Question	Answer	Marks	Partial Marks
4(c)	$their \frac{\cos x}{1+\sin x} = \frac{\sin x}{\cos x}$	**M1**	replace $\tan x$ with $\frac{\sin x}{\cos x}$
	use $\cos^2 x = 1 - \sin^2 x$ $\left(2\sin^2 x + \sin x - 1 = 0\right)$	**M1**	earned when equation reduced to a quadratic in sin*x*
	$(2\sin x - 1)(\sin x + 1) = 0$	**M1**	solve three term quadratic in sin*x*
	$x = \frac{\pi}{6}$	**A1**	or 0.524 or better radians only if M0 M0 M0 and (a) and (b) correct, allow SC2 for tan*x* = $\frac{1}{\sqrt{3}}$, $x = \frac{\pi}{6}$
	$x = \frac{5\pi}{6}$	**A1**	or 2.62 or better radians only A0 if extra solution(s) in range
5	express an equation correctly in powers of 3 or powers of 2	**M1**	
	$x + 2y - 2 = 5$ oe $(x + 2y = 7)$	**A1**	accept unsimpified
	$2x + 1 - 2.5 = 3 + y - 0.5$ oe $(2x - y = 4)$	**A1**	accept unsimplified
	solve correct equations for *x* or *y*	**M1**	
	$x = 3$ and $y = 2$	**A1**	
6(a)	3024	**B1**	
6(b)	24	**B1**	
6(c)	${}^4P_2 \times {}^5P_2$	**M1**	4×3 × 5×4
	240 no isw	**A1**	
6(d)	${}^4P_1 \times {}^8P_3$	**M1**	4 × 8×7×6
	1344 no isw	**A1**	
7(a)	$-x\sin x + \cos x$ isw	**B2**	accept unsimplified if incorrect allow B1 for $\frac{d}{dx}(\cos x) = -\sin x$ clearly seen

Question	Answer	Marks	Partial Marks
7(b)	$x=\pi, y=-\pi$	**B1**	or –3.14 or better
	$x=\pi, \frac{dy}{dx}=-1$	**B1**	from correct $\frac{dy}{dx}$
	gradient of normal =1	**M1**	use $m_1m_2 = -1$ with *their* grad of tangent
	$y=x-2\pi$ cso	**A1**	or $y=x-6.28$ or better fully correct solution
7(c)	$\int their(a)=x\cos x$ $\left(\int -x\sin x+\cos x dx=x\cos x\right)$	**M1**	*
	$\int \cos x dx=\sin x$	**B1**	clearly seen anywhere
	$-x\cos x+\sin x$	**A1**	implies previous marks if (a) is correct
	insert $\frac{\pi}{6}$ into *their* integral	**M1**	*** dep**
	$\frac{1}{2}-\frac{\pi\sqrt{3}}{12}$	**A1**	reject decimals
8(a)	$x^2(y+1)=8$ oe	**B1**	
	$x+2=4y$ oe	**B1**	
	$x^2\left(\frac{x+2}{4}+1\right)=8$	**M1**	eliminate *y* from correct equations
	$x^3+6x^2-32=0$	**A1**	**answer given**
8(b)	$x=2$ or $x=-4$ seen or $(x-2)$ or $(x+4)$ seen	**B1**	
	find quadratic factor	**M1**	x^2 and 16 or long division to $x^2 + kx$ or x^2 and –8 or long division to $x^2 + kx$ not from expanding two linear factors
	$(x^2+8x+16)$ or (x^2+2x-8)	**A1**	
	$(x-2)(x+4)^2$ and $x=2,-4,-4$	**A1**	answer only without working earns B1 above only