Question Number	Scheme	Marks
5(a)	$\cos\theta(3\cos\theta-\tan\theta)=2\Rightarrow\cos\theta(3\cos\theta-\frac{\sin\theta}{\cos\theta})=2$ or e.g. $\cos\theta(3\cos\theta-\tan\theta)=2\Rightarrow 3\cos^2\theta-\sin\theta=2$ or e.g. $\cos\theta(3\cos\theta-\tan\theta)=2\Rightarrow 3\cos^2\theta-\frac{\sin\theta}{\cos\theta}\cos\theta=2$	M1
	$3(1-\sin^2\theta)-\sin\theta=2$	M1
	$3\sin^2\theta+\sin\theta-1=0$ *	A1*
		(3)
(b)	$(\sin 2x=)\frac{-1\pm\sqrt{13}}{6}$ (or awrt 0.43 and awrt –0.77 (or truncated –0.76))	M1A1
	$2x=\sin^{-1}(0.434...)$ or $2x=\sin^{-1}(-0.77...)\Rightarrow x=...$	M1
	$-1.13,\ -0.438,\ 0.225,\ 1.35$	A1A1
		(5)
		(8 marks)

(a)

M1: Uses $\tan\theta=\frac{\sin\theta}{\cos\theta}$ to write the equation in terms of sine and cosine only.

M1: Uses $\sin^2\theta+\cos^2\theta=1$ to obtain a quadratic equation in sine only.

A1*: Achieves $3\sin^2\theta+\sin\theta-1=0$ * with no errors.

Condone one notational slip e.g. $3\sin\theta^2$ instead of $3\sin^2\theta$ or e.g. 3 sin for $3\sin\theta$ in the working but the printed answer must be correct but allow e.g. $0=\sin\theta+3\sin^2\theta-1$

(b)

M1: Attempts to solve the quadratic $3\sin^2\theta+\sin\theta-1=0$ which may be in any variable. Usual rules apply for solving a quadratic (via a calculator is also acceptable and may imply this mark). If no working is shown then the roots must be correct.

A1: $\frac{-1\pm\sqrt{13}}{6}$ or a minimum of $\frac{-1\pm\sqrt{13}}{2\times 3}$ (or as decimals awrt 0.43 and awrt –0.77).

Whether subsequently rejected or not. Ignore any labelling just look for these values.

M1: Attempts to find one angle within the range by finding the inverse sine of one of their roots and dividing by 2. May be implied by their values and allow if working in degrees.

A1: Any two of awrt $-1.13,\ -0.438,\ 0.225,\ 1.35$

A1: All four of awrt $-1.13,\ -0.438,\ 0.225,\ 1.35$ and no others in the range.

Special case - answers in degrees: –64.9, –25.1, 12.9, 77.1

Score A1 for awrt any 2 of these and then A0 so a maximum of 7/8 for the question.

NB allow answers to be found in degrees which are subsequently converted to radians but then left in terms of π e.g. $\frac{-64.9\pi}{180}$ etc. provided the answers round to the $-1.13,\ -0.438,\ 0.225,\ 1.35$

Some candidates are obtaining a different quadratic equation in (a) e.g. $3\sin^2\theta-\sin\theta-1=0$. In such cases allow both M marks in (b) if they persist with their incorrect quadratic provided there are sign errors only e.g. $\pm 3\sin^2\theta\pm\sin\theta\pm 1=0$

Question Number	Scheme	Marks
6(a)	$h = 0.5$	B1
	$\frac{1}{2}\times"0.5"\times\left[3+1.92+2(2.6833+2.4+2.1466)\right]$	M1
	4.845	A1
		(3)
(b)	$\int_0^2 2-\frac{1}{4}x^2\ \mathrm{d}x=\left[2x-\frac{x^3}{12}\right]_0^2=\frac{10}{3}$	M1A1
	$\%\text{ of logo shaded }=\frac{"4.845"-"\frac{10}{3}"}{6}$	dM1
	$=25.2(\%)$	A1
		(4)
		(7 marks)

(a)

B1: $h = 0.5$ seen or implied.

M1: A full attempt at the trapezium rule.

Look for $\frac{\text{their}\,h}{2}\{3+1.92+2(2.6833+2.4+2.1466)\}$ but condone copying slips.

Note that $\frac{\text{their}\,h}{2}3+1.92+2(2.6833+2.4+2.1466)$ scores M0 unless the missing brackets are recovered or implied by their answer. (You may need to check)

Allow this mark if they add the areas of individual trapezia e.g.

$\frac{\text{their}\,h}{2}\{3+2.6833\}+\frac{\text{their}\,h}{2}\{2.6833+2.4\}+\frac{\text{their}\,h}{2}\{2.4+2.1466\}+\frac{\text{their}\,h}{2}\{2.1466+1.92\}$

Condone copying slips but must be a complete method using all the trapezia.

A1: awrt 4.845. Apply isw once awrt 4.845 is seen.

(b)

M1: Attempts to integrate $2-\frac{1}{4}x^2$. Award for either $2x$ or $\ldots x^3$.

A1: $\frac{10}{3}$ seen or implied.

dM1: Attempts to find the difference (either way round) between their answer to part (a) and their attempt at the area under C_2 which must be positive and divides by 6
(Must follow an attempt to integrate C_2 and not an attempt to use the trapezium rule again)

A1: awrt 25.2(%) (the % symbol is not required). Do not allow –25.2% or e.g. 0.252

Allow $\frac{907}{36}(\%)$

Some candidates are not doing the integration and are using their calculators for the area under C2. If they then go on and use the 10/3 to get awrt 25.2% then we will allow a Special Case of M0A0dM0A1