(c)	$f'(x) = 2x + \frac{8}{x^2} + k \Rightarrow \quad \left(f(x) =\right) x^2 - \frac{8}{x} + kx \left(+c\right)$	M1A1ft
	$\left(\sqrt{2}, 2\sqrt{2}\right) \Rightarrow 2\sqrt{2} = 2 - \frac{8}{\sqrt{2}} + \left(1 - 2\sqrt{2}\right)\sqrt{2} + c \Rightarrow c = ...\left(2 + 5\sqrt{2}\right)$	dM1
	$\left(f(x) =\right) x^2 - \frac{8}{x} + \left(1 - 2\sqrt{2}\right)x + 2 + 5\sqrt{2}$	A1
		(4)
		(8 marks)

Notes

Mark all parts together.

(c)

M1: Integrates with two terms having a correct index. Allow indices unprocessed.

It is for 2 from: $2x \rightarrow ...x^2 \left(\text{or } x^{1+1}\right)$, $\frac{8}{x^2} \rightarrow \frac{...}{x} \left(\text{or } ...x^{-1} \text{ or } ...x^{-2+1}\right)$, $k \rightarrow ...x \left(\text{or } ...x^{0+1}\right)$

A1ft: Correct integration in any form with indices processed.

$\left(f(x)\right) = x^2 - \frac{8}{x} + kx \left(+c\right)$ but follow through on their k which may be a decimal and allow the letter k. $"f(x) ="$ is **not** required and "+ c" is **not** required.

Brackets are required around their $1 - 2\sqrt{2}$ but they may be implied by their attempt to find "c" so you may need to check their calculation for c.

dM1: Uses $x = \sqrt{2}$ and their attempt at y using $x = \sqrt{2}$ in $y = 5x - 3\sqrt{2}$ in their integrated function and finds the value of c.

A1: Correct simplified exact expression $\left(f(x) =\right) x^2 - \frac{8}{x} + \left(1 - 2\sqrt{2}\right)x + 2 + 5\sqrt{2}$ or e.g.

$\left(f(x) =\right) x^2 - \frac{8}{x} + x - 2\sqrt{2}x + 2 + 5\sqrt{2}$. $"f(x) ="$ is **not** required.

Brackets are required around their $1 - 2\sqrt{2}$ if written as in the first example above.

Do not allow $1x^2$ or e.g. $\frac{2}{2}x^2$ for x^2 but allow $\sqrt{8}$ for $2\sqrt{2}$.

Apply isw once a correct function is seen.

Question Number	Scheme	Marks
9(a)	$(f(x)=)-4\sin x$ or equivalent such as $(f(x)=)4\cos\left(x+\frac{\pi}{2}\right)$	M1 A1
		(2)
(b)(i)	$\left(\frac{5\pi}{3}, 4\right)$	B1, B1
		(2)
(ii)	$\left(\frac{3\pi}{2}, -2\right)$	B1, B1
		(2)
		(6 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)

M1: For any sine or cosine curve with an amplitude of 4 and a period of 2π and which passes through the origin. E.g. $(f(x)=)\pm 4\sin(\pm x)$, $(f(x)=)\pm 4\cos\left(x\pm\frac{\pi}{2}\right)$

Condone the use of θ for this mark and "f(x) =" (or "$f(\theta)=$") is not required.

Do not allow ambiguous expressions e.g. $(f(x)=)-4f(\sin x)$

A1: Completely correct expression in terms of x e.g. $(f(x)=)-4\sin x$ or equivalent such as $(f(x)=)4\cos\left(x+\frac{\pi}{2}\right)$, $(f(x)=)4\sin(x+\pi)$, $4\sin(-x)$

"f(x) =" is not required.

(b)

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

If more than one answer is given, mark their final answer.

Condone missing brackets e.g. $\frac{5\pi}{3}, 4$ and condone punctuation other than a comma e.g. $\left(\frac{5\pi}{3}; 4\right)$

The x coordinates must be written as single fractions but allow equivalents e.g. $\frac{10\pi}{6}$ for $\frac{5\pi}{3}$

The y coordinate must be written as single number so do not allow 0 – 2 for –2

Do **not** allow coordinates the wrong way round e.g. $\left(4, \frac{5\pi}{3}\right)$ or $\left(-2, \frac{3\pi}{2}\right)$

(b) (i)

B1: One correct coordinate from $x=\frac{5\pi}{3}$ or $y=4$

B1: $\left(\frac{5\pi}{3}, 4\right)$ or $x=\frac{5\pi}{3}$ and $y=4$