$$\int \mathcal{T} \frac{\langle 4k \rangle!}{2^{4k}} \frac{1}{(2k)!k!} \qquad k! \approx \int \mathcal{T}_{\pi} k \left(\frac{k}{e}\right)^{k}$$

$$= \int \mathcal{T} \frac{1}{2^{4k}} \int \mathcal{T}_{\pi} \frac{1}{\sqrt{4k}} \left(\frac{4k}{e}\right)^{4k} \frac{1}{\sqrt{2\pi}} \left(\frac{e}{2k}\right)^{2k} \frac{1}{\sqrt{2\pi}} \left(\frac{e}{k}\right)^{k}$$

$$= \int \mathcal{T} \frac{1}{2^{4k}} \frac{1}{2^{4k}} \int \frac{4k}{2^{4k}} \frac{1}{\sqrt{2k}} \frac{2k+k-4k}{\sqrt{k}} \frac{4k-2k-k}{\sqrt{2k}} \frac{4k}{2^{2k}}$$

$$= \int \mathcal{T} \frac{1}{\sqrt{2\pi}} \frac{1}{2^{4k}} \int \frac{4k}{2^{2k}} \frac{1}{\sqrt{k}} \frac{e^{2k+k-4k}}{\sqrt{k}} \frac{4k-2k-k}{\sqrt{k}} \frac{4k}{2^{2k}}$$

$$\frac{1}{\sqrt{2k}} = \frac{1}{2^{4k}} \int_{-2k}^{4k} \int_{-2k}^{2k} e^{2k+k-4k} \int_{-2k}^{4k-2k-k} e^{4k-2k} \int_{-2k}^{4k} e^{2k+k-4k} \int_{-2k}^{4k-2k-k} e^{2k+k-4k} \int_{-2k}^{4k-2k-k} e^{2k+k-4k} \int_{-2k}^{4k-2k-k} e^{2k+k-4k} \int_{-2k}^{4k-2k-k} e^{2k+k-4k} \int_{-2k}^{4k-2k-k} e^{2k+k-4k} \int_{-2k-k}^{4k-2k-k} e^{2k+k-k} \int_{-2k-k}^{4k-2k-k} e^{2k+k-k} \int_{-2k-k}^{4k-2k-k} e^{2k+k-k} \int_{-2k-k}^{4k-2k-k} e^{2k+k-k} \int_{-2k-k}^{4k-2k-k} e^{2k+k-k} \int_{-2k-k}^{4k-k} e^{2k+k-k} \int_{-2k-k}$$

$$= \frac{1}{2\pi u} \int_{\mathbb{R}}^{1} e^{k} k^{k} 2^{6k}$$

$$= 4^{k} \int_{\mathbb{R}}^{1} \left(\frac{k}{e}\right)^{k} = \frac{1}{\sqrt{2\pi}} 4^{k} \int_{\mathbb{R}}^{1} k! = \int_{\mathbb{R}}^{1} 4^{k} (k-1)!$$