1(a)	$2n^2(n+1)^2+2n(n+1)(2n+1)+2n(n+1)+3n$
	$=2n^4+8n^3+10n^2+7n$
1(b)	$\dfrac{1}{r^4}-\dfrac{1}{(r+1)^4}=\dfrac{(r+1)^4-r^4}{r^4(r+1)^4}=\dfrac{r^4+4r^3+6r^2+4r+1-r^4}{r^4(r+1)^4}=\dfrac{4r^3+6r^2+4r+1}{r^4(r+1)^4}$
	$\displaystyle\sum_{r=1}^{n}\frac{4r^3+6r^2+4r+1}{r^4(r+1)^4}=\sum_{r=1}^{n}\left(\frac{1}{r^4}-\frac{1}{(r+1)^4}\right)$ $=1-\dfrac{1}{2^4}+\dfrac{1}{2^4}-\dfrac{1}{3^4}+\ldots+\dfrac{1}{n^4}-\dfrac{1}{(n+1)^4}$
	$=1-\dfrac{1}{(n+1)^4}$
1(c)	1

1(a)	$\sum_{r=1}^{n}\left(r^3-r\right)=\frac{1}{4}n^2(n+1)^2-\frac{1}{2}n(n+1)$
	$=\frac{1}{4}n(n+1)(n-1)(n+2)$
1(b)	$\frac{r+3}{r^3-r}=\frac{2}{r-1}-\frac{3}{r}+\frac{1}{r+1}$
	$\sum_{r=2}^{n}\frac{r+3}{(r-1)r(r+1)}=\quad 2f(1)-3f(2)+f(3)$ $+2f(2)-3f(3)+f(4)$ $+2f(3)-3f(4)+f(5)$ $\vdots$ $+2f(n-2)-3f(n-1)+f(n)$ $+2f(n-1)-3f(n)+f(n+1)$
	$=\frac{3}{2}-\frac{2}{n}+\frac{1}{n+1}$
1(c)	$\frac{3}{2}$

3(a)	$\sum_{r=1}^{n}\left(r^3+6r^2+11r+6\right)=\frac{1}{4}n^2(n+1)^2+n(n+1)(2n+1)+\frac{11}{2}n(n+1)+6n$
	$=\frac{1}{4}n\left(n^3+10n^2+35n+50\right)$
3(b)	$\frac{2}{(r+1)(r+2)(r+3)}=\frac{1}{r+1}-\frac{2}{r+2}+\frac{1}{r+3}$
	$\sum_{r=1}^{n}\frac{2}{(r+1)(r+2)(r+3)}= f(1)-2f(2)+f(3)$ $+f(2)-2f(3)+f(4)$ $+f(3)-2f(4)+f(5)$ $\vdots$ $+f(n-1)-2f(n)+f(n+1)$ $+f(n)-2f(n+1)+f(n+2)$
	$=\frac{1}{6}-\frac{1}{n+2}+\frac{1}{n+3}$
3(c)	$\frac{1}{6}$

1(a)	$(2-3r)(5-3r)=9r^2-21r+10$
	$9\left(\frac{1}{6}n(n+1)(2n+1)\right)-21\left(\frac{1}{2}n(n+1)\right)+10n$
	$=3n^3-6n^2+n$
1(b)	$\dfrac{1}{(2-3r)(5-3r)}=\dfrac{1}{3}\left(\dfrac{1}{2-3r}-\dfrac{1}{5-3r}\right)$
	$\displaystyle\sum_{r=1}^{n}\frac{1}{(2-3r)(5-3r)}=\frac{1}{3}\left(\frac{1}{-1}-\frac{1}{2}\right)+\frac{1}{3}\left(\frac{1}{-4}-\frac{1}{-1}\right)+\frac{1}{3}\left(\frac{1}{-7}-\frac{1}{-4}\right)+\ldots+\frac{1}{3}\left(\frac{1}{2-3n}-\frac{1}{5-3n}\right)$
	$=-\dfrac{1}{6}+\dfrac{1}{3(2-3n)}$
1(c)	$\displaystyle\sum_{r=1}^{\infty}\frac{1}{(2-3r)(5-3r)}=-\frac{1}{6}$

4(a)	$w_{r+1}-w_r=(r+1)(r+2)\ldots(r+10)-r(r+1)(r+2)\ldots(r+9)$
	$(r+1)(r+2)\ldots(r+9)(r+10-r)=10(r+1)(r+2)\ldots(r+9)$
4(b)	$\frac{1}{10}(w_2-w_1)+\frac{1}{10}(w_3-w_2)+\ldots+\frac{1}{10}(w_{n+1}-w_n)$
	$=\frac{1}{10}(w_{n+1}-w_1)=\frac{1}{10}(n+1)(n+2)\ldots(n+10)-\frac{10!}{10}=\frac{1}{10}(n+1)(n+2)\ldots(n+10)-9!$

4(c)	$v_1 + v_2 + \ldots + v_n = x^{w_2} - x^{w_1} + x^{w_3} - x^{w_2} + \ldots + x^{w_{n+1}} - x^{w_n} = x^{w_{n+1}} - x^{w_1}$
	For $-1 < x < 1$, sum to infinity is $-x^{w_1} = -x^{10!}$
	For $x = \pm 1$, sum to infinity is 0.