$$P_{\text{cp}} = 1 - \frac{1}{\sqrt{2\pi}} \int_0^{\infty} (1 - 2Q(x))^{n-1} \exp\left(-\frac{(x - \sqrt{2\gamma})^2}{2} \right) dx \tag{4}$$

$$= Q(\sqrt{2\gamma}) + \frac{\sqrt{2}}{\sqrt{\pi}} \int_0^{\infty} Q(x) \exp\left(-\frac{(x - \sqrt{2\gamma})^2}{2} \right) \cdot \sum_{i=0}^{n-2} \binom{n-1}{i+1} (-2Q(x))^i dx, \tag{5}$$