Question	Answer	Marks	Partial Marks
4(a)(iii)	Starting with 8: $1\times4\times3\times2\times1=24$	**B1**	
	Starting with 3, 5 or 7: $3\times4\times3\times2\times2=144$	**M1**	May be considering each case separately, need all three cases for M1
		A1	
	Total = 168	**A1**	
4(a)(iii)	**Alternative** Plan for adding numbers ending in 2 and numbers ending in 8	**M1**	
	Ending in 2: $\left(\frac{1}{6}\times720\right)\times\frac{4}{5}=96$	**B1**	Allow unsimplified
	Ending in 8: $\left(\frac{1}{6}\times720\right)\times\frac{3}{5}=72$	**B1**	Allow unsimplified
	Total = 168	**A1**	
4(b)	${}^{n}C_{3}=6\,{}^{n}C_{2}$	**B1**	$\frac{n(n-1)(n-2)}{3!}$
	$\frac{n(n-1)(n-2)}{3!}=\frac{6n(n-1)}{2!}$	**B1**	$\frac{6n(n-1)}{2!}$
	$n(n-1)\left[(n-2)-18\right]=0$	**M1**	Valid attempt to solve, must have at least one previous B mark
	$n=20$	**A1**	
4(b)	**Alternative** ${}^{n}C_{3}=6\,{}^{n}C_{2}$ $(n-2)!2!=(n-3)!3!$	**B1**	For dealing with $(n-2)!$ and $(n-3)!$ to obtain $(n-2)$
	$(n-2)=6\times3$	**B1**	For dealing with 2! and 3! To obtain 6
	$n=20$	**M1**	Valid attempt to solve, must have at least one previous B mark
		A1	
5(a)	f > 9	**B1**	Allow *y* but not *x*
5(b)	It is a one-one function because of the restricted domain	**B1**	

Question	Answer	Marks	Partial Marks
5(c)	$x=(2y+3)^2$ or equivalent	**M1**	For a correct attempt to find the inverse
	$y=\frac{\sqrt{x}-3}{2}$	**M1**	For correct rearrangement
	$\mathrm{f}^{-1}=\frac{\sqrt{x}-3}{2}$	**A1**	Must have correct notation
5(d)	$x>9$	**B1**	**FT** on *their* (a)
5(e)	$\mathrm{f}(\ln(x+4))=49$	**M1**	For correct order
	$(2\ln(x+4)+3)^2=49$ $\ln(x+4)=2$	**M1**	For correct attempt to solve, dep on previous M mark, as far as $x=$
	$x=\mathrm{e}^2-4$	**A1**	
6(a)	$A\left(-\frac{5}{2},\ 0\right)$	**B1**	
	$x(-5-2x)+3=0$ $2x^2+5x-3=0$ $(2x-1)(x+3)=0$	**M1**	For attempt to eliminate one variable, obtain a 3-term quadratic equation = 0 and attempt to solve
	$B\left(\frac{1}{2},\ -6\right)$	**A1**	Allow A1 if just the x-coordinates or just the y-coordinates are given
6(b)	Area of triangle $=\frac{1}{2}\left(\frac{5}{2}+\frac{1}{2}\right)\times 6$, $=9$	**M1**	For attempt at triangle using *their* values
	$\int_{\frac{1}{2}}^{1}-\frac{3}{x}\mathrm{d}x=\left[-3\ln x\right]_{\frac{1}{2}}^{1}$	**M1**	For attempt to integrate, must have ln
	$=3\ln\frac{1}{2}$	**M1**	correct application of limits, dep on previous M mark
	$=-3\ln 2$	**M1**	realisation that value of integral is negative and making the adjustment
		M1	application of log law, dep on previous M mark
	Area $=9+\ln 8$	**A1**	