

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2010 question paper**  
**for the guidance of teachers**

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| <p><b>0581 MATHEMATICS</b></p> <p><b>0581/22</b>      Paper 22 (Extended), maximum raw mark 70</p> |
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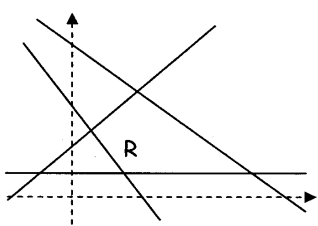
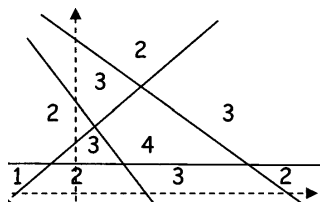
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Mark schemes must be read in conjunction with the question papers and the report on the examination.

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| Qu. | Answers   | Mark   | Part Marks  |
|-----|---|--------|---|
| 1   | (a) 1<br>(b) 1  | 1<br>1 | Allow none  |
| 2   | 0   | 2      | M1 $4\sin^3 120$ evaluated and rounding to 2.6 or better (2.598...) or $\frac{3\sqrt{3}}{2}$  |
| 3   | $2 - \sqrt{3}, 2 - \frac{\sqrt{3}}{2}, \frac{2}{\sqrt{3}}, \sqrt{3}$  | 2      | M1 correct decimals seen  |
| 4   | $\frac{15a+32}{40}$ oe  | 2      | B1 $15a + 32$ seen<br>or SC1 $\frac{15a}{40} + \frac{32}{40}$ on answer line  |
| 5   | $2^{10}$  | 2      | M1 $2^6$ or $2^{-4}$ seen   |
| 6   | $6.4 \times 10^7$   | 2      | M1 $64 \times 100^2 \times 10^2$ or 64 000 000 oe   |
| 7   | $(A \cup B \cup C)'$<br>$(A \cup C)' \cap B$  | 1<br>1 | or $A' \cap B' \cap C'$ or $A' \cap (B \cup C)'$<br>or $A' \cap C' \cap B$  |
| 8   | (a) 43 to 47<br>(b) 64 to 68  | 1<br>2 | SC1 23 to 27  |
| 9   | 63.84 <b>cao</b>  | 3      | M1 figs 1995<br>M1 $32 \times$ their lower bound  |
| 10  | $x = \frac{3}{P-1}$   | 4      | M1 for each of the four moves completed correctly   |
| 11  | (a) 10(.0.)<br>(b) 9.80   | 1<br>3 | M2 $\sqrt{((a)^2 - 2^2)}$ or M1 $PT^2 + 2^2 = (a)^2$  |
| 12  | (a) 440<br>(b) 3 min 20 sec   | 2<br>2 | M1 $\sin 37.1$ or $\cos 52.9 = \frac{h}{730}$ oe<br>M1 $\frac{730}{3.65}$   |
| 13  | (a) $\begin{pmatrix} 6x-3 \\ 4x+5 \end{pmatrix}$ but not $\begin{pmatrix} 6x & -3 \\ 4x & (+)5 \end{pmatrix}$<br>(b) $(6x^2 + x + 5)$ cao | 2<br>2 | B1 $6x - 3$ or B1 $4x + 5$ in a $(2 \times 1)$ matrix on answer line<br>M1 any $1 \times 1$ matrix in answer space  |
| 14  |    | 4      | Mark the position of the letter R (or the worst unshaded region if R is missing) as follows<br> |

|        |                                |          |
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|    |                          |     |   |
|----|--------------------------|-----|---|
| 15 | (a) (2, 4)               | 1   |   |
|    | (b) (6, 0)               | 1   |   |
|    | (c) (i) (4, 2) ft        | 1ft | From (a) and (b)  |
|    | (ii) $y = -3x + 14$ oe   | 2   | M1 sub their (c)(i) into $y = -3x + c$ oe   |
| 16 | $16 \frac{1}{4}$ or 16.3 | 5   | M1 finding the area under graph A1 130<br>M1 $\frac{1}{2} \times 16 \times v$<br>M1 equating and solving  |
| 17 | (a) 201                  | 2   | M1 $\pi \times 8^2$   |
|    | (b) 87.9 or 88.0         | 4   | M1 $\frac{45}{360} \times 2 \times \pi \times 12$ ..... d<br>M1 $2 \times \pi \times 8$ ..... e<br>M1 ft for their (4d + e) which must come from multiples of $\pi$<br>SC2 43.9 or 44.0   |
| 18 | (a) (i) 11               | 1   |   |
|    | (ii) $1 - 6x$            | 2   | M1 $3(1 - 2x) - 2$  |
|    | (b) -1.65, 6.65          | 4   | M1 $\frac{5 \pm k}{2}$ M1 $\sqrt{(-5)^2 - 4 \times 1 \times (-11)}$<br>or better<br>A1 A1   |
| 19 | (a) 6, 30, 70            | 2   | B1 for 2 correct  |
|    | (b) graph                | 3   | P2 7 plots correct from table<br>P1 5 or 6 plots correct from table<br>C1 smooth curve through the points in the given range within one small square of the plots or the correct position |
|    | (c) 82.5 or ft $\pm 1$   | 1ft |   |
|    | (d) 108 or ft $\pm 1$    | 1ft |   |