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

Question Number	Scheme	Marks
7(a)	$\dfrac{12x^3(x-7)+14x(13x-15)}{21\sqrt{x}}=\dfrac{12x^4-84x^3+182x^2-210x}{21\sqrt{x}}$	M1
	$\dfrac{4}{7}x^{\frac{7}{2}}, -4x^{\frac{5}{2}}, +\dfrac{26}{3}x^{\frac{3}{2}}, -10x^{\frac{1}{2}}$	A1
	$\left(y=\right)\dfrac{4}{7}x^{\frac{7}{2}}-4x^{\frac{5}{2}}+\dfrac{26}{3}x^{\frac{3}{2}}-10x^{\frac{1}{2}}$	A1
		(3)
(b)	$y=\dfrac{4}{7}x^{\frac{7}{2}}-4x^{\frac{5}{2}}+\dfrac{26}{3}x^{\frac{3}{2}}-10x^{\frac{1}{2}}$ $\left(\dfrac{\mathrm{d}y}{\mathrm{d}x}=\right)2x^{\frac{5}{2}}-10x^{\frac{3}{2}}+13x^{\frac{1}{2}}-5x^{-\frac{1}{2}}$	M1A1ft
	$2x^3-10x^2+13x-5=0$ *	A1*
		(3)
(c)	$\left(2x^3-10x^2+13x-5\right)\div(x-1)=(2x^2\pm...x\pm...)$	M1
	$2x^2-8x+5$	A1
	$x=\dfrac{4\pm\sqrt{6}}{2}$	A1
		(3)
		(9 marks)

(a)

M1: Attempts to multiply out numerator (at least 2 correct terms obtained).
May be done by e.g. 2 separate fractions.

A1: Two of $\dfrac{4}{7}x^{\frac{7}{2}}, -4x^{\frac{5}{2}}, +\dfrac{26}{3}x^{\frac{3}{2}}, -10x^{\frac{1}{2}}$ where the coefficient may be unsimplified but the index must be processed so allow for any 2 of e.g. $\dfrac{12}{21}x^{\frac{7}{2}}, -\dfrac{84}{21}x^{\frac{5}{2}}, +\dfrac{182}{21}x^{\frac{3}{2}}, -\dfrac{210}{21}x^{\frac{1}{2}}$

A1: $y=\dfrac{4}{7}x^{\frac{7}{2}}-4x^{\frac{5}{2}}+\dfrac{26}{3}x^{\frac{3}{2}}-10x^{\frac{1}{2}}$ or exact simplified equivalent. Allow as a list.

(b)

M1: Differentiates to achieve an expression of the form $\left(\dfrac{\mathrm{d}y}{\mathrm{d}x}=\right)...x^{\frac{5}{2}}\pm...x^{\frac{3}{2}}\pm...x^{\frac{1}{2}}\pm...x^{-\frac{1}{2}}$

A1ft: Correct differentiation $2x^{\frac{5}{2}}-10x^{\frac{3}{2}}+13x^{\frac{1}{2}}-5x^{-\frac{1}{2}}$ Follow through their *a*, *b*, *c* and *d* with simplified coefficients. "$\dfrac{\mathrm{d}y}{\mathrm{d}x}=$" is not required.

A1*: $2x^3-10x^2+13x-5=0$
Reaches this printed answer from a correct derivative where the "= 0" has appeared at least once before the final answer. Must be as shown and not just e.g. $x^{-\frac{1}{2}}\left(2x^3-10x^2+13x-5\right)=0$ but allow e.g. $x^{-\frac{1}{2}}\left(2x^3-10x^2+13x-5\right)=0$ followed by a minimal conclusion e.g. hence proven.