UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

0580 and 0581 MATHEMATICS

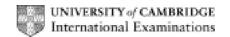**0580/03 and 0581/03**   Paper 3 (Core), maximum raw mark 104

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1 (a) (i) 35   B1   cao

     (ii) 7   B1   cao

     (iii) 8   B1   cao

     (iv) 7.71 **art**   **B3 ft**   M1 for $1\times5 + 5\times6 + 10\times7 + 9\times8 + 7\times9 + 3\times10$ **attempted**
                                          M1 for $\div$ 35 (ft from **(a)(i)** but not for 6)
                                          SC2 for 7.7

     (b) (i) 72   2   M1 for 7/35 x 360   (ft but not for 6)   oe

        (ii) line drawn   B1   final line (ft) drawn accurately, 1° accuracy   [9]

2   all within 1 mm

     (a) translation   B2   (–5,4), (–3,4), (–4,5)
        drawn   SC1 for any other translation not parallel to a axis

     (b) reflection   B2   (1,–3), (3,–3), (2,–4)
        drawn   SC1 for reflection in x=–1 or any y=k

     (c) rotation   B2   (–1,–1), (–3,–1), (–2,–2)
        drawn   SC1 for any 180 rotation or +90, –90 about (0,0)

     (d) enlargement   B2   (2,2), (6,2), (4,4)
        drawn   SC1 for any other enlargement sf=2 or centre (0,0)

     (e) enlargement   B1
        (sf=) 1/2   B1
        (centre) (0,0)   B1   **accept O**   [11]

3 **(a)** −6, −12, −36, 36, 12, 6   B3   B1 for ± 36, B1 for ± 12, B1 for ± 6
SC1 for any 3 correct

(b) 12 points plotted   P3   correct points ft within 1 mm
P2 for 10 or 11, P1 for 8 or 9, P1 for 1 correct branch

     2 curves drawn   C1   must be smooth branches of rectangular hyperbola

(c) 1.6 to 1.8   B1   ft

(d) 36, 9, 0, 9, 36   B2   B1 for 4 correct

(e) 13 points plotted   P3   correct points ft within 1 mm
P2 for 11 or 12   P1 for 9 or 10

     curve drawn   C1   must be smooth parabola

(f) 3.3, 10.9   B1ft   x from 3.2 to 3.4, y from 10.0 to 12.0   [15]

4 **(a)** 70.7 art   B2   M1 for $5 \times \pi \times 3^2 / 2$ **or better**

(b) 5.05 art   B3   M1 for $200 = 5 \times \pi \times r^2 / 2$ oe
M1 for $(r^2 =) 400 / 5\pi$ oe

(c) $(r =) \sqrt{2A/5\pi}$ B3   M1 for any correct x or ÷ of 1 term $2A = 5\pi r^2$
MA1 for $r^2 = 2A / 5\pi$
M1 for square root at end   [8]

5 **(a)** **(i)** −16   B1   cao

     (ii) 7 or 144 or both   B1

     (iii) 144   B1   cao

     (iv) $\sqrt{7}$ B1   cao

(b) 2 x 2 x 2 x 5   B2   B1 for 8x5, 2x20, 4x10, 2x4x5, or list 2, 2, 2, 5

(c) 11, 29   B1   cao
     17, 23   B1   cao   [8]

6 **(a)** **(i)** 78   B1   cao

     (ii) $5p + 4e$ B1   cao

   (b) **(i)** $2x + 3y = 57$ B1
          $5x + y = 58$ B1   **SC1 for different variables**

     (ii) $15x + 3y = 174$ M1   oe, for useful mult. or substitution **(2 terms correct)**
          $x = 9$ A1   cao
          $18 + 3y = 57$ M1   oe, for using first answer correctly and sensibly
          $y = 13$ A1   cao   [8]
                            www4
                            ft for M marks only for linear equations in 2 variables

7 **(a)** **(i)** 2.60 art **or 2.6**   B2   M1 for $\sqrt{(3^2–1.5^2)}$ or better $(\sqrt{6.75})$ **oe**

     (ii) 3.90 art **or 3.9**   B2 ft   M1 for 0.5 x 3 x their **(a)(i)**

     (iii) 31.2 art   B2 ft   M1 for 8 x their **(a)(ii)**

   (b) **(i)** 18   **www2**   M1 for 9 triangles **implied**, or 2 x k, or attempted sketch

     (ii) reasonable **sketch**   B1   shows 3 rectangles, 2 triangles in reasonable proportion

     (iii) area of "rectangle"   M1   for 16 x 9, 144, 3 x 9 x 16, 27 x 16, 432
            height of triangle   M1   for $\sqrt{(9^2–4.5^2)}$, $\sqrt{60.75}$, 7.79, **7.8, 3 x (a)(i) ft or trig**
            area of triangle   M1   for 0.5 x height (ft but not 9) x 9, 35.1, 70.2, **70.1**
                                 OR M2 for 9 x 3.90, 9 x their **(a)(ii)**, 35.1, 70.2, **70.1**
            total area   M1   3 rectangles and 2 triangles, 432 + 70.2 **or 70.1 soi**
            502 art   A2   **if M<3 then add SC3 for 502 art with no wrong working seen**

     (iv) 32.4(0)   B2   M1 for 540 x 6 or figs 324   [17**]**

8 **(a)** **(i)** 10 / 12.   B1   oe **2 sf for decimals and %'s (with sign) throughout**

     (ii) 4 / 12.   B1   oe

     (iii) 12 / 12.   B1   oe

   (b) 10.5   B2   M1 for (10+13+10+8+) / 12 or 126 / 12

   (c) **(i)** 12 points plotted   B3   B2 for 11, B1 for 10

     (ii) ruled line   B1   reasonable, at least from 8 to 19

     (iii) negative   B1   cao   [10]

9 **(a)** **(i)** arc   B1   full arc, centre T, radius 4 cm, must cover whole of town

     (ii) locus   B2   must be accurate perpendicular bisector of PQ
     must show 2 pairs of arcs
     SC1 for accurate without arcs or with 2 arcs just oor

     (iii) R labelled   B1   ft if possible

     (iv) 640 to 700 m   B2 ft   SC1 for 3.2 to 3.5 cm **(ft)**

     (b) locus   B2   must be accurate bisector of angle T
     must show all arcs
     SC1 for accurate without arcs or with all arcs just oor

     (c) correct shading   B2   must be a quadrilateral
     dependent on at least SC1 in **(a)(ii)** and **(b)**   [10]

10 **(a)** 42, 56   B1B1   cao
         71, 97   B1B1   cao

     (b) $n(n+1)$ **oe**   B2   M1 for attempt at length x width involving n
     or n'th (n'th + 1) or k (k + 1) where k is any variable

     (c) 12   B2   M1 for $2n^2 - 1 = 287$ [8]