen M1 A1 $\frac{3}{2x^2 + x - 1}$
				Total 6 marks

Q	Working	Answer	Mark	Notes
20. (a)	$(2/3)^3$	8/27 oe	2	M1 A1 0.296.....
(b)	$(2/3)^2 \times 1/3 \times 3$	4/9 oe	3	M2 A1 M1 for $(2/3)^2 \times 1/3 (=4/27)$ 0.444....
				Total 5 marks

21. (a)	$t = k \sqrt{d}$ $12 = k \sqrt{4}$ $k = 6$	$t = 6\sqrt{d}$	3	M1 M1 A1 Must make t the subject
(b)	"6" $\times \sqrt{9}$	18	2	M1ft A1 ft
				Total 5 marks

22.	210 - 70 (=140) ("AB" <sup>2</sup> =) $3^2 + 5^2 - 2 \times 3 \times 5 \cos "x"$ ("AB" <sup>2</sup> =) 56.98	7.55	3	M1 $x=80,140,210$ A1 awrt 57 A1 7.5485.... awrt 7.54 or 7.55
				Total 3 marks

23.	$d/s = t$ $25 \times 400.5 / 4.95 (=2022.727\dots)$ secs "2022.727"/60 (=33.712..) mins	33mins 43 secs	4	M2 M1 for 400.5 or 4.95 seen M1 dep on at least 1 previous M1 A1 cao
				Total 4 marks

Q	Working	Answer	Mark	Notes
24. (a) (i)		$x^2 - 3$	1	B1 accept "y=" $x^2 - 3$
(ii)		$x + 3$	1	B1 accept "y=" $x + 3$
(b)	$"x^2 - 3" = "x + 3"$ $x^2 - x - 6 = 0$ $(x - 3)(x + 2) (=0)$	$x = 3 \quad x = -2$	3	M1ft quadratic = linear (ax+b) a,b ≠ 0 M1 or formula reaching (x=) $(1 \pm \sqrt{25})/2$ A1 cao algebraic method req <sup>d</sup>
				Total 5 marks

25. (a)	$a^{3.5} = k a^{0.5}$ or $a^3 \sqrt{a} (=k\sqrt{a})$	$n=3$	2	M1 M1 for 3.5 and 0.5 seen or $(\sqrt{a})^6$ or $a^3$ A1
(b)	$2^{-1} \times 2^{-0.5}$	$2^{-1.5}$	2	M1 $1/2^{1.5}$ or $\sqrt{2}/4$ or $2^{0.5}/2^2$ or $2^{0.5} \times 2^{-2}$ A1
				Total 4 marks

				<b>TOTAL FOR PAPER: 100 MARKS</b>
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