A1:	$y=\frac{1}{2}x+\frac{11}{8}$ or exact equivalent but must be in the form $y=mx+c$	
(b)	$\left(\mathrm{f}'(x)=\right)10+\frac{5}{2}x^{-\frac{3}{2}}-2x^{-2}\Rightarrow\quad\left(\mathrm{f}(x)=\right)10x-5x^{-\frac{1}{2}}+2x^{-1}\left(+c\right)$	M1 A1 A1
	Uses $P\left(\frac{1}{4},'\frac{3}{2}'\right)\Rightarrow\frac{3}{2}=\frac{5}{2}-5\times2+2\times4+c\Rightarrow c=...$	**d**M1
	$\left(\mathrm{f}(x)=\right)10x-5x^{-\frac{1}{2}}+2x^{-1}+1$	A1
		(5)

Notes

Condone spurious notation for the A marks e.g. floating integral signs and/or d*x*'s

M1: Attempts to split up the fractional term (into two terms) then integrates with two terms (from the three) having a correct index **after integrating**.

It is for 2 of, $10\rightarrow10x$, $\frac{5\sqrt{x}}{2x^2}\rightarrow...x^{-\frac{3}{2}}\rightarrow...x^{-\frac{1}{2}}$, $\frac{4}{2x^2}\rightarrow...x^{-2}\rightarrow...x^{-1}$

Allow the indices to be unprocessed.

Condone the omission of the + *c*

A1: Two correct terms of $\left(\mathrm{f}(x)=\right)10x-5x^{-\frac{1}{2}}+2x^{-1}$

Allow the indices to be unprocessed and the coefficients to be unsimplified e.g. 2 of

$\left(\mathrm{f}(x)=\right)10x+\frac{\frac{5}{2}x^{-\frac{3}{2}+1}}{-\frac{3}{2}+1}-\frac{2x^{-2+1}}{-2+1}$ The "f(x) =" is not required.

A1: $\left(\mathrm{f}(x)=\right)10x-5x^{-\frac{1}{2}}+2x^{-1}+c$ oe seen on one line but condone the omission of + *c*

Allow the indices to be unprocessed and the coefficients to be unsimplified e.g. allow

$\left(\mathrm{f}(x)=\right)10x+\frac{\frac{5}{2}x^{-\frac{3}{2}+1}}{-\frac{3}{2}+1}-\frac{2x^{-2+1}}{-2+1}$ The "f(x) =" is not required.

dM1: Uses $x=\frac{1}{4}$ and their value of *y* found from substituting their value of *k* and $x=\frac{1}{4}$ in $y=kx+2$ into their integrated function and finds the value of *c*.

Depends on the first method mark.

A1: $\left(\mathrm{f}(x)=\right)10x-5x^{-\frac{1}{2}}+2x^{-1}+1$ or exact equivalent such as $\left(\mathrm{f}(x)=\right)10x-\frac{5}{\sqrt{x}}+\frac{2}{x}+1$

The "f(x) =" is not required but the indices must now be processed and the coefficients simplified.

		(11 marks)

Question Number	Scheme	Marks
9(a)	$\frac{11\pi}{8}$	B1
		(1)
(b)	102	B1
	States $50\times2+2$ or other suitable reason	**d**B1
		(2)
(c)	$\left(\frac{3\pi}{8}, -5\right)$	B1, B1
		(2)
		(5 marks)

Notes

Do <u>not</u> allow the use of degrees in this question.

If there is more than one answer for any part, score the final attempt.

Remember to check for answers written in the question.

(a)

B1: $\frac{11\pi}{8}$ or exact equivalent. Ignore any reference to the *y* coordinate, correct or incorrect but

e.g. $\left(-1, \frac{11\pi}{8}\right)$ scores B0

(b)

B1: 102

dB1: Gives a suitable reason.

Allow a **correct** mathematical calculation. E.g. $50\times2+2$ or e.g. $50\times2+1+1$ or e.g. $100+2$

If a **correct** mathematical calculation is seen do not be too concerned with the precise explanation for their calculation.

If they state 102 but the reason is **clearly incorrect** e.g. 3 roots between 0 and 2π and another 98 score B1B0

Allow an explanation '2 solutions every 2π radians plus another 2 in the next π radians'

Do not be concerned if it is ambiguous if the boundaries of *x* are included or not.

e.g. "there are 100 solutions for $0 \leqslant x \leqslant 100\pi$ and then another 2 in the next π"

See the next page for a diagram of the scenario.

Depends on the first B mark

(c)

B1: One correct coordinate.

B1: $\left(\frac{3\pi}{8}, -5\right)$

Note that $\left(\text{incorrect value}, -5\right)$ scores B1B0 not B0B1

Allow answers to be written as coordinates or as $x = \ldots$, $y = \ldots$

Condone missing brackets e.g. $\frac{3\pi}{8}, -5$ and condone punctuation other than a comma e.g. $\frac{3\pi}{8}; -5$

The *x* coordinate must be written as a single fraction e.g. not $\frac{\pi}{2}-\frac{\pi}{8}$

The *y* coordinate must be written as single number so do not allow -5×1 for -5

Do **not** allow coordinates the wrong way round e.g. $\left(-5, \frac{3\pi}{8}\right)$ scores B0B0