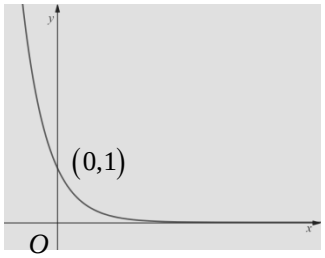
Question Number	Scheme	Marks
5.(a)		
	Shape or intercept at 1	M1
	Fully correct	A1
		(2)
	$h = 0.5$	B1
(b)	Area $\approx \frac{0.5}{2}\left\{4.25+16.06+2\times\left(6.427+9.125+12.34\right)\right\}$	M1
	= awrt 19.0	A1
		(3)
(c)	$\int_2^4\left(x(x-3)+\left(\frac{1}{2}\right)^x\right)\mathrm{d}x = \int_2^4\left(x^2+\left(\frac{1}{2}\right)^x-3x\right)\mathrm{d}x = (b)-\left[\frac{3}{2}x^2\right]_2^4$	M1
	= awrt 1.0	A1ft
		(2)
		(7 marks)

(a)

M1 For either the shape in quadrants 1 and 2 only or the *y*-intercept at 1. Condone slips of the pen but the gradient should be tending to 0 as x increases. Condone (1,0) marked on the correct axis.

A1 Fully correct. Shape in quadrants 1 and 2 only with the *y*-intercept at 1. Condone slips of the pen towards the *x*-axis but the graph should not cross the *x*-axis. Condone (1,0) marked on the correct axis. For a fully correct graph its asymptote should not appear to be $y = 1$. As a rule of thumb look for the asymptote to be at least half way below its *y*-intercept.

Do not be too concerned about relative position of the curve in the second quadrant as long as the curve gets steeper as $x \to -\infty$

(b)

B1 For $h = 0.5$ seen or implied by sight of $\frac{0.5}{2}$ in front of the bracket

M1 For the correct bracket structure $\left\{4.25+16.06+2\times(6.427+9.125+12.34)\right\}$ condoning slips copying from the table or the omission of the final bracket.

eg $\frac{1}{2}\times 0.5\times(4.25+16.06+2\times(6.427+9.125+12.34)$

Recovery from missing brackets to achieving the correct answer can still score full marks.

A1 19.0235 but awrt 19.0 will usually score full marks

Note: The calculator answer for the integral is 18.937… which is A0.

Examples of mark traits where full marks are not scored:

$\frac{1}{2}\times 0.5\times 4.25+16.06+2\times(6.427+9.125+12.34)\quad(=72.9065)$ is B1M0A0

$\frac{1}{2}\times 0.5\times 4.25+16.06+2\times 6.427+9.125+12.34\quad(=51.4415)$ is B1M0A0

(c)

M1 For realising that $\int_2^4\left(x(x-3)+\left(\frac{1}{2}\right)^x\right)\,\mathrm{d}x=\int_2^4\left(x^2+\left(\frac{1}{2}\right)^x-3x\right)\,\mathrm{d}x=(b)-\left[\frac{3}{2}x^2\right]_2^4$

i.e. $(b)-\left[\frac{3}{2}x^2\right]_2^4$ must be seen or $(b)-\int_2^4(3x)\,\mathrm{d}x\Rightarrow$ (b) -18 for this mark. The $3x$ term must be isolated from the rest of the integral that is identified in some way to be their part (b). **There must be some integration carried out** so look for $3x\to\ldots x^2$. Condone poor notation.

A1ft 1.0235 but accept awrt 1.0 or follow through on their answer or their unrounded answer from (b) -18 **provided** M1 has been scored.

Note: The calculator answer for the integral is 0.937 (awrt 0.9) is M0A0

Question Number	Scheme	Marks
6(a)	Attempts line with gradient -2 and point $(4,-1)$ $y+1=-2(x-4)$ $y=-2x+7$	M1 A1 **(2)**
(b)	$y=\frac{1}{2}x$ meets $y=-2x+7$ when $\frac{1}{2}x=-2x+7\Rightarrow x=\frac{14}{5}, y=\frac{7}{5}$ oe	M1 A1
	Attempts $r^2=\left(4-"\frac{14}{5}"\right)^2+\left(-1-"\frac{7}{5}"\right)^2=\frac{36}{5}$ oe	dM1 A1
	$(x-4)^2+(y+1)^2=\frac{36}{5}$ oe	A1 **(5)** **(7 marks)**

(a)

M1 Attempts the equation of the line with gradient -2 and point $(4,-1)$
Condone a slip on one of the signs of the $(4,-1)$. For example $y-1=-2(x-4)$
If the form $y=mx+c$ is used they must proceed as far as $c=...$

A1 $y=-2x+7$

……

Alt (a)

M1 Differentiates implicitly the equation of the circle $(x-4)^2+(y+1)^2=r^2\Rightarrow 2(x-4)+2(y+1)\frac{dy}{dx}=0$
and substitutes in $\frac{dy}{dx}=\frac{1}{2}$

A1 $y=-2x+7$

……

(b)

M1 Attempts to find where $y=\frac{1}{2}x$ meets their $y=-2x+7$. Expect to see candidates proceed to $x=...$

A1 $\left(\frac{14}{5},\frac{7}{5}\right)$ or any other form eg $(2.8,1.4)$ or $x=\frac{14}{5}, y=\frac{7}{5}$

dM1 Attempts to find the distance between their $\left(\frac{14}{5},\frac{7}{5}\right)$ and $(4,-1)$ using Pythagoras' theorem. Look for an attempt to subtract the coordinates, square and add. It is dependent on the previous method mark. Condone a slip on one of the signs.

A1 For $(r=)\ \sqrt{\frac{36}{5}}$ or $(r^2=)\ \frac{36}{5}$ oe

A1 $(x-4)^2+(y+1)^2=\frac{36}{5}$ or $(x-4)^2+(y+1)^2=7.2$ or $5(x-4)^2+5(y+1)^2=36$ only

……