UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

0580 MATHEMATICS

0580/21 Paper 2 (Extended), maximum raw mark 70

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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Abbreviations

cao correct answer only
cso correct solution only
dep dependent
ft follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
www without wrong working

Qu.	Answers	Mark	Part Mark
1	847	**1**	
2	correct regions shaded	**1, 1**	
3	48	**2**	**B1** for 3 **and** 16 seen
4	**(a)** 10 **(b)** 5.5 oe	**1** **1**	
5	**(a)** 86400 **(b)** 8.64×10^4	**1** **1ft**	
6	108	**2**	**M1** for 3^3 or 27 or $\left(\frac{1}{3}\right)^3$ or $\frac{1}{27}$ seen
7	13	**3**	**B1** for 12, 5 seen **M1** for (their 12)^2 + (their 5)^2 or **M2** $\sqrt{[(-8-4)^2 + (1-6)^2]}$ oe or **M1** if $\sqrt{}$ missing
8	6.70	**3**	**M1** for (r^3 =) $1260 \times \frac{3}{4\pi}$ oe seen **M1** for $\sqrt[3]{}$ of their r^3 seen or implied
9	22.5 oe	**3**	**B2** $180 = 5x + 2x + x$ oe or better **B1** for $2x$ or $6x$ marked in the correct place on the diagram.
10	$x = 13$ $y = -9$	**3**	**M1** for consistent multiplication and addition/subtraction **A1** for $x = 13$ or **A1** for $y = -9$
11	**(a)** 85.8 **(b)** 456.8625 cao	**2** **1**	**M1** for 23.25 and 19.65 seen
12	**(a)** (0)8(.)01 (am) **(b)** 78.4 or 78.38 to 78.39	**1** **3**	Not 8.01pm **M2** for 827 ÷ 10.55 or **M1** for figs 827 ÷ their time
13	**(a)** 0.54 **(b)** 1.61	**2** **2**	**M1** for $\frac{2.7 \times 20\,000}{10\,0000}$ oe or **SC1** for figs 54 in answer **SC1** for figs 161 or **M1** 200^2 or $20\,000^2$ seen

14	–2.64, 1.14 cao with working	**4**	**B1** for $\sqrt{3^2 - 4(2)(-6)}$ or better seen anywhere **B1** for $p = -3$ **and** $r = 2 \times 2$ or better as long as in the form $\frac{p+\sqrt{q}}{r}$ or $\frac{p-\sqrt{q}}{r}$ After **B0B0, SC1** for –2.637(45…) and 1.1 or 1.137(45…)
15	**(a)** 4 **(b) (i)** $\frac{12}{36}$ oe 0.333 **(ii)** $\frac{11}{36}$, 0.306 or 0.3055 to 0.3056 **(c)** $\frac{8}{15}$ oe 0.533(3…)	**1** **1** **1** **1**	
16	**(a)** Answer given **(b)** $k = (\pm)\sqrt{\frac{4A}{(4-\pi)}}$ or $2\sqrt{\frac{A}{(4-\pi)}}$	**2** **3**	**M1** $(A =)k^2 - \pi\left(\frac{k}{2}\right)^2$ **E1** $A = k^2 - \frac{\pi k^2}{4}$ correctly completed to $4A = 4k^2 - \pi k^2$ **M1** factorising (must contain a π) **M1** division (by coefficient of k^2) **M1** square root
17	**(a)** 66° **(b)** 33° **(c)** 123°	**2** **1** **2**	**M1** for 90° clearly identified as *A* **B1** for *OBA* or *OAB* = 57°
18	**(a) (i)** **-r + q** or **q** – **r** **(ii)** ½(3**q** – **r**) oe **(b)** correct working	**1** **1** **3**	Must be simplified **M1** for ***MX*** = ½ **r** + ¾ their (–**r + q**) **M1** using a different route for ***XS*** or ½ ***MS*** **E1** dep correct simplification and conclusion
19	**(a)** 480 **(b)** 9900 **(c)** 0.125 or $\frac{1}{8}$	**1** **3** **2**	 **M1** for attempt at area under graph **M1** for 0.5 × 15 × (their **(a)** + 14 × 60) oe or 0.5 × 15 × (8 + 14) oe **M1** for numerical vertical/horizontal or numerical use of v = u + at but t ≤ 120 or t ≤ 2
20	**(a) (i)** 9 **(ii)** $8x^3$ cao **(b)** 4 **www** **(c)** $\frac{x+3}{2}$	**1** **1** **3** **2**	 **M1** for $(2x - 3)^3 = 125$ **M1** $2x - 3 = 5$ **M1** for $x \pm 3 = 2y$ or $x = \frac{y \pm 3}{2}$