

Question	Answer	Marks	Guidance
	Integrate $\sqrt{2\pi-2x}$ to obtain form $k_1(2\pi-2x)^{\frac{3}{2}}$	M1	any constant k_1
	Obtain correct $-\frac{1}{3}(2\pi-2x)^{\frac{3}{2}}$	A1	OE
	Apply limits to obtain $\frac{1}{3}(2\pi)^{\frac{3}{2}}$ or exact equivalent	A1	at this stage or later
	Use identity $-\sin^2 x = -\frac{1}{2} + \frac{1}{2}\cos 2x$	B1	OE
	Integrate to obtain form $k_2x + k_3 \sin 2x$	M1	any constants k_2, k_3
	Obtain correct $-\frac{1}{2}x + \frac{1}{4}\sin 2x$	A1	OE if area taken as positive
	Substituting correct limits into <i>their</i> $\frac{1}{2}x - \frac{1}{4}\sin 2x$	M1	Can be SOI by $\pm\frac{1}{2}\pi$ Allow one slip
	Obtain $\frac{1}{3}(2\pi)^{\frac{3}{2}} - \frac{1}{2}\pi$ or exact equivalent	A1	CWO
		8	