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

Question Number	Scheme	Marks
3(a)	$\left(\mathrm{f}(x)=\right)-3\cos x$ or $\left(\mathrm{f}(x)=\right)3\sin(x-90°)$	M1 A1
		(2)
(b)(i)	8	B1
(ii)	5	B1
		(2)
		(4 marks)

Notes

Check for answers given in the body of the question.

(a)

M1: $\left(\mathrm{f}(x)=\right)\pm 3\cos x$ or $\left(\mathrm{f}(x)=\right)\pm 3\cos\left(-x\right)$ or $\left(\mathrm{f}(x)=\right)\pm 3\sin(x\pm 90°)$ or equivalent e.g. $\left(\mathrm{f}(x)=\right)\pm 3\cos(x\pm 180°)$

For this mark, their equation must be correct or be the equation of the given curve reflected in the x-axis.

Brackets are required if needed e.g. $\left(\mathrm{f}(x)=\right)3\sin x-90°$ scores M0

The "$\mathrm{f}(x)=$" is **not** required.

The degrees symbol is **not** required.

Condone use of another variable for this mark e.g. θ.

A1: $\left(\mathrm{f}(x)=\right)-3\cos x$ or $\left(\mathrm{f}(x)=\right)3\sin(x-90°)$ or $\left(\mathrm{f}(x)=\right)-3\cos\left(-x\right)$ or equivalent.

If correct, the equations are likely to be one of the above but there are an infinite number of possibilities e.g. $\left(\mathrm{f}(x)=\right)3\cos(x-180°)$, $\left(\mathrm{f}(x)=\right)3\cos(x+180°)$, $\left(\mathrm{f}(x)=\right)-3\sin(x-270°)$ etc.

The "$\mathrm{f}(x)=$" is **not** required so ignore how they reference their expression.

The degrees symbol is **not** required.

Must be in terms of x not e.g. θ.

Note that just $\left(\mathrm{f}(x)=\right)3\sin(x\pm 90°)$ with no choice made scores M1A0

(b)(i)

B1: 8 cao. Must be 8 not just a list of roots.

(b)(ii)

B1: 5 cao. Must be 5 not just a list of roots.