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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.

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CIE is publishing the mark schemes for the October/November 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.
<table>
<thead>
<tr>
<th>Abbreviations</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cao</td>
<td>correct answer only</td>
</tr>
<tr>
<td>cso</td>
<td>correct solution only</td>
</tr>
<tr>
<td>dep</td>
<td>dependent</td>
</tr>
<tr>
<td>ft</td>
<td>follow through after error</td>
</tr>
<tr>
<td>isw</td>
<td>ignore subsequent working</td>
</tr>
<tr>
<td>oe</td>
<td>or equivalent</td>
</tr>
<tr>
<td>SC</td>
<td>Special Case</td>
</tr>
<tr>
<td>www</td>
<td>without wrong working</td>
</tr>
</tbody>
</table>
1 (a) (i) $(6 000)$ cao  
   B2 M1 for $0.1 \times 10 000 + 0.25 \times 20 000$ oe 
   
(b) $(11 200)$ ft  
   B1 ft ft $17200 - their (a)(i)$ 
   
(c) (i) $(7500)$ cao  
   B2 M1 for $\frac{12000}{5 + 3} \times 5$ oe 
   After M0, SC1 for 4500 
   
(ii) $9/80$ cao  
   B1 Ignore decimals or %’s seen 
   Mark final fraction 
   
(d) $(8640)$ cao  
   B2 M1 for $10 800 \div 1.25$ oe 
   
[10] 

2 (a) (i) \[\frac{x(x + 4)}{2} = 48 \text{ oe}\]  
\[x^2 + 4x - 96 = 0\]  
   M1 Eqn must include 48  
   E1 Dep on M1 + shows one intermediate algebraic step with no errors seen 
   
(ii) $-12$ or $8$  
   B1 Allow deletion of negative root 
   
(iii) $12$ (cm) correct or ft  
   B1ft Accept 12 or ft their positive root in part (ii) (if only one) + 4. 
   
(b) $\frac{4}{5}$ oe  
   B2 M1 for $\frac{x}{x + 4} = \frac{1}{6}$ oe 
   
(c) (i) $(x + 4)^2 + x^2 = 9^2$ oe or  
\[x^2 + 8x + 16 + x^2 = 81\]  
\[2x^2 + 8x - 65 = 0\]  
   M1 Accept 2nd line for M1  
   or $2x^2 + 8x + 16 = 81$  
   E1 Dep on M1 with no errors, expanded brackets step needed 
   
(ii) $p \pm \sqrt{q}$ where $p = -8$ and $r = 2 \times 2$  
\[r\] and $q = 8^2 - 4(2)(-65)$ oe  
\[= 8.04, 4.04 \text{ cao www}\]  
   M1 M1 Allow second mark if in form $p \pm \sqrt{q}$  
   \[r\]  
   A1A1 SC2 if correct solutions but no working shown  
   or SC1 for $-8.041522987$ and $4.041522987$ rounded or truncated 
   
(iii) $21.08$ or $21.1$ (cm) strict ft  
   B1ft dep ft $4.04$ in part (ii) or $2 \times a \text{ positive root} + 13$ 
   
[14]
### 3 (a) 5.04, 0.0, 8.7 or 8.66(6...) or better seen

**B3**

### (b) Correct axes for domain and range 10 correct points, on correct grid line or within correct 2mm square vertically Reasonable curve through 10 points condone curvature around $x = -0.2$ and 0.2 Two separate branches

**S1**
**P3ft**
**P2ft** for 8 or 9 correct
**P1ft** for 6 or 7 correct
**C1ft**
**B1ft**
Correct shape, not ruled, within 1 mm of points (curves could be joined)
Independent but needs two ‘curves’ on either side of $y$-axis

### (c) (i) $y = -3x$ ruled correctly

-2.95 to -2.6, -0.75 to -0.6, 0.5 to 0.6

**L1**
Check at (-1, 3) to (1, -3) within 1 mm (can be shorter)

**B2**
**B1** for 2 correct.

isw $y$–values
No penalty for each extra value if curve is cut more than 3 times

### (ii) $(a =) 3$ $(b =) -1$

**B1B1**
After 0,0 **SC1** for $x^3 + 3x^2 - 1 = 0$

### (d) Tangent to their curve ruled at $x = -2$

Rise/run using correct scales
-4.5 to -3

**T1**
Must be a reasonable tangent allow slight daylight <1mm

**M1**
Dep on **T1** (implied by answer 3 to 4.5)

**A1**
Must show working if answer out of range

---

### 4 (a) 72

**B1**

### (b) (i) $0.5 \times 15 \times 15 \sin (their\ 72) \ oe$

106.9 to 107 (cm$^2$) **csO**

**M1**
not for 90°

**A1**
www2

### (ii) 534.5 to 535 (cm$^2$) **ft**

**B1 ft**

ft their (i) $\times 5$

### (iii) $\pi \times 15^4 \times 50$

their (ii) $\times 50$

Vol of cylinder – prism
8590 – 8625 (cm$^3$) **cao**

**M1**
(707 or 35350) or $\pi \times 15^4$

**M1**
(26750) or $\pi \times 15^2$ – their (b) (ii)

**M1**
Dep on **M2** then $\times 50$

**A1**
www4

### (c) $(AB =) 15 \sin (their\ 36) \times 2 \ oe \ (17.63)$

(not 30° or 45°)

Area of one rectangle = their $AB \times 50$
5 (50 x a length) $+ 2 \times their\ (b)(ii)$
5470 – 5480 (cm$^2$) **cao**

**M1**
or $\sqrt{15^2 + 15^2 - 2 \times 15 \times 15 \times \cos (their\ 72)}$

Not for 90° or 60°
or sine rule

**M1**
dep on **1M** (881.5) not $15 \times 50$

**M1**
Indep (4407.5 + 1070)

**A1**
www4

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<table>
<thead>
<tr>
<th></th>
<th>Mark Scheme</th>
<th>Syllabus</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 (a)</td>
<td>(60 + 40)/35 Correct method to convert a decimal time to minutes 14.46 or 2.46 pm cao</td>
<td>M1 M1</td>
<td>(2.857...) could be in parts ft a decimal either full answer or decimal part * 60 (e.g. 51.(428), 171.(4..) or 2hrs 51 or 51 m) www3</td>
</tr>
<tr>
<td>(b) (i)</td>
<td>260</td>
<td>B1</td>
<td>www3</td>
</tr>
<tr>
<td>(ii)</td>
<td>145</td>
<td>B1ft ft their (b) (i) – 115</td>
<td></td>
</tr>
<tr>
<td>(c)</td>
<td>(AC = \sqrt{40^2 + 60^2 - 2 \times 40 \times 60 \times \cos 115}) of a correct combination 85.(0 km) cao</td>
<td>M2 M1 for correct implicit version M1 dependent (7229) A1</td>
<td>Implicit equation Could use cosine rule M1 for implicit and M1 for explicit form Dep on M1 Explicit equation A1 www3</td>
</tr>
<tr>
<td>(d)</td>
<td>(\sin A = \frac{\sin 115}{60}) (\text{their (c)}) oe ((\sin A = \frac{\sin 115}{60}) (\text{their (c)}) (\times 60) 39.76 to 39.8 cao</td>
<td>M1</td>
<td>Implicit equation Could use cosine rule M1 for implicit and M1 for explicit form M1 for either 40sin80 or 60sin35 or implicit trig version using (\text{their (c)}) www3</td>
</tr>
<tr>
<td>(e)</td>
<td>(40\sin 80 + 60\sin 35) oe (39.4) (34.4)</td>
<td>M2</td>
<td>(\text{their (c)}) (\times \sin (100 - \text{their (d)})) or (\text{their (c)}) (\times \cos (\text{their (d)} - 10)) M1 for either 40sin80 or 60sin35 or implicit trig version using (\text{their (c)}) www3</td>
</tr>
<tr>
<td>6 (a) (i)</td>
<td>30</td>
<td>B1</td>
<td>Penalty 1 for each extra value Ignore repeated values</td>
</tr>
<tr>
<td>(ii)</td>
<td>30, 30.5, 31</td>
<td>B1 B1</td>
<td>M1 for use of 15, 21, 23, 27 (allow one error) and M1 for use of (\sum fx) with value of (x) in correct range used (allow one further error) and M1 dep on 2nd M for dividing by (\sum f) or 200 www4 Accept 21 after M3 earned</td>
</tr>
<tr>
<td>(iii)</td>
<td>(10 \times 30 + 7 \times 31 + x \times 32) (10 + 7 + x) correct clearance of fraction 3 cao</td>
<td>M1 M1 Dep on M1 e.g. 517 + 32x = 521.05 + 30.65x oe A1</td>
<td>M1 for use of 15, 21, 23, 27 (allow one error) and M1 for use of (\sum fx) with value of (x) in correct range used (allow one further error) and M1 dep on 2nd M for dividing by (\sum f) or 200 www4 Accept 21 after M3 earned</td>
</tr>
<tr>
<td>(b) (i)</td>
<td>(\frac{35 \times 15 + 115 \times 21 + 26 \times 23 + 24 \times 27}{200})</td>
<td>M3</td>
<td>(4186/200) M1 for use of 15, 21, 23, 27 (allow one error) and M1 for use of (\sum fx) with value of (x) in correct range used (allow one further error) and M1 dep on 2nd M for dividing by (\sum f) or 200 www4 Accept 21 after M3 earned</td>
</tr>
<tr>
<td>(ii)</td>
<td>2.6 cao 0.7 and 0.8</td>
<td>B1 B4</td>
<td>B3 for one correct or B2 for 3.5 and 4 seen or B1 for 4 seen</td>
</tr>
</tbody>
</table>
### Question 7

**Part (a) (i)**

Translation only

\[
\begin{pmatrix}
0 \\
-1
\end{pmatrix}
\] oe

- **B1**
- **B1**

Throughout parts (i) to (v) if more than one transformation is given then no marks at all for that part

**Accept T**

**Part (ii)**

Reflection only

\[ x = 1 \] oe only

- **B1**
- **B1**

**Accept M**

**Part (iii)**

Reflection only

\[ y = -x \] oe only

- **B1**
- **B1**

**Accept M**

**Part (iv)**

Enlargement only

(centre) (2, 0), only

(scale factor) 0.5 oe only

- **B1**
- **B1**
- **B1**

**Accept E**

**Part (v)**

Stretch only

(factor) 2, only

x-axis oe invariant cao only

- **B1**
- **B1**
- **B1**

**Accept S**

Ignore parallel to y-axis

### Question 8

**Part (a)**

\[ x = 78 \]

alternate angles

Either \[ y = 144 \] or \[ z = 102 \]  
(opposite angles of) cyclic quad (= 180)

and \[ z = 102 \] or \[ y = 144 \]  
Angles (in (a)) quadrilateral (= 360)  
or (opp angles of) cyclic quad (= 180)

- **B1**
- **R1**

Dep on B1 Accept Z angle, extras can spoil

Accept longer reasons using correct language and clarity with angles used.  
E.g. allied angles gives 102° and angles on a straight line = 180°

**Part (b)**

Their \[ z + 36 \neq 180 \] oe

- **R1**

Could also use their angles \[ x \] and \[ y \] provided \[ x + y \neq 180 \].  
Could be a longer reason involving angles must be clearly explained.

**Part (c)**

\[ 72 \text{ or } 288 \]

**B1**

**Part (d)**

\[ 51 \]

cao

**B1**

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<table>
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<tbody>
<tr>
<td>9 (a)</td>
<td>(p =) 5 cao, (q =) 12 cao (r =) 1 ft</td>
<td>B1</td>
<td>B1</td>
<td>B1 ft</td>
</tr>
<tr>
<td></td>
<td>Accept in correct order if no labels ft for r = 18 – their p – their q provided r not negative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) (i)</td>
<td>17 cao</td>
<td>B1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>12 cao</td>
<td>B1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) (i)</td>
<td>26 cao</td>
<td>B1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>57 ft</td>
<td>B1 ft</td>
<td>ft 45 + their q</td>
<td></td>
</tr>
<tr>
<td>(d) (i)</td>
<td>(\frac{8}{100}) oe isw</td>
<td>B1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>(\frac{45}{100}) oe isw</td>
<td>B1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e)</td>
<td>Any fraction with denominator 74 seen (\frac{37 \times 36}{74 \times 73}) (\frac{18}{73}) oe isw cao</td>
<td>B1</td>
<td>M1</td>
<td>ft their fraction i.e. one taken off each part (\frac{k \times (k-1)}{l \times (l-1)}) N.B. (\frac{1}{2} \times \frac{36}{73}) gets B1M1</td>
</tr>
<tr>
<td></td>
<td>A1</td>
<td>1332 (\frac{5402}{www3}) (if decimal then 0.247 or better) Do not accept ratio or in words</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 10 (a) (i) | \(\frac{8 \times (8+1)}{2} = 36\) | E1 |
| (ii) | 80 200 | B1 |
| (b) (i) | \(2 (1 + 2 + 3 + \ldots + n) = 2 \times \frac{n(n+1)}{2} = n(n+1)\) | E1 | both steps must be shown |
| (ii) | 40 200 | B1 |
| (iii) | 40 000 | B1 ft | ft their (a)(ii) – their (b)(ii) or their (b)(ii) – 200 ft Not for zero or negative answer |
| (c) (i) | \(\frac{2n(2n+1)}{2}\) oe final answer | B1 | e.g. \(2n^2 + n\) |
| (ii) | \(n^2\) cao | B2 | M1 for their (c)(i) – \(n(n+1)\) or \(n(n+1) – n\) or \(n/2(2+2(n-1))\) |