(4.) $\sum_{n=3}^{\infty} \frac{(2n-1)^n}{2^{n-1}\cdot n^n}(x+1)^{2n+1}$

$$\sum_{n=3}^{\infty} \frac{(2n-1)^n}{2^{n-1}}(x+1)^{2n+1} = \sum_{n=3}^{\infty} \frac{(2n-1)^n}{2^n\cdot\frac{1}{2}}(x+1)^{2n}\cdot(x+1) =$$

$$= \sum_{n=3}^{\infty} \frac{(2n-1)^n\cdot\left((x+1)^2\right)^n\cdot(x+1)}{2^n\cdot\frac{1}{2}}$$

$$\underline{\lim_{x\to\infty}\int_3^{\Sigma} \sqrt[x]{\left|\frac{\overbrace{(2x-1)^x\left((x+1)^2\right)^x\cdot(x+1)}^{+}}{\underbrace{2^x\cdot\frac{1}{2}}_{+}}\right|}\,dx} = \lim_{x\to\infty}\int_3^{\Sigma}\frac{(2x-1)\cdot(x+1)^2\cdot\sqrt[x]{x+1}}{2\cdot\frac{1}{\sqrt[x]{2}}}\,dx$$

$$= \lim_{x\to\infty}\int_3^{\Sigma}\frac{(2x^3+3x^2-1)\sqrt[x]{x+1}}{2\cdot\frac{1}{\sqrt[x]{2}}}\,\cancel{dx} = \frac{\sqrt[x]{x+1}\;(2x^3+3x^2-1)}{\sqrt[x]{x+1}\;(2x^3+3x^2-1)}\,dx =$$

$$\left\|\begin{array}{l}(x+1)^2 = x^2+1+2x \\ (x+1)^2\cdot(2x-1) = 2x^3 \cancel{+2x} + 4x^2 - x^2 - 1 \cancel{-2x} = 2x^3+3x^2-1\end{array}\right.$$

$$= \lim_{x\to\infty}\int_3^{\Sigma}\frac{(2x^3+3x^2-1)^2\cdot(x+1)}{\frac{2}{\sqrt[x]{2}}\sqrt[x]{(x+1)}\;\cancel{(2x^3+3x^2-1)}} =$$

$$\lim_{x\to\infty}\int_3^{\Sigma}\sqrt[x]{\left|\frac{(2\cancel{x}-1)^{\cancel{x}}\cdot(x+1)^{2\cancel{x}+1}}{2^{\cancel{x}-1}}\right|}\,dx = \lim_{x\to\infty}\int_3^{\Sigma}\sqrt[x]{\frac{(2x-1)^x\cdot(x+1)^{2x+1}}{2^{x-1}}}\,dx =$$

$$= \lim_{x\to\infty}\int_3^{\Sigma}\frac{(2x-1)\cdot(x+1)^{\frac{2x+1}{x}}}{2^{\frac{x-1}{x}}}\,dx = \lim_{x\to\infty}\int_3^{\Sigma}\frac{(2x-1)(x+1)^{\frac{x}{x}\frac{2+\frac{1}{x}}{1}\to 0}}{2^{\frac{x}{x}\frac{1-\frac{1}{x}\to 0}{1}}}\,dx =$$

$$= \lim_{x\to\infty}\int_3^{\Sigma}\frac{(2x-1)(x+1)^2}{2}\,dx = \frac{1}{2}\;!$$

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