Question	Answer	Marks	Guidance
7(a)	$\frac{dy}{dx}=\frac{\left((x+5)\times\frac{3}{2}\times2(2x+1)^{\frac{1}{2}}-(2x+1)^{\frac{3}{2}}\right)}{(x+5)^2}$	**3**	**B1** for $\frac{3}{2}\times2(2x+1)^{\frac{1}{2}}$ oe **M1** for attempt to differentiate a quotient or product **A1** for all terms other than $\frac{3}{2}\times2(2x+1)^{\frac{1}{2}}$ correct
	$\frac{(2x+1)^{\frac{1}{2}}}{(x+5)^2}(x+14)$	**A1**	
7(b)	When $\frac{dy}{dx}=0$, $x=-14$ and $x=-0.5$ but $x\geqslant0$ so no stationary point	**B1**	FT on *their* $(x+14)$
7(c)	$\frac{5\sqrt{3}p}{12}$, $\frac{15\sqrt{3}p}{36}$ or $0.722p$	**2**	**M1** for calculation of $\frac{dy}{dx}$ when $x=1$ and multiplication by p
7(d)	$\frac{25\sqrt{3}}{24}$ or 1.80 oe	**2**	**M1** for multiplication of *their* $\frac{dy}{dx}$ calculated in **(c)** by 2.5, must be numeric
8(a)(i)	17640	**B1**	
8(a)(ii)	Ends in a 5: 2160 or ${}^6P_1\times{}^6P_4$	**B1**	
	Ends in a 0 : 2520 or ${}^7P_1\times{}^6P_4$	**B1**	
	4680	**B1**	
8(a)(iii)	Starts with 85 : 360 Starts with 86 : 360 Starts with 87 : 360 Starts with 89: 360 oe 1440 or $4\times{}^6P_4$	**B1**	
	Starts with 9 : 2520 or ${}^7P_5$	**B1**	
	3960	**B1**	

Question	Answer	Marks	Guidance
8(b)	With brothers : 126 or ${}^{9}C_{5}$	**B1**	
	Without brothers : 9 or ${}^{9}C_{8}$	**B1**	
	135	**B1**	
9(a)	$\sin^2\left(2\phi-\frac{\pi}{3}\right)=\frac{3}{4}$ soi	**B1**	
	$\phi=\frac{\pi}{3},\ \frac{\pi}{2},\ \frac{5\pi}{6}$	**3**	**M1** for a correct method of solution, may be implied by one correct solution. **A1** for a second correct solution **A1** for a third correct solution and no extra solutions within the range
9(b)	$\cot^2\theta=\frac{1}{y+1}$	**B1**	
	Attempt to use $\cot^2\theta+1=\text{cosec}^2\theta$	**M1**	For attempt to eliminate θ
	$y=\frac{1}{2x-2}-1$ oe	**2**	**Dep M1** for attempt to rearrange to obtain the required form
	Alternative $\frac{1}{\sin^2\theta}=2x-1$ **and** $y+1=\frac{\sin^2\theta}{\cos^2\theta}$	**(B1)**	
	$y+1=\frac{\frac{1}{2x-1}}{1-\frac{1}{2x-1}}$ oe	**(M1)**	For attempt to eliminate θ
	$y=\frac{1}{2x-2}-1$ oe	**(2)**	**Dep M1** for attempt to rearrange to obtain the required form
10(a)	$\frac{6(x+1)^2+4(2+3x)-2(2+3x)(x+1)}{(2+3x)(x+1)^2}$	**M1**	For dealing with the fractions, allow an extra $(x+1)$ in each of the terms in the numerator and in the denominator Allow one sign error
	$\frac{(14x+10)}{(2x+3)(x+1)^2}$	**A1**	**AG** - Must have sufficient evidence of expansion and simplification to obtain the given answer