

4400 IGCSE Mathematics
May 2006
Paper 3H

Q		Working	Answer	Mark		Notes
1.	(a)	$\frac{180}{510} \times 100$	35	2	M1 A1	for $\frac{180}{510}$ or 0.35... for 2 sf or better (35.2941...)
	(b)	$\frac{35}{14}$	2.5	2	M1 A1	for $\frac{35}{14}$ SC Award M1 for 0.4 oe or for 2 : 5 for 2.5 or $2\frac{1}{2}$ or $\frac{5}{2}$
						Total 4 marks
2.		$7 = 4x + 10$ or $-4x = 10 - 7$ $4x = -3$ or $-4x = 3$	$-\frac{3}{4}$ or -0.75	3	M1 M1 A1	may be implied by second M1 Condone $\frac{3}{-4}$
						Total 3 marks
3.			reflection $y = 3$	2	M1 A1	Accept reflect, reflected, reflex etc Accept e.g. 'in dotted line'
						Total 2 marks
4.	(a)	$9 + 12$	21	2	M1 A1	for 9 or + 12 $-9 - 12 = 21$ cao scores M0 A0
	(b)	(i) (ii)	p^8 q^6	2	B1 B1	cao cao
						Total 4 marks

5.	(a)	1,1,1,1,1,1,2,2,2,3,4,5,5,5,5 or $7\frac{1}{2}$ or 8 seen	2	2	M1 A1	cao
	(b)	$1 \times 6 + 2 \times 3 + 3 \times 1 + 4 \times 1 + 5 \times 4$ or $6 + 6 + 3 + 4 + 20$ or 39 “39” $\div 15$	2.6	3	M1 M1 A1	for at least 3 products (need not be evaluated or summed) (dep) for “39” $\div 15$ cao
						Total 5 marks

6.	(a)	$\frac{12}{15}$ or $\frac{2}{5} \times 2$	$\frac{4}{5}$	2	M1 A1	cao Do not accept decimals
	(b)	$\frac{8}{3} \times \frac{6}{5}$	$3\frac{1}{5}$	2	M1 A1	for $\frac{8}{3} \times \frac{6}{5}$ may be implied by $\frac{48}{15}$ or $\frac{16}{5}$ but not by 3.2 cao Do not accept decimals
						Total 4 marks

7.		$7.5^2 - 7.2^2$ or 4.41 $\sqrt{7.5^2 - 7.2^2}$	2.1	3	M1 M1 A1	for squaring and subtracting (dep) for square root cao
						Total 3 marks

8.		$2 + 3 + 4$ or 9 seen	24	2	M1 A1	for $2 + 3 + 4$ or 9 seen or for 6 seen Accept 12 : 18 : 24
						Total 2 marks

9.			R shown	3	B3	B3 for correct R shaded in or out Condone omission of label B2 for single shaded shape with 3 correct boundaries or for parts of both regions unambiguously shown or for 3 or 4 correct lines + 0 incorrect B1 for single shaded shape with 2 correct boundaries or for square parts of both regions ambiguously shown or for 2, 3 or 4 correct lines + one or more incorrect SC B1 for region bounded by $1 \leq y \leq 3$ and $-4 \leq x \leq -2$
						Total 3 marks

10.	(a)		$360 \div 32$ or $32 \times 11.25 = 360$	1	B1	Accept also $\frac{180}{16}$ and $\frac{360}{11.25} = 32$ NB answer 11.25 is given
	(b)	$\frac{11.25}{2}$ or $180 - 11.25 = 168.75$ and $\frac{180 - "168.75"}{2}$	5.625 84.375 or 95.625	3	M1 A1 A1	may be stated or shown on diagram 5.625 seen scores M1 A1 Accept 84.4, 84.38, 84.37, 95.6, 95.62, 95.62
	(c)	$\pi \times 135$	424	2	M1 A1	Accept any value rounding to 424
	(d)	"424" \div 0.26 or 1630 "1630" \div 60	27	3	M1 M1 A1	for division for 0.26 (dep on first M1) for division by 60 for 27, 27.2 or answer truncating to 27.1 ft from answer to (c)
						Total 9 marks

11.		(i) (ii)	360 000 0.0029	2	B1 B1	cao Accept $\frac{29}{10000}$	Total 2 marks	
12.		eg $\frac{25}{15} = 1.67$ and $\frac{20}{10} = 2$ $\frac{15}{10} = 1.5$ and $\frac{25}{20} = 1.25$	“No” indicated	3	M1 M1 A1	e.g. for $\frac{25}{15}$ for $\frac{20}{10}$, consistent pairing dep on both M marks, inc. evaluation or simplest forms of ratios	Total 3 marks	
13.	(a)	$12x^2 + 21x - 20x - 35$	$12x^2 + x - 35$	2	M1 A1	for 4 correct terms ignoring signs or 3 correct terms with correct signs Accept $12x^2 + 1x - 35$		
	(b)		$8p^{12}$	2	B1 B1	for 8 for p^{12}	B2 for $8 \times p^{12}$ B1 for $8 \pm p^{12}$	
	(c)		$16y^4$	2	B1 B1	for 16 for y^4	B2 for $16 \times y^4$ B1 for $16 \pm y^4$	
							Total 6 marks	

14.	(a)	(i) $0.3 + 0.6$	0.9	3	M1 A1 B1	ft 1 - "0.9"
		(ii)	0.1			
	(b)	0.3×0.3 0.6×0.4 or $0.6 \times 0.3 + 0.6 \times 0.1$ or 0.24 or $0.6 \times 0.3 \times 2$ or 0.36 or $0.6 \times 0.1 \times 2$ or 0.12 "0.24" $\times 2$ oe or $1 - (0.6 \times 0.6 + 0.4 \times 0.4)$ or $1 - (0.36 + 0.16)$	0.09 0.48 0.48	5	M1 A1 M1 M1 A1 M2 A1	dep on previous M1 ft from "0.1" The assumption that $P(3) = P(4) = 0.5$ makes the method incorrect and 0.48 cannot gain full marks but $0.6 \times 0.3 \times 2$ still scores M1.
						Total 8 marks

15.	(a)		1, 4, 6, 8	1	B1	cao
	(b)		2,3,5 or 2,3,7 or 2,5,7 or 3,5,7	2	B2	B1 if one condition satisfied but do not award B1 for 2,3,5,7
						Total 3 marks

16.	(a)		1, -5	1	B1	Allow ± 0.1 for y-coordinate
	(b)	Points of intersection of curve and x-axis indicated	3.2 -1.2	2	M1 A1	May be implied by one correct solution for both values seen Allow ± 0.1 Condone coordinates Allow solutions to > 1 dp unless there is clear evidence that the formula has been used
	(c)	$x^2 - 2x - 4 = x + 2$ or $y = x + 2$ seen line $y = x + 2$ drawn	4.4 -1.4	3	M1 M1 A1	may be implied by 2nd M1 Allow ± 0.1 Do not accept coordinates
	(d)	$2 \times 6 - 2$ (or 10 seen)	$2x - 2$ 10	4	B2 M1 A1	B1 each term (-B1 each extra term) may be awarded if at least B1 above cao
						Total 10 marks

17.	(a)	(i)	e.g. 9	2	B1	Accept any multiple of 9 inc 45, 90, ... Must be positive whole number
		(ii)	multiple of 9		B1	Accept 'in 9 times table' oe
	(b)	1.3777... and 1.4222...	1.4 and agree to 2 sf or 1 dp oe	2	M1 A1	for converting to decimals with at least 2 dp rounded or truncated 1.4 and correct explanation needed
						Total 4 marks

18.		$2.3 \sin 62^\circ$ $2.030\dots$ $\tan 74^\circ = \frac{"2.030"}{BQ}$ or $\tan 16^\circ = \frac{BQ}{"2.030"}$ $BQ = \frac{"2.030"}{\tan 74^\circ}$ or $BQ = "2.030" \tan 16^\circ$	0.582	5	M1 A1 M1 M1 A1	At least 3 sf May be implied by correct final answer for 0.582 or better (0.582316...) Award full marks for 0.58 if all preceding M marks scored ft from "2.030" (ft from $AD = 2 \rightarrow 0.5734\dots$)
Total 5 marks						

19.	(a)		45 75	2	B2	B1 for each
	(b)		bar 17sq high, 10 sq wide bar 16 sq high, 5 sq wide	2	B2	B1 for each NB $80 < t \leq 90$
						Total 4 marks

20.		$A = \pi(R^2 - r^2)$ or $\frac{A}{\pi} = (R + r)(R - r)$ $A = \pi R^2 - \pi r^2$ or $\frac{A}{\pi} = R^2 - r^2$ $R^2 = \frac{A + \pi r^2}{\pi}$ or $R^2 = \frac{A}{\pi} + r^2$		4	M1 for $R^2 - r^2$ seen or division by π M1 for $A = \pi R^2 - \pi r^2$ or $\frac{A}{\pi} = R^2 - r^2$ M1 for $R^2 = \frac{A + \pi r^2}{\pi}$ or $R^2 = \frac{A}{\pi} + r^2$ A1 Condone omission of \pm Do not award if followed by further incorrect 'simplifying'	This M1 also implies the first M1 ft if $(R + r)(R - r)$ expanded as $R^2 - r^2$ to a maximum of 3 marks
						Total 4 marks

21.			46 6	2	B1 B1	Condone $6\sqrt{5}$ Award B1 + B1 for $46 + 6\sqrt{5}$ seen and isw
						Total 2 marks

22.	$\pi \times 30^2 \times 5$ or $\pi \times 30^2 \times 41 - \pi \times 30^2 \times 36$ or 14123 - 14151 " $\pi \times 30^2 \times 5$ " = $\frac{4}{3}\pi r^3$ $r^3 = \frac{3 \times \pi \times 30^2 \times 5}{4\pi}$ or $\frac{15 \times 30^2}{4}$ $\sqrt[3]{\frac{3 \times \pi \times 30^2 \times 5}{4\pi}}$ oe	15	5	M1	
				M1	dep on previous M1
				M1	dep on previous M1
				M1	dep on previous M1
				A1	for 15 or for answer rounding to 15.0
					Total 5 marks

23.	$(2x + 3)^2 = x^2$ $4x^2 + 12x + 9 = x^2$ or $4x^2 + 6x + 6x + 9 = x^2$ $3x^2 + 12x + 9 = 0$ $(x + 1)(x + 3)$ OR $(2x + 3)^2 = x^2$ $2x + 3 = \pm x$ $x + 3 = 0$ or $3x + 3 = 0$	-1 -3	5	M1	for $(2x + 3)^2$ seen
				M1	
				M1	
				M1	Accept $(3x + 3)(x + 3)$ & $(3x + 9)(x + 1)$ or $\frac{-12 \pm 6}{6}$ or $\frac{-4 \pm 2}{2}$
				A1	for both solutions isw Condone coordinates
			5	M1	
				M2	(M1 for $2x + 3 = x$)
				M1	for both
				A1	for both solutions isw Condone coordinates
					Total 5 marks PAPER TOTAL 100 MARKS