Mark Scheme (Results)

Summer 2008

O Level Mathematics B (7361) Paper 2

Mathematics B 7361

Paper 2

1.		Balancing equations, no errors	M1	
		Correct decision to add/subtract (one sign error)	M1 dep	
		OR		
		Making x/y the subject (one sign error)	M1	
		Correctly substituting x or y into 2nd equation	M1 dep	
		OR (by matrices)		
		Inverse matrix (allow one numerical error)	M1	
		Premultiplying $\begin{pmatrix} 3 \\ -5 \end{pmatrix}$ by c's inverse matrix	M1 dep	
		x = ½, y = 2/3 (o.e)	A1, A1	**4**
			Total 4 marks	
2.	(a)	205/2.5; 82 km/h	M1, A1	**2**
	(b)	125/75; 15 00 hrs (allow 3 pm)	M1, A1	**2**
	(c)	465 x 2/3; 310 km	M1, A1	**2**
			Total 6 marks	
3.	(a)	$5(-2)^3 + 6(-2)^2 - 2k - 2 = 0$	M1	
		k = -9	A1	**2**
	(b)	$5x^2 - 4x$ ……	M1	
		$5x^2 - 4x - 1$	A1	
		attempt to factorise a trinomial quadratic	M1	**4**
		$(x + 2)(5x + 1)(x - 1)$	A1	
			Total 6 marks	

4.

    (a) $6x^3 - 15x^2 + 14x - 35$ B1   **1**

    (b)   One term correctly differentiated (and simplified)   M1
             from c's expression

             $18x^2 - 30x + 14$ A1   **2**

    (c)   Correctly rearranging c's equation into a trinomial   M1
             quadratic (= 0)

             $18x^2 - 30x - 12$ (= 0)   (o.e.)   A1

             attempt to factorise a trinomial quadratic   M1

             $x = 2$, $x = -1/3$ (o.e.)   A1   **4**

                                                                 Total 7 marks

5.

    (a)   (i) $\frac{3}{4}\mathbf{a} - \mathbf{c}$ (o.e.)   (ii) $\mathbf{a} + \frac{4}{5}\mathbf{c}$ (o.e.)   B1, B1   **2**

             $\rightarrow$

                                                          M1

    (b) $OX = \mathbf{c} + 2\left(\frac{3}{4}\mathbf{a} - \mathbf{c}\right)$

                                                         A1   **2**

             $= \frac{3}{2}\mathbf{a} - \mathbf{c}$ OR $\frac{1}{2}(3\mathbf{a} - 2\mathbf{c})$

             $\rightarrow$ M1

    (c) $XY = \frac{3}{2}\mathbf{a} + \frac{6}{5}\mathbf{c} - $ c's$\left(\frac{3}{2}\mathbf{a} - \mathbf{c}\right)$ (o.e.)

                                                         A1

             $= \frac{11}{5}\mathbf{c}$ + conclusion   **2**

                                                                     Total 6 marks

6. (a) $(x^2 =) \ 20 \ x \ 1.8$ M1

   $(x =) \ 6 \ cm$ A1   **2**

   (b) AF = $\sqrt{\{20^2 + (9 + 6)^2\}}$ M1

   conclusion   A1   **2**

   (c) *FE*. 25 = 9.(9 + 2 x c's(6)) (o.e.)   M1
        (correct use of intersecting chords)

   AE = 17.4 cm (or better)   A1   **2**

   (d) *OX* = 21.8/2 - 1.8   M1

   tan $\angle$ *XFO* = c's(*OX*)/(c's(6) + 9)   M1 dep

   (o.e. trig statement)

   $\angle$ *XFO* = 31.2°/31.3°   A1   **3**

                                                                                           Total 9 marks

7. (a) 12, 2 & 4   B1

   any one of 14 – *x*, 18 – *x* or 4 - *x*   (o.e.)   B1

   all three of 14 – *x*, 18 – *x* and 4 - *x*   (o.e.)   B1

   8   B1   **4**

   (b) 14 - x + 18 – x + 4 – x + x + 26 = 56   M1

        62 - 2*x* = 56

        x = 3   A1   **2**

   (c) (i)   47   (ii)   9   (iii)   8   B1 ft, B1 ft, B1   **3**

                                                                                           Total 9 marks

8. (a)   2 correct probabilities   B1

         4 correct probabilities   B1

         8 correct probabilities   B1   **3**

  (b)   (i)   c's(3/10) x c's(2/9)   = 1/15 (o.e.)   M1, A1

       (ii)   attempt to gather at least two consistent   M1
              pairs of probabilities together

             complete method   M1 dep

             31/45 (o.e.)   A1

       (iii) 1 - 2/10 x 1/9   = 44/45 (o.e.)   M1, A1   **7**

                                                            Total 10 marks

9. (a)   63 $\rightarrow$ 65 m   B1   **1**

  (b)   Accept a reading in the range 51 km/h $\rightarrow$ 54 km/h   M1

          32 $\rightarrow$ 34 m   A1   **2**

  (c)   6.7,   36.7,   90.7   B1, B1, B1   **3**

  (d)   usual graph penalties   B3   **3**
      straight line segment
      each point missed($\pm$ one small square)
      each missed segment
      each point plotted incorrectly ($\pm$ one small square)
      tramlines

  (e)   identification of a distance of 134 m used ($\pm$one   M1
      small square)

          97 $\rightarrow$ 99 km/h   A1   **2**

  (f)   an answer given in the range 90 $\rightarrow$ 100 km/h   M1

      93 $\rightarrow$ 97 km/h   A1   **2**

                                              Total 13 marks

10. (a) 90° clockwise (-90)   B1   1

(b) scale factor 2; centre *P* OR (3, 6)   M1, M1   2

(c) centre of enlargement plus at least one enlarged   M1
vertex identified correctly

plotted figure (*C*) and labelled   A2 (-1 ee)   3

(d) plotted figure (*D*) and labelled   B2 ft (-1 ee)   2

(e) reflection; *y* = *x*   M1, A1   2

(f) reflection, x-axis **OR** *y* = 0   M1, A1   2

(g)
$$\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$$
                                                                   B2   2

Total 14 marks

11. (a) $\sqrt{(8^2 + 8^2)}$ (o.e.)   M1

        11.3 cm   A1   **2**

(b) $\angle EBD = 76°$ **OR** $\angle BDE = 28°$ B1

    $\dfrac{\frac{1}{2}\,BE}{\text{c's}(11.3)} = \cos$ c's(76°)   M1

    $BE = 2 \times$ c's(11.3) $\times \cos$ c's(76°)   M1 dep

       5.47 cm   A1   **4**

(c) $\angle EDB = 180 - 2 \times$ c's(76°)   M1

    $\angle CDF = 17°$ A1   **2**

(d) $CF/8 = \tan$ c's(17°)   M1

    $CF = 2.45$ cm   A1   **2**

(e) $BF = 8 -$ c's(CF)   M1

    $\frac{1}{2} \times$ c's(5.47) $\times$ c's(5.55) $\times \sin(31°)$ M1 dep

       7.75 cm^2 $\rightarrow$ 7.83 cm^2 A1   **3**

(f) area $\Delta\,BEC = \frac{1}{2} . 8 .$ c's(5.47) $\times \sin(31°)$ M1

    area$\Delta EFC = \frac{1}{2} . 8.$c's(5.47) $\times \sin(31°) -$ c's(7.82)   M1 dep

       3.42 $\rightarrow$ 3.52 cm^2 A1   **3**

OR (ratio of areas)

    $\dfrac{\text{c's}(2.45)}{\text{area}\Delta EFC} = \dfrac{8 - \text{c's}(2.45)}{\text{c's}(7.82)}$ M1

    area$\Delta EFC = \dfrac{\text{c's}(7.82) \times \text{c's}(2.45)}{\text{c's}(5.55)}$ M1 dep

    3.42 $\rightarrow$ 3.52 cm^2 A1

Total 16 marks

PAPER TOTAL 100 MARKS