| Question Number | Scheme | Marks |
|---|---|---|
| **1(a)(i)** | $(2, 12)$ | B1 |
| **(ii)** | $(2, 15)$ | B1 |
| | | **(2)** |
| **(b)** | $k \text{ ,, } 3, \quad k = 5$ | M1 A1 |
| | | **(2)** |
| **(c)** | $(x =) -5$ | B1 |
| | | **(1)** |
| | | **(5 marks)** |

**Notes**

**Check for answers given in the body of the question. (There are lots!)**

**In the absence of any labelling for (a)(i) and (ii) the first answer is to be taken as (i)**

**(a)(i)**

**B1:** $(2, 12)$ but allow coordinates given separately e.g. $x = 2$, $y = 12$

Condone missing brackets e.g. 2, 12 and condone $\begin{pmatrix} 2 \\ 12 \end{pmatrix}$

**(a)(ii)**

**B1:** $(2, 15)$ but allow coordinates given separately e.g. $x = 2$, $y = 15$

Condone missing brackets e.g. 2, 15 and condone $\begin{pmatrix} 2 \\ 15 \end{pmatrix}$

**(b)**

**M1:** One of $k \text{ ,, } 3, \quad k < 3$ or $k = 5$. Condone use of $y$ for $k$ but not $x$ for $k$.

**A1:** $k \text{ ,, } 3, \quad k = 5$ or e.g. $k \text{ ,, } 3$ or $k = 5$

Condone $k \text{ ,, } 3$ and $k = 5$

Must be in terms of $k$. Allow $(-\infty, 3]$ for $k \text{ ,, } 3$

An answer of $5 \text{ ,, } k \text{ ,, } 3$ scores M1A0

**(c)**

**B1:** $-5$ only and no other values.

But beware values of $x$ that form part of their working which are clearly not part of their final answer e.g. $f(x) = 0$ when $x = -1$ so $f(x + 4) = 0$ when $x = -5$ scores B1

$x = ...$ is not required so just look for the correct value.

$(-5, 0)$ is B0

| Question Number | Scheme | Marks |
|---|---|---|
| **2(a)** | $6=5a+b,\ 3.3=8a+b$ | M1 A1 |
| | $a=-0.9, b=10.5$ | dM1 A1 |
| | | **(4)** |
| **(b)(i)** | $10.5\ \text{m}^3$ | B1ft |
| **(ii)** | $-0.9\sqrt{t}+10.5=0\Rightarrow 0.9\sqrt{t}=10.5\Rightarrow t=...$ | M1 |
| | $t=136\ (\text{min})$ | A1 |
| | | **(3)** |
| | | **(7 marks)** |

**Notes**

**(a)**

**M1:** Sets up the two simultaneous equations, one of which must be correct.
Allow if square roots are present for this mark e.g. $6=\sqrt{25}a+b$, $3.3=\sqrt{64}a+b$
Condone e.g. $6=\pm 5a+b$

**A1:** Two correct equations with the square roots processed. May be implied.
Allow e.g. $6=\pm 5a+b$ and $3.3=\pm 8a+b$ here.

**dM1:** Solves their equations by any means including calculator to obtain values for *a* and *b*.

**A1:** Correct values $a=-0.9, b=10.5$ or the equivalents e.g. $a=-\frac{9}{10}, b=\frac{21}{2}$ only.
If they solve e.g. $6=\pm 5a+b$ and $3.3=\pm 8a+b$ and offer extra values score A0.

**(b)(i)**

**B1ft:** $10.5\ \text{m}^3$ oe e.g. $\frac{21}{2}\ \text{m}^3$ <u>including the units</u>, ft on their *b* provided $b > 0$

**(b)(ii)**

**M1:** Solves their $-0.9\sqrt{t}+10.5=0\Rightarrow t=...$ which must involve squaring, not square rooting.
You may need to check but may be implied by e.g. $t=\frac{1225}{9}$ (if *a* and *b* are correct)
Note that if *a* and *b* are correct, square rooting rather than squaring leads to 3.41565… and scores M0

**A1:** Awrt 136
Units are **not** required but if any are given they must be correct.
Condone "m" for "min"
Apply isw if necessary e.g. score A1 for *t* = 136.1 = 137 to the nearest minute.
Correct answer only of awrt 136 following a correct *a* and *b* scores M1A1