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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 October/November 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.
Abbreviations

In addition to those already seen the following may crop up.

cao – correct answer only

ww – without working

www – without wrong working

oe – or equivalent

soi – seen or implied

bod – benefit of doubt

art – anything rounding to

isw – ignore subsequent working

ft – follow through

oor – out of range

isr – ignore subsequent rounding

rot – rounded or truncated

mog – marks on graph
1 (a) (i) \[385 \times 0.9 \text{ oe} \]
\[($) 346.5(0) \text{ cao} \]
M1
A1
Ig implied by ans 346 or 347

(ii) \[385 \div 1.1(0) \text{ oe} \]
\[($) 346 \text{ cao} \]
M1
A1
www2

(b) (i) \[\frac{23}{23+19} \times 210 \text{ oe} \]
\[115 \text{ cao} \]
M1
A1
www2

(ii) their (i) \times 2.50 + (210 – their (i)) \times 1.50
\[($) 430 \text{ cao} \]
M1
A1
www2

(iii) \{their (ii) – 410\} / 410 \times (100) \text{ oe} \]
\[4.88 \]
M1
A1
www2

(c) \[2.6(210 – x) \text{ or } 1.4(210 – x) \text{ seen} \]
\[2.6(210 – x) + 1.4x = 480 \]
\[546 – 480 = 2.6x – 1.4x \text{ or } 2.6x – 1.4x = 480 – 294 \]
\[55 \text{ cao} \]
M1
A1
www2

2 (a) (i) \[6 \]
\[4.5 \]
M1
B1
Allow 1 slip

(ii) \[(1 \times 1 + 2 \times 2 + 4 \times 3 + 7 \times 4 + 4 \times 5 + 8 \times 6 + 2 \times 7) \]
\[127 \]
\[+ 28 \]
\[4.54 \]
M1
B1
M1dep
dep on 1st M1
A1
www3
4.53571…

(iv) \[\frac{4 \times 3}{28 \times 27} \]
\[\frac{1}{63} \text{ o.e.} \]
M1
A1
www2 e.g. \(\frac{12}{126}, 0.0159 \text{ etc} \)

(v) \[\frac{4 \times 3}{21 \times 20} \]
\[\frac{1}{35} \text{ o.e.} \]
M1
A1
www2 e.g. \(\frac{12}{128}, 0.0286 \text{ etc} \)

(vi) \[\frac{24 \times 23 \times 4}{28 \times 27 \times 26} \]
\[\frac{92}{819} \text{ o.e.} \]
M1
A1
www2 e.g. \(\frac{2208}{19666}, 0.112 \)

(b) (i) \[0.08 \text{ o.e.} \]
\[0.9 \times 0.05 \text{ o.e.} \]
M1
B1
dep on 1st M1
A1
www3

(ii) their (b)(i) \times 0.9 \times 0.05
\[0.125 \text{ o.e.} \]
M1dep
A1
B1 ft
their (ii) \times 56 either correct to 3sf or better or r.o.t.

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### Question 3

(a) (i) (0, 1)  
(ii) (4, 0) and (0, 4)

(b) $-1$ cao

(c) $(x) < 0$ (allow $\leq$)

(d) $x^2 + 1 = 4 - x$  o.e.

(e) $\frac{p + (-)\sqrt{q}}{r}$ where $p = -1$ and $r = 2 \times 1$ and $q = 1^2 - 4(1)(-3)$  o.e.

-2.30, 1.30 cao www4

(f) (-0.5, 4.5 or 4.49)

- **Mark Scheme**

### Question 4

(a) (i) $4\pi 3.5^3 = 153.86$ to 153.96 or 154

(ii) $\frac{4}{3}\pi 3.5^3 = 179.5$ to 179.62 or 180

(iii) 1005 to 1006 or 1008 or 1010

(b)  

$$\pi 8^2 \times 8$$

$$\pi 8^2 h = 2 \times$$ their (ii) $+$ $\pi 8^2 \times 8$

$$(2 \times$$ their (ii) $+$ $\pi 8^2 \times 8$) $+$ $$(\pi 8^2$$)

9.78 to 9.79 (cm)

(c)  

$$1000 \ (or \ 1) \div 4.8 \div \frac{4}{3}\pi$$

$$\frac{\sqrt{ans}}{} \ (or \ 10 \times \frac{\sqrt{ans}}{})$$

3.67 to 3.68 (cm)

- **Mark Scheme**
5 (a) (i) \[ \sqrt{7^2 - 4^2} = 5.74 \text{ (cm)} \]
\[ 6.32 \text{ (cm)} \]

(ii) \[ 2 \times \frac{1}{2} \times 8 \times 5.74 + 2 \times \frac{1}{2} \times 6 \times 6 = 131.8 \text{ to } 132 \text{ (cm}^2 \text{)} \]

(b) \[ (\text{PX})^2 = \text{(their (a)(i))^2} - 3^2 \]
\[ \text{soi or } 4.89 \text{ seen} \]

(c) (i) \[ \tan(PNX) = \frac{\text{their (a)(ii)}}{5} \text{ o.e.} \]
\[ 44.4 \text{ to } 44.43^\circ \]

(iii) \[ \text{Acc. bisector of angle } A \text{ with arcs (at least } 5\text{ cm long) (± } 2^\circ) (± 2 \text{ mm}) \]

(iv) \[ \text{Acc. perp. bisector of } AD \text{ with at least } 1 \text{ pair of arcs (± } 2^\circ)(± 2 \text{ mm) (at least } 5 \text{ cm long) } \]

(v) \[ \text{PHN or PGM \text{ o.e. (letters)}} \]

6 (a) (i) \[ AB = 13 \text{ cm and BD = } 15 \text{ cm (± } 2 \text{ mm) } \]
\[ \text{Angle } A = 80^\circ \text{ (± } 2^\circ) \]
\[ \text{A,B,C,D correct within } 4 \text{ mm} \]

(ii) \[ \text{Angle } ADB \text{ correct (57-61)}^\circ \text{ (± } 2^\circ) \]
\[ \text{Angle DCB correct (101-105)}^\circ \text{ (± } 2^\circ) \]

(iii) \[ \text{Acc. bisector of angle } A \text{ with arcs (at least } 5 \text{ cm long) (± } 2^\circ) (± 2 \text{ mm) } \]

(iv) \[ \text{Acc. perp. bisector of } AD \text{ with at least } 1 \text{ pair of arcs (± } 2^\circ)(± 2 \text{ mm) (at least } 5 \text{ cm long) } \]

(v) \[ \text{‘Correct’ area shaded below their perp. bisector and below their angle bisector} \]

(b) (i) \[ \sin D = \sin 80 \]
\[ \frac{26}{30} \text{ o.e.} \]
\[ (\sin D) = \frac{26 \sin 80}{30} \text{ o.e.} \]

(ii) \[ \text{Angle } BDC = 41.4^\circ \]
\[ (BC^2) = 18^2 + 30^2 - 2 \times 18 \times 30 \cos 41.4^\circ \]
\[ \text{square root of correct collection} \]
\[ 20.3 \text{ to } 20.35 \text{ (m) cao} \]

(iii) \[ 0.5 \times 26 \times 30 \sin 41.4^\circ + 0.5 \times 18 \times 30 \sin 41.4^\circ \text{ o.e.} \]
\[ 436 \text{ to } 437 \text{ (m}^3 \text{) cao} \]
### Question 7

**Part (a)**
- **Correct axes**
  - S1  must fit on paper 2mm acc throughout
  - Ignore labels on triangles throughout

**Part (b)**
- Correct triangle drawn (T)
  - T1  vertices at (8, 6), (6, 10) and (10, 12)

**Part (c)**
- **(i)** Correct reflection in \(y = x\) drawn (P)
  - P2ft  ft their T, P1 for two correct vertices drawn (6, 8), (10, 6), (12, 10)
  - or  line \(y = x\) correctly drawn (within 2mm of (12,12) if extended)

- **(ii)**
  - B2  B1 for a correct column

**Part (d)**
- **(i)** Correct enlargement, scale factor 0.5, centre (0,0) drawn (Q)
  - Q2ft  (4, 3), (3, 5), (5, 6)
  - Q1 for any enlargement s.f. \(\frac{1}{2}\) or 2 correct vertices drawn
  - SC1 for 3 points within 5 mm if rays method used or for correct enlargement but of P

- **(ii)**
  - B1  indep
  - B1  indep

**Part (e)**
- Correct stretch drawn (R)
  - R2ft  R1 for two correct vertices ft (4, 6), (3, 10), (5, 12)

### Question 8

**Part (a)**
- \(2\)

**Part (b)**
- \[ \frac{3}{2x - 1} + 1 \]
  - \(3 + 2x - 1 \)
  - \(2x - 1 \)
  - \(2 + 2x \)
  - \(2x - 1 \)
  - \(\text{o.e. final ans}\)

**Part (c)**
- \(y = \frac{3}{x} + 1\)
  - \(y - 1 = \frac{3}{x} \) or \(xy = 3 + x\)
  - \(x(y - 1) = 3\)
  - \(\frac{3}{x - 1} \) o.e. final answer

**Part (d)**
- \(256\)

**Part (e)**
- \(2^x = \frac{3^{2/3}}{2} + 1\)
  - \(-3\)

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<tbody>
<tr>
<td>9</td>
<td>(a)</td>
<td>-7, 512, (\frac{8}{9}), 81, 2187, -2106</td>
<td>B6</td>
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<tr>
<td></td>
<td>(b) (i)</td>
<td>(P) (9 - 2n)</td>
<td>B1</td>
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<tr>
<td></td>
<td></td>
<td>(Q) (n^3)</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(R) (\frac{n}{n + 1})</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>(iv)</td>
<td>(S) ((n + 1)^2)</td>
<td>B1</td>
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<tr>
<td></td>
<td>(v)</td>
<td>(T) (3^{n-1})</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>(vi)</td>
<td>(U) ((n + 1)^2 - 3^{n-1})</td>
<td>B1 ft</td>
</tr>
<tr>
<td>(c)</td>
<td>their (b)(i) = (-777)</td>
<td>M1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(393) cao</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>(d)</td>
<td>12</td>
<td>B2</td>
<td>SC1 for 11 or (n - 1 = 11) or (3^{12}, 3^{11}) seen [16]</td>
</tr>
</tbody>
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