

Q	Marking instructions	AO	Mark	Typical solution
8	Uses integration by parts with $u = x$ and $v' = \cos x$ PI by $x \sin x + \cos x$	3.1a	B1	$u = x \quad u' = 1$ $v' = \cos x \quad v = \sin x$ $\int x \cos x \, dx = x \sin x - \int \sin x \, dx$ $= x \sin x + \cos x$
	Applies integration by parts formula correctly by substituting their u , u' , v and v' PI by $x \sin x + \cos x$	1.1a	M1	$\int_{\frac{\pi}{4}}^{\frac{\pi}{3}} x \cos x \, dx = [x \sin x + \cos x]_{\frac{\pi}{4}}^{\frac{\pi}{3}}$ $= \frac{\pi}{3} \sin \frac{\pi}{3} + \cos \frac{\pi}{3} - \left(\frac{\pi}{4} \sin \frac{\pi}{4} + \cos \frac{\pi}{4} \right)$
	Obtains $x \sin x + \cos x$ CAO	1.1b	A1	$= \pi \frac{\sqrt{3}}{6} + \frac{1}{2} - \left(\pi \frac{\sqrt{2}}{8} + \frac{\sqrt{2}}{2} \right)$
	Substitutes limits correctly into their integrated expression PI by correct a and b	1.1a	M1	$= \left(\frac{4\sqrt{3} - 3\sqrt{2}}{24} \right) \pi + \left(\frac{1 - \sqrt{2}}{2} \right)$
	Uses correct exact value for any one of $\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$ or $\cos \frac{\pi}{3} = \frac{1}{2}$ or $\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$ or $\sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$ PI by correct a or b	1.2	B1	
	Obtains correct exact values of a and b ACF Ignore if 0.14(...) seen subsequently	1.1b	A1	
Total			6	