$$E\Big(\prod_{x_j\in\Phi} g(x_j)\Big) = E\Big(\lim \prod g_n(x_j)\Big) = \lim \underline{E\Big(\prod g_n(x_j)\Big)}$$

$$= \lim_{n\to\infty} \exp\Big\{-\sum_{i=0}^{n-1}\Big(1-\frac{i}{n}\Big)\cdot \Big|\{x ; \frac{i}{n} \le g(x) < \frac{i+1}{n}\}\Big| \quad —① $$

$$\{x ; \frac{i}{n} \le g(x) < \frac{i+1}{n}\} = C_i$$

$=$

一方、$\displaystyle\int_{-\infty}^{\infty}(1-g(x))\,dx = \int_{\bigcup_{i=0}^{n-1} C_i}(1-g(x))\,dx = \sum_{i=0}^{n-1}\int_{C_i}(1-g(x))\,dx = \sum_{i=0}^{n-1}$

$$\int_{-\infty}^{\infty}(1-g(x))\,dx = \lim\int_{-\infty}^{\infty}(1-g_n(x))\,dx = \lim\sum_{i=0}^{n-1}\int_{C_i}(1-\underbrace{g_n(x)}_{=\frac{i}{n}})\,dx$$

$$= \lim\sum_{i=0}^{n-1}\Big(1-\frac{i}{n}\Big)\underbrace{\int_{C_i} 1\,dx}_{=|C_i|} \quad —②$$

①,②より

$$E(\text{〃}) = \exp\Big\{-\int_{-\infty}^{\infty}(1-g(x))\,dx\Big\}$$