UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2007 question paper

4024 MATHEMATICS

4024/01   Paper 1, maximum raw mark 80

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.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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1 **(a)** 15½ or 15.5   1   Not 31/2

   (b) (0).175   1   2

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2 **(a)** $\dfrac{11}{28}$ 1   If answer decimal in range 0.39 to 0.40, accept fraction in working

   (b) 10   1   2

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3 (d =) 12   (implied by 8/12)   1   Accept answer reversed without evidence

                               After 0+0.allow M1 for $\dfrac{8\times3}{2}$ or $\dfrac{39\times2}{3}$ seen   M1

      (n =) 26   (implied by 26/39)   1   2

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4 **(a)** (0).6 or $\dfrac{3k}{5k}$ (m/s²)   1   Accept – 0.6 etc

   (b) 72   (km/h)   1   2

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5 **(a)** $\dfrac{66}{100}$ $\dfrac{666}{1000}$ 0.6r   0.67   1   Accept any equivalents

   or 0.6 $\dfrac{66}{100}$ $\dfrac{666}{1000}$ 0.67

   (b) 1.507×10^9 cao   1   2

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6 **(a)** $2 \times 7 \times 11$ (× 1)   1   Accept without "×" if clear (e.g. 2, 7, 11)

   (b) 1078   cao   1   2

                                                   12   **12**

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7 **(a)** 36   1   Accept 36°

   (b) B + C = 180 or A + D = 180   1   2   Accept reference to interior or allied angles supplementary

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8 **(a)** R correctly marked   1   2 squares "below" P

   (b) $-$ ¾ or $-$ (0).75   1   2

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9 **(a)** y marked in correct region   1   Within A $\cap$ B$'$.   Not just shading

   (b) **(i)** 6   1   <u>Without</u> brackets or braces

       (ii) 4 , 5   1   3   Ignore extra braces

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10 **(a)** $(-1 , 3)$ 1

    (b) $y < 3$ oe   1   Accept $\leq$ for $<$ etc in both cases
          $y > \frac{1}{2}x$ oe   1   3   Both reversed, after $0 + 0$ allow C1

                                           10   **10**

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11 **(a)** **(i)** $p = 40$ 1

       (ii) $q = 18$ 1   Accept answer(s) reversed without evidence

    (b) Rectangle, width 30, height 0.4   1   3

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12 **(a)** 1   1

    (b) 32   1   Accept ± 32, but not -32 alone

    (c) 25   1   3

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13 **(a)** 4   1

    (b) **(i)** 2   1   Accept 2/1 or 4/2

        (ii) 1.1 to 1.3   1   3   Ignore any value of y

                                           9   **9**

14 (a) $6\pi x$ (cm) only   1   Accept numerical π in both parts

(b) $3\pi x^2$ (cm²) or unsimplified equiv   2   3 $3\pi x^2 / 2$ or unsimplified equiv   C1
(e.g. $4\pi x^2 - \pi x^2$)   **or** area larger (semi)circle = $(\frac{1}{2})\pi(2x)^2$ M1
                                           or area smaller (semi)circle = $(\frac{1}{2})\pi x^2$ M1

15 (a) 42 (cm²)   1

(b) 16 (cm)   2   3   Use of similar triangles e.g. $\dfrac{h-4}{h} = \dfrac{9}{12}$ M1

                                           or use their BCDE = $\frac{1}{2}$ 12(4 + h) - $\frac{1}{2}$ 9h

16 (a) 2/3   1   Accept 0.666 or better

(b) $\dfrac{3x+4}{5}$ asc   2   3 $ax + b$ with $a = 3/5$ $b \neq 0$ or $a \neq 0$ $b=4/5$ seen   M1

                                           Use of letter other than x, give - 1 if possible

17 (a) ($DCB =$) 140   1   Not reflex angle

(b) ($DCF =$) 105 or {245 – their **(a)**} √   1   No √ for 122.5 then 122.5

(c) ($EFC =$) 75 or {180 – their **(b)**} √   1   3   **SC** 155, 90 , 90 scores 0, 1√, 0

18 (a) ($) 14 000   1

(b) 25 (%)   2   3   Answer 75 or 125   C1
                                           figs$\dfrac{4.20-3.15}{4.20}$ oe   seen   M1

15   **15**

19 (a) $AY = BC$ (=3)
　　　$CY = AB$ (=5)
　　　AC common
　　　Triangles congruent　　　**2**

Conclusion must be stated
but SSS not needed unless extra facts
are quoted
Two correct pairs of facts stated　C1

(b) Area AYC = area ABC
　　(Add ACX)
　　$AYCX = ABCX$　　　**1**

Use of "right angle" scores 0

(c) Kite　　　**1**　**4**

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20 (a) 1 : 500　　　**1**

Accept 500

(b) (i) Triangle drawn with angles
　　　$35° \pm 2°$ and $70° \pm 2°$　　　**1**

(ii) 340 or 200　　　**1**

Accept $340° \pm 2°$ or $200° \pm 2°$

(iii) 28 to 31 (m)　　　**1**　**4**

dep on scoring 1 in **(b)(i)**

　　　　　　　　　　　　　　　8　　　　　　　　　　　　　**8**

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21 Condone missing outside brackets, "= 0" and use of wrong letter if clear. If only "solutions" (even incorrect) in answer space, give marks if factors seen

(a) $(2x + 3)(x – 5)$　oe　　　**2**

$(2x – 3)(x + 5)$　C1

or $\dfrac{7 \pm \sqrt{169}}{4}$ or better seen　M1

(b) $(2y – z)(t – 4s)$　oe　　　**2**　**4**

Complete correct extraction of one factor　M1
such as $2yt – 8ys – z(t – 4s)$

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22 (a) (i) $k > 2$　　　**1**

Accept $2 < k$　Not just 2

(ii) $(t =)$ 30　　　**1**

(b) $x = 18½$ or 18.5　　　**3**　**5**
　　$y = 10½$ or 10.5

$x = \dfrac{37k}{2k}$ and $y = \dfrac{21k}{2k}$ seen　C2
or one correct **with supporting working**　C2
or one correct improper answer **with supporting working**　C1
or correct method to eliminate x or y,　M1
condoning 1 arithmetic slip

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23 (a) 1   1

   (b) (i) $x^2 - 4x = 0$ correctly obtained **AG**   2 $(3x + 1)^2 = (x + 1)^2 + (3x)^2$ oe   seen   M1
                                                                      [Condone $3x^2$ for $(3x)^2$ for M1 etc]

      (ii) $(x =) 4$ 1   Ignore $x = 0$

      (iii) $-\dfrac{5}{13}$ or $-\dfrac{\text{their (ii)} + 1}{3\,\text{their (ii)} + 1}$ √   1   5   If answer decimal look back for fraction

                                             14   **14**

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24 (a) $\begin{pmatrix} 3 \\ 7 \\ 0 \end{pmatrix}$ 1

   (b) (i) (a) $(p =) 5$ 1
          (b) $(w =) 4$ or $14 - 2 \times$ their p √   1   Only allow √ if their $w > 0$

      (ii) 7600   1   Ignore lack of braces

      (iii) Total cost of making (100) buses   1   5   Accept reasonable equivalents involving
              and (200) lorries   **cost** (and **toys)**

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25 (a) (i) $125 < h \le 135$ implied   1   Not just 20

      (ii) 126.25, 126.2, 126.3, 126 or 126¼   3   **or** Correct method such as
                                                        $\dfrac{5 \times 110 + 10 \times 120 + 20 \times 130 + 5 \times 140}{5 + 10 + 20 + 5}$ M2
                                                        condoning one error or omission
                                                        or consistent use of wrong h in above   M1
                                                        or $5 \times 110 + 10 \times 120 + 20 \times 130 + 5 \times 140$ M1

   (b) (i) 11 (cm)   2   121 or 132 used

      (ii) 16   1   7

                                             12   **12**