

June 2005

Paper 4H Mark
scheme

Q	Working	Answer	Mark	Notes
1.	Correctly collect p terms in eqn Correctly collect constants in eqn	$\frac{1}{2}$ oe	3 M1 M1 A1	eg $4p + 3 = 5$ (not $7p - 3p + 3 = 5$) Total 3 marks
2.	14.9422 $611 - 182 = 429$ "429" \times 0.0704 or 30.2016 "14.9422" + "30.2016" or 45.1438 "45.1438" \times 5/100 or 2.25719 "45.1438" + "2.25719"	47.40(099)	7 B1 B1 M1 M1 M1 M1 A1	Allow working to 3 s.f. or better throughout M marks can be implied 45.14 \times 1.05 or 47.50 or 2.25 Can be awarded in previous line At least 2 d.p. Total 7 marks
3. (a)		50°	3 B3	If B3 not gained: $PQS = 70^\circ$ / $\angle PTR = 60^\circ$ / ext $\angle PTR = 120^\circ$: B2 If B2 not gained: $\angle PST = 60^\circ$: B1
(b)		\angle s on a straight line = 180° or \angle sum of triangle = 180° or ext \angle of Δ = sum of int opp \angle s AND Corresponding \angle s or alternate \angle s or allied or supp or included or interior or co-interior \angle s	2 B1 B1	 Total 5 marks

4.	(a)	(i)	p^4	1	B1	
		(ii)	$-3a + 4b - 7$	2	B2	B1: 2 terms. subs include
		(iii)	q^6	1	B1	working: -B1
	(b)		$2x^2 + 3x$	2	B2	B1 each term. subs include working: -B1
	(c)		$y^2 + 2y - y - 2$	2	M1	3 terms correct or 4 terms correct ignoring sign
			$y^2 + y - 2$		A1	Incorrect subsequent work: -A1
Total 8 marks						
5.	(a)		10-19	1	B1	
	(b)		42/59 or 0.71(...) or 71(...)%	2	B2	B1 num, B1 denom 42:59 B1
	(c)		$8 \times 4.5 + 20 \times 14.5 + 14 \times 24.5 + 5 \times 34.5 + 12 \times 44.5$ Midpoints 4.5 (or 5 or 4) etc	3	M1	\geq four fx attempted, consistent x within interval dep (for midpoints 4 or 5 etc) ISW eg $\div 59$ 23.3, 1405, 1346 (no working): SC B2 22.8, 23.8 : SC B1
			1375(.5) or 1376		M1 A1	
Total 6 marks						
6.			No or not necessarily Some are (or may be) both	2	B1 B1	dep on 2 nd B1
Total 2 marks						

7.	(a)	$8^2 + 15^2$ or 289 seen $\sqrt{\quad}$	17cm	3	M1	$\tan x = 15/8$ dep on x used
					M1	dep $8/\cos x$
					A1	Answer rounds to 17.0
	(b)		15/8 or 1.875 or 1.88 seen	1	B1	ISW
Total 4 marks						
8.	(a)		Kitchen chairs	2	B1	Or equivalent. Must be clear that overlap is intended eg "chairs that are part of / common to kitchen furniture" "furniture that is both a chair and in the kitchen"
			belonging to Angela or "her"		B1	
	(b)	(i)	1, 2, 3, 4, 5, 6, 7, 8, 9	2	B2	-B1 each omission or extra Any order, in a single list Ignore negative odd numbers
		(ii)	Yes - no common members	1	B1	Or eg "No odd numbers in P." "P is even numbers, or Q is odd numbers." Must refer to sets or odd or even
Total 5 marks						
9.		$19.8 = 2\pi \times r \times 2.1$ or $19.8 / (2\pi \times 2.1)$	1.5 or better	2	M1A1	Or $19.8 = 2\pi \times 1.5 \times 2.1$
		OR $2\pi \times 19.8 \times 2.1$	261(.3..)		M1A1	
Total 2 marks						

- | | | | | | |
|-----|-----|---|---|----------------|---|
| 10. | (a) | 9.905×10^7 or 99 050 000 or
9.91×10^7 or 99 100 000 | 2 | B2 | B1 for digits 9905 or 991 |
| | (b) | $9.7/100 \times 9.72 \times 10^7$

9.43×10^6 or 9 430 000 or better | 2 | M1
A1 | |
| | (c) | Total = 5.988×10^8 or 598800000
(4.98×10^8 / her 5.988×10^8) x 100

83% or better | 3 | B1
M1
A1 | Or 599000000
dep total clearly attempted |

Total 7 marks

- | | | | | | |
|-----|-----|---|---|------------|--|
| 11. | (a) | 3 x (i) or otherwise equalize
coeffs

$\frac{1}{2}, 1$ | 3 | M1
A1A1 | Whole equations correct
T & I: 3 or 0 |
| | (b) | Her ($\frac{1}{2}, 1$) | 1 | B1f | |

Total 4 marks

- | | | | | | |
|-----|-----|-------------------------------------|---|----------|---------------------|
| 12. | (a) | 49 | 1 | B1 | |
| | (b) | (i) $2.5 \times 3/2$ oe

3.75 | 2 | M1
A1 | cao |
| | | (ii) $1.5 \times 2/3$ oe

1 | 2 | M1
A1 | Or 1.5 - 0.5
cao |

Total 5 marks

13. (a) $2(-4) - 3$ -11 2 M1
A1
- (b) $2a - 3 = 5$ or $(5 + 3)/2$ 4 2 M1
A1
- (c) $f(2 \times 6 - 3) + 1$ 4 2 M1
A1
- (d) Negative or $x < 0$ 1 B1
- (e) $y = 1 + \sqrt{x}$ | $\sqrt{\quad}, +1$
 $x = (y - 1)^2$ | becomes $-1, (\quad)^2$ 3 M1 Or $x = 1 + \sqrt{y}$
M1 Or $g^{-1}(x) = (x - 1)^2$ or $(x - 1)^2$
A1

Total 10 marks

14. (a) $x(28 - 2x)$ seen 1 B1 Brackets essential
- (b) (i) $28 - 4x$ 2 B1B1 Ignore "y ="
- (ii) " $28 - 4x$ " = 0 $x = 7$ 2 M1
A1
- (iii) negative coeff. of x^2 or \cap shape 1 B1 Not "the value is negative."
or $\frac{d^2y}{dx^2} = -4$, which is negative ft her $28 - 4x$
- (c) $28 \times 7 - 2 \times 7^2$ 98 2 M1 ft his (ii) if working seen
A1 cao

Total 8 marks

15.	(a)	$\pi \times 12^2 \times 110/360$		2	M1	Or $\pi \times 12^2 \times 0.31,$ Or $\pi \times 12^2 \div 3.3$ or better	
			138(.2. . .)		A1		
	(b)	$1/3 \times 2\pi r$ or $120/360 \times 2\pi r$ seen + $2r$ seen		3	M1 M1 A1	Or equivalent explanation	
			$\frac{2\pi r}{3} + 2r$ or $2/3\pi r + 2r$				
Total 5 marks							
16.	(a)	(i)	-a + b	oe	1	B1	} Simplification not required } Allow plain <i>a, b</i> }
		(ii)	2a	oe	1	B1	
		(iii)	-2a + 2b	oe	1	B1	
	(b)		Parallel $QR = 2MN$ or lines in ratio 1:2 or 2:1		2	B1 B1	(b) marks dep (a)(i)&(iii) correct Without vector symbols unless "length" stated.
Total 5 marks							
17.	(a)	One block of correct height, or $20/5$ or $14/5$ or $8/20$ seen		4	M1	8cm, 5.6cm or 0.8cm, any width	
			Correct blocks, height & width		A1A1A1		
	(b)	$1/2 \times 14$ or $1/4 \times 8$ or 2.5×2.8 or 5×0.4		2	M1	Value "7" or "2" not enough	
			9		A1		
Total 6 marks							

18. (a) $\frac{2}{5}$ and $\frac{3}{5}$ correctly placed 3 B1
 $\frac{3}{4}$ and $\frac{1}{4}$ correctly placed B1 Allow even if extra branches
 Correct structure includes labels B1

(b) $\frac{3}{5} \times \frac{3}{4}$ or $\frac{9}{20}$
 $+ \frac{2}{5}$

$\frac{17}{20}$ or 0.85 oe

3 M1

M1 dep
 A1

Total 6 marks

19. $5.\dot{1}-0.5\dot{1}$ or $51.\dot{1}-5.\dot{1}$ or $51.\dot{1}-0.5\dot{1}$

2 M1 Or 1/90 seen

$\frac{23}{45}$ or $\frac{46}{90}$ or $\frac{460}{900}$ oe A1

Total 2 marks

TOTAL FOR PAPER: 100 MARKS