2) Find the radius and the interval of convergence for the power series.

$$\sum_{n=0}^{\infty} \frac{3^n x^{2n}}{(2n)!}$$

Use the ratio test to find the radius of convergence.

$$\lim_{n \to \infty} \left| \frac{3^{n+1} x^{2(n+1)}}{(2(n+1))!} \cdot \frac{(2n)!}{3^n x^{2n}} \right|$$

$$= \lim_{n \to \infty} \left| \frac{3^{n+1} x^{2n+2} (2n)!}{(2n+2)(2n+1)(2n)! \; 3^n x^{2n}} \right| = \lim_{n \to \infty} \left| \frac{3 x^2}{(2n+2)(2n+1)} \right| = 0$$

$$\text{Thus} \quad R = \infty \qquad \text{and} \quad I = (-\infty, \infty)$$