Question	Answer	Marks	Guidance
6(b)	$y=\left(3+\sqrt{5}\right)\left(3\sqrt{5}-5\right)^2$ $-8\sqrt{5}\left(3\sqrt{5}-5\right)+60$ $=\left(3+\sqrt{5}\right)\left(45+25-30\sqrt{5}\right)$ $-120+40\sqrt{5}+60$ $=210+70\sqrt{5}-90\sqrt{5}-150$ $-120+40\sqrt{5}+60$	**M1**	For substitution of *their x* and simplification with sufficient detail to imply no use of a calculator. Allow one numerical slip or sign error in the expansion of $\left(3+\sqrt{5}\right)\left(3\sqrt{5}-5\right)^2$ or one sign error in the other terms.
	$=20\sqrt{5}$	**2**	**A1** for all non surd terms = 0 **A1** for $20\sqrt{5}$
7(a)(i)	20160	**B1**	
7(a)(ii)	7200	**2**	**B1** for ${}^6\mathrm{P}_4$ or $6\times5\times4\times3\left(=360\right)$ for 'inner' characters or ${}^5\mathrm{P}_2$ or $4\times5\left(=20\right)$ for 'outer' characters Must be part of a product
7(a)(iii)	360	**2**	**B1** for ${}^3\mathrm{P}_3$ or 3! or 6 for arrangements of symbols or ${}^5\mathrm{P}_3$ or $5\times4\times3$ (= 60) for the digits Must be part of a product
7(b)	$\frac{n!}{(n-5)!5!}=\frac{6(n-1)!}{((n-1)-4)!4!}$	**B1**	May be implied by simplification e.g. $\frac{n!}{5!}=6\frac{(n-1)!}{4!}$ or $\frac{n(n-1)(n-2)(n-3)(n-4)}{5!}$ $=\frac{6(n-1)(n-2)(n-3)(n-4)}{4!}$
	Simplification of either the numerical factorials or the algebraic factorials	**M1**	
	$n=30$	**A1**	

Question	Answer	Marks	Guidance
8(a)	$\lg y = b\lg x + \lg A$	**B1**	May be implied by subsequent work
	$4.37 = 5.36b + \lg A$ $0.57 = 0.61b + \lg A$	**M1**	For at least one correct equation
	$b = 0.8$	**A1**	
	$\lg A = k \quad (0.082)$ $A = 10^k$	**M1**	**Dep** for substitution to obtain $\lg A = k$ and hence A
	$A = 1.21$	**A1**	
	Alternative 1 $\lg y = b\lg x + \lg A$	**(B1)**	May be implied by subsequent work
	Gradient = $\dfrac{4.37 - 0.57}{5.36 - 0.61}$	**(M1)**	
	$b = 0.8$	**(A1)**	
	$\lg A = k \quad (0.082)$ $A = 10^k$	**(M1)**	**Dep** for substitution into a correct equation to obtain $\lg A = k$ and hence A
	$A = 1.21$	**(A1)**	
	Alternative 2 $10^{4.37} = A \times 10^{5.36b}$ or $10^{0.57} = A \times 10^{0.61b}$	**(B1)**	
	$3.8 = 4.75b$	**(M1)**	For eliminating A correctly Must have B1.
	$b = 0.8$	**(A1)**	
	$A = 10^{4.37 - (5.36 \times (their b))}$ oe	**(M1)**	For a correct attempt to find A. Must have B1
	$A = 1.21$	**(A1)**	
8(b)	$y = 1.21(3)^{0.8}$ or $\lg y = 0.8\lg 3 + 0.082$	**B1**	**FT** for substitution into *their* equation
	y = awrt 2.9	**B1**	
8(c)	$3 = 1.21x^{0.8}$ or $\lg 3 = 0.8\lg x + 0.082$	**B1**	**FT** for substitution into *their* equation
	x = awrt 3.1	**B1**	