Question	Scheme	Marks	AOs
4(a)	$\sin y = x \Rightarrow \cos y \dfrac{dy}{dx} = 1$ $\quad$ $\sin y = x \Rightarrow \dfrac{dx}{dy} = \cos y$	M1	1.1b
	$\sin^2 y + \cos^2 y = 1 \Rightarrow \cos y = \sqrt{1 - \sin^2 y} = \sqrt{1 - x^2}$	M1	2.1
	$\dfrac{dy}{dx} = \dfrac{1}{\sqrt{1 - x^2}}$ * cso	A1*	1.1b
		(3)	
(b)	$f(x) = \frac{3x+2}{\sqrt{4-x^2}} = \frac{3x}{\sqrt{4-x^2}} + \frac{2}{\sqrt{4-x^2}}$	M1	3.1a
	$\displaystyle\int \frac{3x}{\sqrt{4-x^2}}\,dx = \beta\sqrt{4-x^2}$	M1	1.1b
	$\displaystyle\int \frac{2}{\sqrt{4-x^2}}\,dx = \alpha \arcsin\left(\frac{x}{2}\right)$	M1	1.1b
	$\displaystyle\int \frac{3x+2}{\sqrt{4-x^2}} = -3\sqrt{4-x^2} + 2\arcsin\left(\frac{x}{2}\right)\{+c\}$	A1	1.1b
	$\text{Mean} = \frac{1}{\sqrt{2}-0}\left[-3\sqrt{4-x^2} + 2\arcsin\left(\frac{x}{2}\right)\right]_0^{\sqrt{2}}$ $= \frac{\sqrt{2}}{2}\left[\left(-3\sqrt{4-(\sqrt{2})^2} + 2\arcsin\left(\frac{\sqrt{2}}{2}\right)\right) - \left(-3\sqrt{4-(0)^2} + 2\arcsin\left(\frac{0}{2}\right)\right)\right]$	M1	2.1
	$= \frac{\pi\sqrt{2}}{4} + 3\sqrt{2} - 3$	A1	2.2a
		(6)	
			(9 marks)

Notes:

(a)

M1: Finds x in terms of y and differentiates

M1: Uses the trig identity $\sin^2 y + \cos^2 y = 1$ to express $\cos y$ in terms of x

A1*: Correctly achieves the required answer. cso

(b)

M1: Splitting the fraction into two separate expressions

M1: Integrates the first fraction into the required form

M1: Integrates the second fraction into the required form

A1: Correct integration of $f(x)$

M1: Applies the correct method to find the mean value over the required interval

A1: Correct answer