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, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.
Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

**GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

**GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always **whole marks** (not half marks, or other fractions).

**GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

**GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.
### Abbreviations
- **ca** - correct answer only
- **soi** - seen or implied
- **isw** - ignore subsequent working
- **oe** - or equivalent
- **nfww** - not from wrong working
- **dep** - dependent
- **AG** - answer given

### Question | Answer | Marks | Partial Marks
--- | --- | --- | ---
1(a)(i) | 6 points plotted correctly | 2 | B1 for 4 or 5 points plotted correctly
1(a)(ii) | Positive | 1 | 
1(a)(iii) | $\frac{3}{5}$ cao | 2 | B1 for $\frac{6}{10}$ oe seen
1(a)(iv) | Ruled line of best fit | B1 | 
1(a)(v) | 54 to 58 | B1 | FT reading from *their* straight line of best fit at 48 km
1(b)(i) | $20 < t \leq 40$ | 1 | 
1(b)(ii) | 39.5 | 3 | B1 for correct use of midpoints soi M1 for $(10 \times 29 + 30 \times 38 + 50 \times 26 + 70 \times 21 + 90 \times 6) \div 120$ oe
1(b)(iii) | 22.5 | 2 | B1 for $21 + 6$ or $27$ seen

### Question | Answer | Marks | Partial Marks
--- | --- | --- | ---
2(a) | 395.25 cao | 3 | B2 for answer 79.05 OR B1 for [time = ] 7.75 oe soi M1 for *their* 7.75 $\times$ 10.20 oe
2(b) | 23.75 | 2 | M1 for $(19.80 \times 25 - 400) \div 400$ oe If 0 scored, SC1 for answer 123.75 or 123.8
2(c) | 14.5[0] | 2 | M1 for $\frac{(100 + 8)}{100} \times x = 15.66$ soi
2(d) | 3744.14 final answer | 3 | M2 for $3500 \times \left(1 + \frac{1.7}{100}\right)^4$ oe or M1 for $3500 \times \left(1 + \frac{1.7}{100}\right)^k$ oe where $k > 1$
### Question 3(a)

\[
\cos A = \frac{95^2 + 174^2 - 132^2}{2 \times 95 \times 174}
\]

\[
A = 48.56[7…] \text{ or } 48.57
\]

**Answer**: 48.56 or 48.57

**Marks**

- M2 or M1 for 132² = 95² + 174² - 2 × 95 × 174 × cos A
- A1

### Question 3(b)

1580 to 1581

**Answer**: 1580 to 1581

**Marks**

- M1 for \( \frac{1}{2} \times 95 \times 174 \times \sin 48.6 \)
- AND
- M2 for their area × 3 ÷ 100 × 8.50
- or M1 for two operations correct in their area × 3 ÷ 100 × 8.50
- or for 3 ÷ 100 × 8.50 soi

### Question 4(a)(i)

\[
A = 1, 2, 5, 10, 3, 6, 7, 9
\]

**Answer**: Diagram with numbers placed

**Marks**

- B1 for 8 or 9 numbers correctly placed
- or for 1, 2, 4, 5, 8, 10 correctly placed with no numbers placed incorrectly
- FT n(A ∪ B) from their Venn diagram

### Question 4(a)(ii)

6

**Answer**: 6

**Marks**

- FT n(A ∪ B) from their Venn diagram

### Question 4(a)(iii)

Factors of 10

**Answer**: Factors of 10

**Marks**

- 1

### Question 4(b)(i)

10

**Answer**: 10

**Marks**

- B1 for Venn diagram with at least 3 numbers correct
- Or M1 for 30 = 8 + 12 + x

### Question 4(b)(ii)

\[
\frac{42}{870} \text{ or } \frac{7}{145}
\]

**Answer**: \( \frac{42}{870} \) or \( \frac{7}{145} \)

**Marks**

- M1 for \( \frac{7}{30} \times \frac{6}{29} \) [x2]
- or SC1 for answer \( \frac{49}{900} \), FT their Venn diagram

© UCLES 2018
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Marks</th>
<th>Partial Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>5(a)</td>
<td>–1.6 oe</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5(b)</td>
<td>Correct smooth curve</td>
<td>3</td>
<td><strong>B2FT</strong> for 7 or 8 points correctly plotted or <strong>B1FT</strong> for 5 or 6 points correctly plotted</td>
</tr>
<tr>
<td>5(c)(i)</td>
<td>Tangent drawn at (–2, 0.8)</td>
<td>B1</td>
<td></td>
</tr>
<tr>
<td>5(c)(ii)</td>
<td>–3.1 to –2.2</td>
<td>B1</td>
<td>Dependent on tangent drawn at $x = –2$</td>
</tr>
</tbody>
</table>
| 5(d)     | –2.5 to –2.3  
1.4 to 1.6  
2.7 to 2.9 | 3 | **FT** reading *their* graph at $y = 2$  
Tolerance ± 1 mm  
**B1** for each one correct  
After 0 scored, **SC1** for $y = 2$ soi |

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Marks</th>
<th>Partial Marks</th>
</tr>
</thead>
</table>
| 6(a)     | $\angle TAO = \angle TCO$ tangent perpendicular to radius  
$AO = CO$ [equal] radii  
$TO$ is common  
Congruent RHS | 3 | **B1** for one correct pair of equal angles and one correct pair of equal sides  
or for two correct pairs of equal sides  
**B1** for correct reason for two pairs of equal sides/angles |
| 6(b)(i)  | 90 – $x$ | 1 |               |
| 6(b)(ii) | $\frac{90 – x}{2}$ oe | 1 | **FT** *their* algebraic (b)(ii) ÷ 2 |
| 6(b)(iii)| 270 – $x$ | 1 |               |
| 6(c)     | 16.5 or 16.46[...] | 3 | **M2** for $[OT] = \frac{6}{\sin35}$  
or **M1** for $\sin35 = \frac{6}{[OT]}$ |
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Marks</th>
<th>Partial Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>7(a)</td>
<td>$\begin{pmatrix} 2 \ 4 \end{pmatrix}$</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7(b)</td>
<td>6.71 or 6.708…</td>
<td>2 M1 for $6^2 + (-3)^2$ oe</td>
<td></td>
</tr>
<tr>
<td>7(c)</td>
<td>(0, 5)</td>
<td>2 FT their (a) ((their 2 – 2), (their 4 + 1)) B1 for one value in coordinates correct or for $\begin{pmatrix} CB = \ \end{pmatrix} \begin{pmatrix} 2 \ -1 \end{pmatrix}$ soi</td>
<td></td>
</tr>
<tr>
<td>7(d)(i)</td>
<td>$y = -\frac{1}{2}x + 4$ oe final answer</td>
<td>3 B2 for $y = -\frac{1}{2}x + c$ oe OR M1 for gradient $= -\frac{3}{6}$ soi M1 for (–2, 5) substituted into $y = their \ mx + c$</td>
<td></td>
</tr>
<tr>
<td>7(d)(ii)</td>
<td>$y = 2x$ oe</td>
<td>1 FT their gradient from (d)(i)</td>
<td></td>
</tr>
</tbody>
</table>
| 8(a)     | $n + 5$
$n + 10$ | 1 Both correct |               |
<p>| 8(b)(i)  | $(n + 5)^2$ and $n(n + 10)$ | M1 |               |
| 8(b)(ii) | $n^2 + 5n + 5n + 25 - n^2 - 10n = 25$ | A1 or $n^2 + 10n - n^2 - 5n - 5n - 25 = -25$ |               |
| 8(c)     | 63 | 3 M1 for $n + n + 5 + n + 10 = 174$ oe A1 for $n = 53$ If 0 scored, SC1 for answer 53 |               |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Marks</th>
<th>Partial Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>9(a)(i)</td>
<td>(\pi \times 3^2 \times 21 + \frac{2}{3} \times \pi \times 3^3)</td>
<td>M3</td>
<td>B1 for cylinder height = 21 soi M1 for (\pi \times 3^2 \times \text{their height}) M1 for (\frac{2}{3} \times \pi \times 3^3)</td>
</tr>
<tr>
<td></td>
<td>(= 650.3[...]) or 650.4</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>9(a)(ii)</td>
<td>452 or 452.3 to 452.4…</td>
<td>3</td>
<td>M2 for (2 \times \pi \times 3^2 + \pi \times 6 \times 21) or M1 for (2 \times \pi \times 3^2) or (\pi \times 6 \times 21)</td>
</tr>
<tr>
<td>9(a)(iii)</td>
<td>21.2 or 21.22 to 21.23…</td>
<td>2</td>
<td>B1 for (\frac{\sqrt{450}}{\sqrt{650}}) soi or (\frac{\sqrt{650}}{\sqrt{450}}) soi</td>
</tr>
<tr>
<td>9(b)</td>
<td>1.57</td>
<td>3</td>
<td>B1 for 4.25 or 335 used M1 for (\text{their} 4.25 - 8 \times \text{their} 335 \div 1000) or (\text{for their} 4250 - 8 \times \text{their} 335)</td>
</tr>
<tr>
<td>10(a)(i)</td>
<td>(\frac{1}{2} x(x - 4) \times 15 = 440)</td>
<td>M2</td>
<td>B1 for height = ((x - 4))</td>
</tr>
<tr>
<td>10(a)(ii)</td>
<td>Correct expansion and simplification leading to (3x^2 - 12x - 176 = 0)</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>10(b)(i)</td>
<td>(\frac{-(-12) \pm \sqrt{(-12)^2 - 4 \times 3 \times -176}}{2 \times 3})</td>
<td>B2</td>
<td>B1 for (\sqrt{(-12)^2 - 4 \times 3 \times -176}) or (\frac{-(-12) \pm \sqrt{\text{their} 2256}}{2 \times 3})</td>
</tr>
<tr>
<td>10(b)(ii)</td>
<td>9.92 and –5.92</td>
<td>B1</td>
<td></td>
</tr>
<tr>
<td>10(c)</td>
<td>5.92</td>
<td>1</td>
<td>FT (\text{their positive root} - 4) if result positive</td>
</tr>
<tr>
<td>10(d)</td>
<td>18.2 or 18.21 to 18.22…</td>
<td>4</td>
<td>M2 for ([AF] = \sqrt{15^2 + \text{their} 9.92^2}) Or for ([BF] = \sqrt{\text{their} 9.92^2 + \text{their} 5.92^2 + 15^2}) oe or M1 for (AF^2 = 15^2 + \text{their} 9.92^2) soi or for (BF^2 = \text{their} 9.92^2 + \text{their} 5.92^2 + 15^2) oe AND M1 for (\tan [AFB] = \frac{\text{their} 5.92}{\text{their} 17.98}) or (\sin [AFB] = \frac{\text{their} 5.92}{\text{their} 18.93})</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
<td>Marks</td>
<td>Partial Marks</td>
</tr>
<tr>
<td>----------</td>
<td>--------</td>
<td>-------</td>
<td>---------------</td>
</tr>
</tbody>
</table>
| 11(a)    | \[
\frac{1 - 2x}{(2x - 3)(x - 2)} \text{ or } \frac{1 - 2x}{2x^2 - 7x + 6} \text{ final answer}
\] | 3     | B1 for \(4(x - 2) - 3(2x - 3)\) oe isw  
B1 for denominator \((2x - 3)(x - 2)\) oe isw |
| 11(b)    | \[
\frac{2x - 3}{x - 5} \text{ final answer nfww}
\] | 3     | B1 for \((2x + 3)(2x - 3)\) seen  
B1 for \((2x + 3)(x - 5)\) seen |