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

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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1 (a) (i) 35   B1   cao

       (ii) 7   B1   cao

       (iii) 8   B1   cao

       (iv) 7.71 **art**   **B**3 **ft**   M1 for 1x5 + 5x6 + 10x7 + 9x8 + 7x9 + 3x10 **attempted**
                                               M1 for ÷ 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 x π x 3² / 2 **or better**

(b) 5.05 art   B3   M1 for 200 = 5 x π x r² / 2   oe
                           M1 for (r² =) 400 / 5π oe

(c) (r =) $\sqrt{2A/5\pi}$ B3   M1 for any correct x or ÷ of 1 term   2A = 5πr²
                                         MA1 for r² = 2A / 5π
                                         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 $0.5 \times 3 \times$ their**(a)(i)**

      (iii) 31.2 art   B2 ft   M1 for $8 \times$ their **(a)(ii)**

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

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

      (iii) area of "rectangle"   M1   for 16×9, 144, $3 \times 9 \times 16$, 27×16, 432
            height of triangle   M1   for $\sqrt{(9^2-4.5^2)}$, $\sqrt{60.75}$, 7.79, **7.8, 3 $\times$ (a)(i) ft or trig**
            area of triangle   M1   for $0.5 \times$ height (ft but not 9) $\times$ 9, 35.1, 70.2, **70.1**
                                       OR M2 for 9×3.90, $9 \times$ 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 540×6 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 t~

         (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]