

Section 11.6 Solutions

math 31

$$2. \sum_{n=1}^{\infty} \frac{(-2)^n}{n^2}$$

$$\text{Ratio Test: } \lim_{n \rightarrow \infty} \left| \frac{2^{n+1}}{(n+1)^2} \cdot \frac{n^2}{2^n} \right| = 2 \lim_{n \rightarrow \infty} \left(\frac{n}{n+1} \right)^2 = 2 > 1$$

 $\therefore$ series diverges

$$6. \sum_{n=0}^{\infty} \frac{(-3)^n}{(2n+1)!}$$

$$\text{Ratio Test: } \lim_{n \rightarrow \infty} \left| \frac{3^{n+1}}{(2(n+1)+1)!} \cdot \frac{(2n+1)!}{3^n} \right| = 3 \lim_{n \rightarrow \infty} \frac{(2n+1)!}{(2n+3)(2n+2)(2n+1)!}$$

$$= 3 \lim_{n \rightarrow \infty} \frac{1}{(2n+3)(2n+2)} = 0 < 1$$

 $\therefore$ series converges absolutely

$$8. \sum_{n=1}^{\infty} \frac{n!}{100^n}$$

$$\text{Ratio Test: } \lim_{n \rightarrow \infty} \left| \frac{(n+1)!}{100^{n+1}} \cdot \frac{100^n}{n!} \right| = \frac{1}{100} \lim_{n \rightarrow \infty} (n+1) = \infty > 1$$

 $\therefore$ series diverges