UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

0580 MATHEMATICS

0580/22 Paper 22 (Extended), maximum raw mark 70

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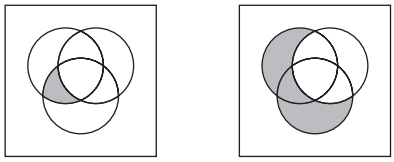
Qu	Answers	Mark	Part Marks
1	**(a)** 6	1	
	(b) 0	1	
2	37, 41	2	**B1, B1** independent
3	–0.577 or $\frac{-\sqrt{3}}{3}$ or $\frac{-1}{\sqrt{3}}$	2	**B1** numerator 0.5 oe **or B1** denominator –0.866……or $\frac{-\sqrt{3}}{2}$
4	$1.25\,x^4$ (or $1\frac{1}{4}x^4$)	2	**B1** 1.25 **B1** x^4
5	139	2	**M1** $1.322 \times 10^9 / 9.5 \times 10^8$ (× 100)
6	8	2	**M1** $\|\mathbf{A}\| = 0 \times 12 - 1 \times -4$ or better **or** $\|\mathbf{B}\| = 3 \times -4 - 0 \times 4$ or better det symbol can be implied by the working
7		2	**B1, B1**
8	10 **www**	2	**M1** $(-2 - -8)^2 + (10 - 2)^2$ or better
9	$x = 0.5$ $y = 3$ **www**	3	**M1** consistent × and – for y or consistent × and + for x **A1** one correct provided M1 scored
10	128	3	**M1** $d = kv^2$ **A1** k = 2/25 (= 0.08) or **M1** $v^2 = kd$ **A1** k = 12.5
11	198 cao	3	**M1** 12.5 and 20.5 seen **M1** 6 × sum of their two upper bounds
12	$-36x^2 + 48x$ or $12x(4 - 3x)$ oe or other partly factorised versions	3	**M1** squaring to "$9x^2 - 12x + 4$" algebraic **M1** multiplying by –4 terms **M1** adding 16 only
13	$x \geqslant 0.8$ or $x \geqslant 4/5$ cao	3	**B1** $12 - 18x$ **B1** $-4 + 8x$ these terms may be reversed if moved to the other side of the inequality allow >=
14	\$12.92	3	**M1** $249 \times r^3$ r can be anything **dep M1** r = 1.017 and subtracting 249 **SC2** 261.92 on answer line

15	**(a) (i) OQ**	1	
	(ii) RM or **MP**	1	Allow ½**RP**
	(b) 	2	**B1, B1** correct position wrt each direction of the vector ± 1 mm
16	**(a)** (0)810 or 8:10 etc.	1	
	(b) 4	2	**M1** (3 + 3)/(1 + 0.5)
	(c) 265	1	
17	**(a)** 261.48 cao	2	**M1** 4000 / 15.2978
	(b) **(±)**3.86(48…) or 3.865	2	**M1** (15.9128 – 15.2978)/15.9128 (×100) oe or ("261.48" – 4000/15.9128) / "261.48"
18	$m = 2$ $c = -10$	4	**B1** $B(5, 0)$ or $A(-4, 0)$ seen or used **B1** $m = 2$ **M1** substituting (5,0) into $y = 2x + c$ or $\frac{0-c}{5-0} = 2$
19	**(a)** 44	2	**M1** $OCB = 68$
	(b) 158	2	
20	**(a)** 38	1	
	(b) 45 to 46	1	
	(c) 15 to 16	1	
	(d) 10 or 11	2	**SC1** 70 on answer line
21	**(a)** 0.8 or 4/5 cao	2	**M1** speed/time
	(b) 960 **www**	3	**M1** 30 × (12 + 36)/2 **M1** 10 × (12 + 36)/2 **M1** 12 × 40 **M1** ½ × 40 × 24

22	**(a)** 2	2	**M1** f(0) = 1
	(b) $4x^3 + 5$	2	**M1** $4(x^3 + 1) + 1$
	(c) $\frac{(3x-1)}{2}$	2	**M1** rearranging $y = (2x + 1)/3$ to make x the subject and interchanging x and y. Allow any **one** error in the working
		70	