Math 1552, Integral Calculus

Sections 10.5: Ratio and Root Tests

Determine whether the following series converge or diverge. Justify your answers using any of the tests we discussed in class.

(1)

$$\sum_{k=1}^{\infty} \frac{(2k)^k}{k!}$$

(2)

$$\sum_{k=1}^{\infty} \left(\frac{k}{k+1} \right)^{2k^2}$$

(3)

$$\sum_{n=1}^{\infty} \frac{1 \cdot 3 \cdot 5 \cdot \ldots \cdot (2n-1)}{4^n 2^n n!}$$

(4) Suppose $r > 0$. Find the values of r, if any, for which $\sum_{k=1}^{\infty} \frac{r^k}{k^r}$ converges.