[nex16] **Moments and cumulants of the Poisson distribution.**

Calculate the generating function $G(z) \equiv \langle z^n \rangle$ and the characteristic function $\Phi(k) \equiv \langle e^{ikn} \rangle$ for the Poisson distribution

$$P(n) = \frac{a^n}{n!} e^{-a}, \quad n = 0, 1, 2, \ldots$$

From $\Phi(k)$ calculate the cumulants $\langle\langle n^m \rangle\rangle$. From $G(z)$ calculate the factorial moments $\langle n^m \rangle_f$ and the factorial cumulants $\langle\langle n^m \rangle\rangle_f$.