MARK SCHEME for the May/June 2008 question paper

0580, 0581 MATHEMATICS
0580/04, 0581/04 Paper 4 (Extended), maximum raw mark 130

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.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.
1 (a) (i) 250 ft
(b) (i) \(20 \div 5 \times 3\)
(b) (ii) \(\frac{(x + 4)(x - 5)}{7 \text{ hours } 12 \text{ mins}}\) cao
(c) \(20 \times 100000 \div 80\)

2 (a) (i) \((x + 4)(x - 5)\)
(b) \((-2) \pm \sqrt{(-2)^2 - 4.3 - 2}\)
(c) \((m - 2n)(m + 2n)\)
(d) \(4 \pm 4\)

3 \((m^2 - 4n^2)(m^2 + 4n^2)\) or \((m^2 + 4n^2)(m^2 - 4n^2)\)

4 \(\sqrt{\frac{y^2 + m^2}{4}}\) or \(\sqrt{\frac{m^2 - y^2}{4}}\) o.e. www

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### 3

#### (a) (i)
\[
\begin{align*}
&\frac{1}{3}, \frac{3}{8}, \frac{6}{8}, \frac{2}{8} \\
\text{o.e.}
\end{align*}
\]
- **M1**
- **A1**
- **B3**

#### (ii)
\[
\begin{align*}
&\frac{2}{3} \times \frac{5}{8} \\
&\frac{5}{12} \\
\text{o.e.}
\end{align*}
\]
- **M1**
- **A1**
- *www2*
- 10
- etc., 0.416(6…)

#### (iii)
\[
\begin{align*}
&\frac{5}{12} + \frac{1}{3} \times \frac{6}{8} \\
&\frac{2}{3} \\
\text{o.e. cao}
\end{align*}
\]
- **M1**
- **A1**
- *www2*
- 16
- 8
- etc., 0.666(6…)

#### (b) (i)
\[
\begin{align*}
&\frac{3}{10} \times \frac{2}{9} \times \frac{1}{8} \\
&\frac{1}{120} \\
\text{o.e.}
\end{align*}
\]
- **M1**
- **A1**
- *www2*
- 6
- 720
- etc., 0.00833(3…)

#### (ii)
\[
\begin{align*}
&\frac{119}{120} \\
\text{o.e.}
\end{align*}
\]
- **B1**
- *ft*
- 714
- etc., 0.991(6…)
- ft
- 1 – their (i) not for 7/10
- Could start again and have a correct answer independently [10]

### 4

#### (a) (i)
\[
\begin{align*}
&36 \ (36.0–36.4) \\
\text{B1}
\end{align*}
\]

#### (ii)
\[
\begin{align*}
&50 \ (50.0–50.4) \\
\text{B1}
\end{align*}
\]

#### (iii)
\[
\begin{align*}
&29 \ (28.6–29.4) \\
\text{B1}
\end{align*}
\]

#### (iv)
\[
\begin{align*}
&20 \\
\text{B2}
\end{align*}
\]
- If B0, **SC1** for 19 or 21 or 180 seen

#### (b) (i)
\[
\begin{align*}
&p = 16, \ q = 4 \\
\text{B1,B1}
\end{align*}
\]
- If B0, **SC1** if \( p \) and \( q \) add up to 20

#### (ii)
\[
\begin{align*}
&\left(\frac{7220}{200}\right) = 36.1 \ \text{cso} \\
\text{www4}
\end{align*}
\]
- **B4**
- Answer 36 scores 4 marks after some correct working shown with no incorrect working seen
- **M1** for using mid-values at least four correct from 5, 15, 25, 35, 45, 55, 65, 75
- **M1** (dep on correct mid values or mid-values ±0.5) for \( \sum fx \) (at least four correct products)
- **M1** (dependent on 2\(^{nd} \) **M1**) for dividing sum by 200 or 180 + their \( p \) + their \( q \)

### 5

#### (a) (i)
\[
\begin{align*}
&360 \div 8 \quad \text{or} \quad (8 - 2) \times 180 \\
\text{M1}
\end{align*}
\]
- Allow 6 \( \times \) 180

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180 – their \((360 \div 8)\) o.e. \(\frac{8}{10}\) M1 dependent

(ii) 45° used or use implied o.e. E1 Accept sketch with values

(b) (i) \(\frac{l}{12} = \cos 45^\circ\) o.e. \(\frac{8.49}{(8.485\ldots)}\) o.e. \(\frac{8}{12}\) M1 For o.e. allow implicit expression

A1 Accept \(\sqrt[2]{72}, \ 2\sqrt{18}, \ 3\sqrt{8}, \ 6\sqrt{2}\)

(ii) \((PQ) = 2 \times \text{their } PH + 12\) o.e. \((PQ) = 29(0)\) (28.96–29.00) ft www2 M1 ft their \(PH\) accept surd form

A1 ft their \(PH\)

(iii) their \(PH + 2\) o.e. \(\text{(Area } APH = )\) 36 (35.95–36.1) ft www2 M1

A1 ft their \(PH\)

(iv) (their \(PQ^2 - 4 \times \text{their area of triangle o.e. (Area octagon = )}\) 695 (694.0–697.1) cao www2 M2 If M0, M1 for a clear collection of areas leading to the octagon possibly without any calculation shown

A1

(c) (i) 0.5 of their \(PQ\) o.e. 14.5 (14.47–14.53) cao www2 M1 e.g. 6 \(\times \text{PH}\), \(6\tan 67.5^\circ\) accept surd form

A1

(ii) \(\pi \times (\text{their } r)^2\) their \(\text{circle area}\) \(\times 100\) their \(\text{octagon area}\) 94.8 (94.35 to 95.60) cao www3 M1

A1 (660.5\ldots)

Dependent on first M1 and circle smaller than the octagon

(b) Translation \(\begin{bmatrix} 0 \\ -4 \end{bmatrix}\) o.e. B1, B1 Allow (0 –4), condone omission of brackets, allow in words

Any extra transformation spoils both marks

(c) \(y > 0\) o.e. 
\(x < 2\) o.e. 
\(y > \frac{1}{2}x\) o.e. 
\(y < 2x + 4\) o.e. B1 For all four, condone strict inequalities and only penalise first incorrect sign, which may be = or an inequality sign

B2 If B0, B1 for \(2x\) or for 4 if other co-efficient is not zero \(y < \frac{1}{2}x + 4\) gets zero

(9)

7 (a) (i) cyclic B1 Condone concyclic

(ii) Any one of 40, 45, 50 Any one of 20, 25, 30 Any one of 105, 110, 115 B1 Angle \(BCD = 40^\circ\) is inconsistent with \(ST\) parallel to \(OB\). So different values of angles \(x, y, z, OCT\) and \(AOC\) can be arrived at, depending on route taken.

(iii) Any one of 80, 85, 90 B1

(iv) Any one of 210, 215, 220, 225, 230 B1

(b) (i) Similar (or enlargement) B1

(ii) \(\left(\frac{7}{10}\right)^2\) or \(\left(\frac{10}{7}\right)^2\) o.e. seen 9.8 (9.79 to 9.81) www2 M1

(0.49), (2.04)

A1

It is possible to do (iii) then (ii) and full marks can still be scored

(iii) \(\frac{1}{2} \times 10 \times \text{height} = 20\) \(\frac{1}{2}\) www2 M1

A1

(11)

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<thead>
<tr>
<th></th>
<th>8 (a)</th>
<th></th>
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<th>9 (a)</th>
<th></th>
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<th>10(a)</th>
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<tbody>
<tr>
<td></td>
<td>108(16) (allow 108.2(0))</td>
<td>M1</td>
<td></td>
<td>(i)</td>
<td>p + r</td>
<td>B1</td>
<td>Answers in bracketed column form</td>
<td>(i)</td>
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<td></td>
<td>148(02…) 324(3…)</td>
<td>www2</td>
<td>A1</td>
<td>(ii)</td>
<td>–p + r</td>
<td>B1</td>
<td>penalise only once throughout</td>
<td>(ii)</td>
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<td></td>
<td>Correct axes full domains</td>
<td></td>
<td></td>
<td>(iii)</td>
<td>–p + 2/3 r</td>
<td>B1</td>
<td></td>
<td>(b)</td>
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<td></td>
<td>5 correct pts 100, 148 ft, 219, 324ft, 480</td>
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<td></td>
<td>(iv)</td>
<td>p + 1/2 r</td>
<td>B1</td>
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<td>(b) (i)</td>
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<td></td>
<td>Smooth exponential curve, correct shape through 5 points</td>
<td></td>
<td></td>
<td>(b) (ii)</td>
<td>14 – 10 or 14 – 12 + 2 or 4</td>
<td>E1</td>
<td>x + 12 and x + 14 must be seen to be used</td>
<td>(b) (ii)</td>
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<td>(c)</td>
<td>lie on a straight line</td>
<td>B1</td>
<td>dependent on their (b)(ii) being a multiple of p</td>
<td>(c) (i)</td>
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<td>(d) (iii)</td>
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**8 (a) (i)** | **8 (a) (ii)** | **8 (a) (iii)** | **8 (a) (iv)** | **8 (a) (v)** | **8 (a) (vi)** | **8 (a) (vii)** | **8 (a) (viii)** | **8 (a) (ix)** | **8 (a) (x)** |
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**8 (b)** | **8 (c)** | **8 (d)** | **8 (e)** | **8 (f)** |
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