HW 1.8: Series, ratio test

Apply the ratio test (possibly in combination with other tests) and state your conclusion about convergence.

1. \( \sum_{n=1}^{\infty} \frac{n!}{n^n} \)
2. \( \sum_{n=0}^{\infty} \frac{1}{n!} \)
3. \( \sum_{n=0}^{\infty} \frac{2^{n^2}}{n!} \)
4. \( \sum_{n=1}^{\infty} \frac{10^n}{n^{10}} \)
5. \( \sum_{n=1}^{\infty} \frac{(2n)!}{(n!)^2} \)

6. Why does the ratio test work well on the above series?