1210.

а) $\lim\limits_{n\to\infty} \dfrac{(n+1)^3-(n-1)^3}{(n+1)^2+(n-1)^2} = \lim\limits_{n\to\infty} \dfrac{n^3+3n^2+3n+1-n^3+3n^2-3n+1}{n^2+2n+1+n^2-2n+1} = \lim\limits_{n\to\infty} \dfrac{6n^2+2}{2n^2+2} \div \dfrac{n^2}{n^2} = \lim\limits_{n\to\infty} \dfrac{6+2\cdot\frac{1}{n^2}}{2+2\cdot\frac{1}{n^2}} = \lim\limits_{n\to\infty} \dfrac{6+2\cdot 0}{2+2\cdot 0} = 3$

б) $\lim\limits_{n\to\infty}\left(\dfrac{2n^2}{2n+3} + \dfrac{1-3n^3}{3n^2+1}\right) = \lim\limits_{n\to\infty} \dfrac{6n^4+2n^2+2n+3-6n^4-9n^3}{6n^3+2n+9n^2+3} = \lim\limits_{n\to\infty} \dfrac{-9n^3+2n^2+2n+3}{6n^3+9n^2+2n+3} \div \dfrac{n^3}{n^3} = \lim\limits_{n\to\infty} \dfrac{-9+2\cdot\frac{1}{n}+2\cdot\frac{1}{n^2}+3\cdot\frac{1}{n^3}}{6+9\cdot\frac{1}{n}+2\cdot\frac{1}{n^2}+3\cdot\frac{1}{n^3}} = \lim\limits_{n\to\infty} \dfrac{-9+2\cdot 0+2\cdot 0+3\cdot 0}{6+9\cdot 0+2\cdot 0+3\cdot 0} = -\dfrac{3}{2}$

1213.

б) $\lim\limits_{n\to\infty} \dfrac{(n+2)!-(n+1)!}{(n+3)!} = \lim\limits_{n\to\infty} \dfrac{(n+2)(n+1)!-(n+1)!}{(n+3)(n+2)(n+1)!} = \lim\limits_{n\to\infty} \dfrac{(n+1)!(n+2-1)}{(n+3)(n+2)(n+1)!} = \lim\limits_{n\to\infty} \dfrac{n+1}{n^2+5n+6} \div \dfrac{n^2}{n^2} = \lim\limits_{n\to\infty} \dfrac{\frac{1}{n}+\frac{1}{n^2}}{1+5\cdot\frac{1}{n}+6\cdot\frac{1}{n^2}} = \lim\limits_{n\to\infty} \dfrac{0+0}{1+0+0} = 0$

ђ) $\lim\limits_{n\to\infty}\left(\overbrace{\dfrac{1+5+9+\cdots+(4n-3)}{2(n+1)}}^{Sn=\frac{n}{2}(1+4n-3)=\frac{n}{2}(4n-2)=2n-n^2} - n \right) = \lim\limits_{n\to\infty} \dfrac{2n^2+n-2n^2-2n}{2n+2} = \lim\limits_{n\to\infty} \dfrac{-3n}{2n+2} \div \dfrac{n}{n} = \lim\limits_{n\to\infty} \dfrac{-3}{2+2\cdot\frac{1}{n}} = \lim\limits_{n\to\infty} \dfrac{-3}{2+2\cdot 0} = -\dfrac{3}{2}$