Q	Marking instructions	AO	Marks	Typical solution
8	Begins integration by parts by writing $u = x$ $v' = \sin 4x$ $u' = 1$ $v = A\cos 4x$ PI by $Ax\cos 4x - A\int (\cos 4x)\,dx$ Or $u = \sin 4x$ $v' = x$ $u' = A\cos 4x$ $v = Bx^2$ PI by $Px^2 \sin 4x - Q\int (x^2 \cos 4x)\,dx$	3.1a	M1	$u = x$ $v' = \sin 4x$ $u' = 1$ $v = -\frac{1}{4}\cos 4x$ $\left[-\frac{1}{4}x\cos 4x\right]_0^{\frac{\pi}{2}} + \frac{1}{4}\int_0^{\frac{\pi}{2}}(\cos 4x)\,dx$ $= \left[-\frac{1}{4}x\cos 4x + \frac{1}{16}\sin 4x\right]_0^{\frac{\pi}{2}}$ $= \left(-\frac{\pi}{8}\cos\frac{4\pi}{2} + \frac{1}{16}\sin\frac{4\pi}{2}\right) - \left(0\times\cos 0 + \frac{1}{16}\sin 0\right)$ $= -\frac{\pi}{8}$
	Selects the correct method for integration by parts $u = x$ $v' = \sin 4x$ $u' = 1$ $v = A\cos 4x$ PI by $Ax\cos 4x - A\int (\cos 4x)\,dx$	1.1a	M1	
	Substitutes their u, u', v, v' of **either** of the above forms into the integration by parts formula. Eg $Px\cos 4x - P\int (\cos 4x)\,dx$ $Px^2 \sin 4x - Q\int (x^2 \cos 4x)\,dx$ $\frac{x^2}{2}\sin 4x - \int (2x^2 \cos 4x)\,dx$ PI by $-\frac{1}{4}x\cos 4x + \frac{1}{16}\sin 4x$	1.1a	M1	
	Obtains $-\frac{1}{4}x\cos 4x - \frac{1}{4}\int (-\cos 4x)\,dx$ Condone missing dx PI by $-\frac{1}{4}x\cos 4x + \frac{1}{16}\sin 4x$	1.1b	A1	
	Completes integration by parts to obtain $-\frac{1}{4}x\cos 4x + B\sin 4x$ with $B \neq \pm 1$	1.1a	M1	
	Completes reasoned argument by explicitly substituting correct limits into $-\frac{1}{4}x\cos 4x + \frac{1}{16}\sin 4x$	2.1	R1	

	To obtain $-\frac{\pi}{8}$ Accept $\left(-\frac{\pi}{8}\cos 2\pi + \frac{1}{16}\sin 2\pi\right) - 0$ AG			
	Question 8 Total		**6**	